Universal Design for Learning Textbook for students with and without disabilties – Systematizing the design and development process.

The Paraguay Experience.

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INTRODUCTION

This document aims at recording the process carried out in Paraguay during the initiative for the development of **Accesible Digital Textbooks in Universal Design for Learning** (UDL) **for students with and without disabilties.** It captures the point of view of different actors, both from the Ministry of Education and Science's technical team as well as the participating schools' teachers and principals.

In the first part we find the general proposal's development, background and activities.

In the second part we find the systematization itself which aims at briefly describing the development process of the UDL digital textbook's prototype, made by a multidisciplinary team – all technical professionals from different General Departments from the Ministry of Education and Science (MEC), National Secretariat for Human Rights Protection of Persons with Disabilities (SENADIS) and from the Planning Technical Secretariat (STP)'s Relay Center.

From the voices of technical participants, **what was most valued during this process -**apart from the great collective learning process on UDL- was the multidisciplinary team's work and the inter-institutional and intra-institutional articulation that everyone points as a necessary aspect towards the success of such a project.

The process took place in 2019, in the systematization it can be noted that the team went through several decision making stages that contributed to personal, group, professional and institutional growth.

The results reached during this period have fulfilled the team's expectations, they have also identified challenges and possibilities for action to overcome the difficulties found, proposing guidelines to continue with this experience during 2020.

It is also worth mentioning the involvement from authorities from institutions supporting the work and achievement of these goals.

The material's development process was completed by a total of **15 professionals** and many others who participated in specific moments contributing their knowledge and experience in the field of education and technologies.

For the development team members, taking the **pilot** to girls and boys in schools to try out the prototype was the milestone experience, since it made it possible to realise that the UDL approach reflected in the guide is an extremely valuable tool necessary to make education and learning more accesible to children with disabilities and to those who do not face barriers to participation and learning.

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I. PROJECT BACKGROUND

The State of the World's Children report (UNICEF, 2013) indicates that 80% of 93 million children living with disabilities in the world live in developing countries and it is likely that he/she is one of the poorest members of the population and is deprived of basic rights. Children with disabilities are disproportionately represented among children not attending school and it is estimated that one every three children in street situation has a disability.

In Paraguay, the 2012 Census' preliminary data states that 11.4% of the population has some kind of disability (STP / DGEEC, 2012). A JICA study (2011) indicates that 19% of Paraguay's population of all ages have a disability; 14% are children and adolescents. Bearing in mind this data and regional trends, it is suspected that there is a 12% of people with disabilities.

Estimations based on educational statistics indicate that the population with disabilities enrolled in some level of education in any of the educational institutions (no matter the type of education) is 8.032 people. We can come to the conclusion that no more than 1% of persons with disabilities are in the educational system, both in regular education as well as in special services or institutions. (MEC, 2015 and Global baseline/Save the children, 2015).

These differences regarding children with disabilities, imply that the way we look at them and what it is expected from them in terms of development and education is still very much related to discrimination. They are judged and defined by their defects rather than by their capabilities, they are often invisible to the system and, therefore, they are systematically denied of their individuality, dignity and right to life.

In Paraguay there is a legal frame[1] and a favorable environment for the full development of people with disabilities' rights; however, implementation practices are not sufficient. Whatsmore, the country doesn't have the budget allocation for implementing the recent legislation and this has an immediat impact in the access, permanence and promotion in education of children and adolescents with disabilities. It is a challenge for the government to develop public policies that would allow to put in place and guarantee a cultural change in the educational system. Changing the cultural paradigm through the educational system means moving towards a social rights based model ("inclusive education"). (Brizuela, 2018)

In this context, it is necessary to strengthen research about disability from a social rights' perspective, as well as data collection and analysis that will lead to designing better public policies. Inclusive education is no doubt one of the most important challenges faced by schools and teachers today.

Apart from these specific laws related to inclusive education, over the last decade, other international agreements have been ratified, such as Act 5362 / 2014, that ratifies the Marrakech Treaty. (Annex I)

National laws and regulations

[1] Graph on page 7: national plans and laws guaranteeing educational rights in Paraguay.

- ✓ National Constitution:
  - On Art. 73 on the Right to Education and its objectives, it is established that every person has the right to comprehensive lifelong education, and that as a system and process it takes place in the context of the community's culture.
  - On Art. 75 on Educational Responsibility: education is the responsibility of the entire society.
  - On Art. 76 on State Obligations

- ✓ General Education Act (1.264/98), establishes State's responsibility in guaranteeing the right to learn and equal opportunities, real equal opportunities (Art. 3 y 4).
- ✓ Educators Act (N° 1.725/2001).
- ✓ In 1990 the Convention on the Rights of Children was signed.
- ✓ Childhoood and Adolescence Code (Act 1.680/2001).
- ✓ In 2008 the Convention on the Rights of Persons with disabilities (CRPD) code and its Optional Protocol were ratified.
- ✓ Act 4720/12, creation of the National Secretariat for Human Rights Protection of Persons with Disabilities (SENADIS), as governing body responsible for guaranteeing the implementation of the Convention on the Rights of Persons with disabilities (CRPD) and the rights' approach.
- ✓ In December 2013, Congress approved the Inclusive Education Act (N° 5136/13). In January 2015 it was regulated. This law is now in a progressive implementation process.
- ✓ National Education Plan 2024.
- ✓ National Development Plan 2030.
- ✓ Education Agenda 2013 – 2018.
- ✓ Policy for ICT inclusion to the Paraguayan Educational System.

Taking into account MEC's efforts in all the actions it leads towards strengthening inclusive education (among them, training and educating teachers and technicians) United Nations Children's Fund (UNICEF), supported this goal through **technical assistance to the country for the design of educational material in universal design**.

Technology and innovation + cross-sector approach = the strategy's cornerstones.

UNICEF's Paraguay team is convinced discrimination and prejudice can only be eliminated by educating children and adolescents about their basic human rights. This is why we need to raise awareness about the richness of diversity and acknowledge multiculturalism when building a society from a gender and non-discrimination perspective. In the next 3 years (2017 - 2019), Unicef's Paraguay country office emphasized the implementation of the right to education for children and adolescents with disabilities (Unicef, 2018).

The strategy was developed according to the following aspects:

- **Advocacy.** Destined to strengthen cooperation with the Ministry of Education (MEC), as well as with the National Secretariat for Human Rights Protection of Persons with Disabilities (SENADIS) in order to influence policies and programs destined to improve the situation of children with disabilities.
- **South-South Cooperation.** Strengthen horizontal cooperation with the region's countries, particularly those of the Southern Cone. Support the country's education strategic agenda as well as sucessful experiences in order to reach goals without recurring to international exchanges or cooperation.
- **Innovation.** Through technology and new teaching methods, supporting an inclusive education's effective implementation model.
- **Communication.** Each one of the country office's publications incorporated all available inclusive tools.

In this way, Unicef proposed **3 components** for actions in the sector. They are explained below as context information:

i. Awareness Sessions on Universal Design for Language and Accesibility

SENADIS -as a public policy governing body- through the use of specific strategies based on a UNICEF developed ***communication package to raise awareness on children and adolescents with disabilities centered on an inclusive teaching system***, supported a cultural change that aims at advocating the shift from a medical assistive ("special education and services for persons with disabilities") to a social rights based model ("inclusive approach services that give attention FROM and FOR diversity").

These awareness lines were shared in spaces -where at present SENADIS has service units- where four-hour workshops have been organized that promoted the following **specific goals**:

1- Promote the *human rights and accesibility* concept presented in the National Action Plan for the Rights of Persons with Disabilities.
2- Exchanging *experiences with local actors* in relation to the subject of UDL (Universal Design for Learning) in teaching contexts (formal and informal).
3- Make people know about the country's **accessible textbook** experience through video stories and the **printed textbooks' accessibility guide**.

ii. Inclusion stories: photo reportage about children and adolescents with disabilities

Based on the work carried out by Unicef's Paraguay Country Office on the development of the inclusive printed textbooks' prototype, the opportunity arose to portray the reality of children and adolescents with and without disabilities in their schools. In the life story of 3 people, the Country Office found a way to show what "real" inclusion means from the perspective of children and adolescents with disabilities in the region, and that of their families, schools and communities.

To that end, the UNICEF Office for Latin America and the Caribbean chose Brian Sokol: highly qualified, laureate photo journalist that has earned prizes and international acclaim.

The objective is to develop an advocacy tool for the region and complement the disability agenda in Paraguay, to promote children and adolescents with and without disabilities' rights to play and learn together in a safe and inclusive environment.

This work is reflected in an information package on disability with three (3) communication materials that portray three graphic stories[2]: Samira's, Tobías's and Arturo's -communicating messages on the inclusion of children and adolescents with disabilities in the school and family environment.

iii. Printed textbook adaptation into UDL digital textbook

"Accessible Universal Design digital textbooks for students with and without disabilities" is a project generated by Unicef that began in 2014 -springing from several consultations and workshops carried out with the participation of representatives from Argentina, Brazil, Paraguay, United States, India and Kenya.

As a result, a **Basic Guide** was elaborated (Annex III) where indications to adapt a printed textbook applying universal design concepts can be found.

Representatives from Paraguay took part in different regional workshops and brought back the projects' proposal to begin the experience to create a textbook based on this guide. A **country diagnostic** was carried out (see **Annex IV)** where the questions asked in order to know the existing policies in the country at that time, as well as previous experiences, etc., are included. It is a question table serving as a baseline to know the country's situation in relation to the accesible textbook project's proposal.

The process applied is the one described in the present systematization, where emphasis will be placed on activities and the process followed based on the basic guide. There is a brief explanation of this guide on the firts item and from then onwards the development of the different phases appears in: "The development of accesible digital textbooks - Roadmap".

[2]The three life stories can be seen in Annex II, with the reminder that the Spanish translation is automatic and can present inadequate expressions and language, from the point of view of a rights' prespective.

II. ACCESSIBLE TEXTBOOK DESIGN

International Guideline for Education Ministries, publishers, technology and content developers, teachers and other implementing parties[3]

An **accessible digital textbook** is a tool allowing all students, with or without disability, to access information in alternative formats.

Digital accessible formats are versatile and allow each user to customize and combine different features as for example: narration, sign language; interactivity; audiodescription of image and other features that adapt to preferences, learning styles or access needs.

The guide's goal, as concieved by the experts, is to explore the intersection between (accessible) technology and (accessible) content adaptation to contribute to improving school results for boys and girls with and without disabilities.

A textbook's **content adaptation** can be described as the pratice of modifying the traditional way in which text and excercises are presented so that they become accessible to persons with different disabilities and learning styles.

Technology development makes it possible to continue advancing in terms of open technical standards in accessible publications, in line with Universal Design for Learning (UDL) and with the user feature requirements. This will also allow parents, teachers and students, to choose, combine and synchronize differente features to obtain specific user customized textbooks.

Developing **accessible contents** based on UDL concept and practices, involves:

- **Using wide typography.** When writing a document wide typography (such as Arial, Helvética or Universal) must be used, instead of narrower types.
- **Keeping a coherent heading structure.** Headings that only change the size or format of typography must be avoided since they could be modified by the user.
- **Add hyperlinks.** Adding hyperlinks facilitates browsing and access to aditional information, provided there's internet connection.
- **Distinguishing between unordered and sequential lists.** Tabulated numbers must be used for sequential lists to show the sequential order. Bullet points must be used for non sequential lists.
- **Separating numbers.** Numbers must be written using periods, brackets and commas as separators in order to avoid screen readers to convert numbers the wrong way.
- **Including a summary if the content includes text and graphics.** Flux diagrams or decision trees can be useful for students with learning difficulties, but using only graphs can be problematic for blind or low vision students.

[3] In Annex III we find the International Guideline used as a base for ADT's adaptation process.

- **Including a glossary.** Definition of key words or new terminology must be included in a glossary.
- **Including the meaning of icons.** When using icons, a clear explanation of their meaning must be included and added to the glossary.

Adapted exercises

- **Including more clues.** Aditional information and descriptions must be included to provide context to the content.
- **Including a consistent format.** Exercises' format must be consistent.
- **Give step-by-step instructions.** Whenever possible, exercises must be presented in individual steps and show only one support material, such as one question and the corresponding answers.
- **Including context for the activities**. Whenever possible, context to an activity must be provided, connecting it to textbook concepts, both before and after the activity, and showing images that support the activity's goal.
- **Using a variety of exercises**. Students should be presented with different ways to understand the content.

Activities that are easier to adapt to accessibility. Examples:

- **True or false:** Deciding if a statement is true or false. There is no other possible answer.
- **Matching exercises**: Pairing one of the elements in the list (definitions for example) with one of the options given in the question.
- **Listening activities:** Identifying a sound and matching it with an element in the image.
- **Classification activities**: Placing images or elements in the proposed (or selected) categories.
- **Memory activities:** Finding a pair of images among the images shown.
- **Spelling activities**: Complete a word chosing among the letters shown.
- **Short answer:** Brief indication demanding a written answer.

Developing **accessible technology** from a UDL perspective[4]

- Including a title for each activity to facilitate browsing
- Including synchronized sign language videos
- Including highlighter
- Interactive feature
- Including text or additional features for complex concepts
- Presenting several ways of classifying

[3] Material with summarized basic UDL concepts and theory can be found in Annex V.

- Including audiodescription of images and screen content
- Use illustrations and symbols to differentiate and separate content and activities

III. THE DEVELOPMENT OF ACCESSIBLE DIGITAL TEXTBOOKS - ROADMAP

The Unicef initiative supported the content adaptation process of one unit from a 1st grade textbook "Leo, Pienso y Aprendo", LPA (I Read, I Think, I Learn, RTL) as well as the necessary digital technology and training so that it follows the Universal Design for Learning (UDL) principles.

In the initial stages, the initiave focuses on the materials specific to the first years of schooling but the **goal is that all learning materials be available in accessible digital format**. It is expected that gradually, these materials be incorporated to the teaching system established by the Ministry of Education as **part of a policy** for all, and that it can be implemented through acquisition or similar processes. In this way, it will be possible to obtain quality sustainable products and a regulated provision of accessible digital textbooks for students with **different learning styles**. (Unicef, 2019)

Based on the **Convention on the Rights of Persons with Disabilities** (CRPD) as support frame , this initiative aims at giving opportunities for education and reincorporation to the formal educational system for all girls and boys, including those that are outside the school system.

1. Methodology proposed in the basic guide

The methodology suggested in "*Guide for Ministries, publishers, content and technology developpers, teachers and implementers*" is the one used as a base for the Paraguay Guide and it is also the base around which this systematization is organized.

PREPRODUCTION: Includes the implementation's first steps aimed at building capacities at local level.

Activities:

1. Identify key partners and create a steering committee;
2. Begin planning and coordinating for a framework's development;
3. Create a multidisciplinary technical team in accordance with UDL principles;
4. Define and analize the technology ecosystem (Epub3);
5. Choose textbooks from the school curriculum;
6. Choose pilot schools/methodology;
7. Implement a one week workshop;

8. Process validation

PRODUCTION: Includes developing and adapting the prototype.

Activities

1. Develop a storyboard
2. Define technical needs
3. Identify technical teams to make each adaptation
4. Define budget for each adaptation
5. Beginning the production phase
6. Agreeing on the content

POSTPRODUCTION: Includes creating production master files, translating them to different accessible formats, quality control and final production.

Activities

1. Design accessible features
2. Create a master file
3. Reach an agreement on textbook design with experts and users
4. Edit accessible content
5. Testing and validation
6. Distributing the textbook
7. Creating a user guide
8. Document the process.

2. Workshop marking the beginning of the process

On February 2019, a "**Workshop on the elaboration of accessible textbooks**" was organized, where local actors linked to the MEC, SENADIS, social and civil organizations and publishers participated.

During this workshop -and in presence of **Mrs. Rosangela Berman Bieler**, Senior Advisor on Children with Disabilities in UNICEF New York [5]- a proposal was introduced to give technical support to appropriate learning content production when adapting the chosen pilot textbooks.

The systematization done during this workshop can be seen in **Annex VI**.

[5] During the workshop the lecturers were: Julie de Barbeyrac, Programm Coordinator, Disability Section, Program Division, UNICEF New York; Pedro Milliet, Accessible Digital Textbook specialist; Cinthia Brizuela, UNICEF Education Representative and Claudia Pacheco, Consultant and specialist on human rights and persons with disabilities.

Group work during the Accessible Textbooks Workshop. Asuncion, 2019

Group work during the Accessible Textbooks Workshop. Asuncion, 2019

3. Key Actors and Stakeholders

Starting by identifying and appraising who would be the main actors to carry forward the process, the initiative aimed at reaching not only duty bearers but also that publisher networks could participate -as they have been doing it during similar experiences in other countries- since printed textbooks are made by those publishers and it is advised that they take part in the process destined

to instauring the UDL proposal when it comes to designing and developing the digital prototypes of the books they sell to the State.

With this goal in mind, below you will find the actors' mapping processs carried out:

Actor	Sector	Role	Level of interest	Level of Power
Ministry of Education and Science (MEC)	Public Sector	Governing Body responsible to execute education public policy.	For	High
National Secretariat for Human Rights Protection of Persons with Disabilities (SENADIS)	Public Sector	Advocating and controlling the necessary measures for the effective fulfilment of public policies for the rights of PwD[6].	For	Medium
Ministry of Childhood and Adolescence (MINNA)	Public Sector	Governing Body responsible to execute public policy on Childhood and Adolescence.	For	Medium
Paraguay Chamber of Books (CAPEL)	Private Sector	Non-profit Trade Association comprising 40 publishing companies, bookstores, book distributors and related organisms.	For	High [7]
Asuncion Chamber of Books	Private Sector	Non-profit association whose goal is to gather all natural or legal persons working in relation with books. (20 members).	For	High [8]
National Council for the Integration of Disabled Persons (CONADIS)	Public and Civil Society Sectors[9]	Guarantee that actions, laws and policies to be implemented in the entire territory of Paraguay answer to the present real needs and vision of the inclusive society to be built.	For	Medium [10]

[6] PwD: Persons with disabilities
[7] As an association, its members have different levels of power.
[8] Idem
[9] Convergence between Civil Society Organizations representing PwD and high representatives from Executive, Departamental and Town Representatives
[10] As an association, its members have different levels of power.

Actors that could be againsst including UDL in teaching materials were not identified. **The general level of interest is perceived as high for all identified actors.**

4. Inclusive education's current situation - Diagnosis

In the following table, apart from stating the regulatory framework previously mentioned in the background, it can also be seen a summary of what initial key actors (authorities, developers and others) shared during a consultation on inclusive education's current situation in Paraguay and on what could be the **main difficulties** in implementing this proposal[11].

1.	Poor infrastructure and budget.
2.	Trying to achieve school inclusion of children with disabilities **without strengthening local support networks** (health, therapeutical, technical networks supporting the process).
3.	**Low income** students do not have access or do not have ICT equipment.
4.	Low **infrastructure** (ICT equipment, internet conexion, classrooms, etc.) and lack of UDL materials.
5.	Initial **teacher training** (inclusive education, use of ICT) and that of technical services on inclusive matters.
6.	In general, **ignorance or misinformation on children's evolution stages**; as a result there is an imbalance in programs and/or activities proposed in great part of the curricula.
7.	Segregated culture still prevails in the educational system as there is **lack of information and udpdating**.
8.	**Wrong ideas** about UDL. In spite of training carried out there is still **poor teacher training when it comes to considering diversity** in students.
9.	Lack of training spaces for MEC professionals on the subject of UDL. **Few training opportunities** for professionals interested in learning about UDL and other current subjects.
10.	Change in authorities **that interrupt processes**, making it difficult to go forward with the projects.
11.	Lack of **implementation of existing regulations** with regards to sign language and inclusion.

Once these data was gathered, the starting point was the supposition that the present initiative could give support to reducing difficulties presented in points: 3, 4, 5, 7, 8, 9 and 11 of this table.

5. Building the technical team

The initiative took place at the MEC's **Directorate General for the Development of Education**. The Directorate was in charge of calling on representatives from other directorates they considered important, for the elaboration of the accessible text, and invited them to work with UNICEF's

[11] Vaccotti, Paola. Consultation from May, 2019

assistance to later assume the responsibility of making decisions with regards to changes in the proposals presented in the guide, based on the actual situation in the MEC.

Technical team's proposal (from the international guide)	**Paraguay's, MEC's and SENADIS' technical teams**
• ME representatives • Group Coordinator • Technical experts/ multidisciplinary teachers, by disability category. • Technology specialists • Lingüists • A DAISY/EPUB 3 technology specialist • Learning and evaluation specialists • Publishers/authors • Users with disabilities • Audiovisual producer, designer, sound engineering and editing experts	2 Directorate General for the Development of Education representatives. 2 Curriculum Directorate's Technical representatives. 2 Directorate General of Inclusive Education representatives. 3 Basic Education's First and Second Cycle Directorate General representatives. 2 Technology and Science Directorate General's technical representatives. 1 Professional Teacher Training Directorate General's technical representative. 1 SENADIS's representatives.

Professionals taking part in the technical team were chosen from an initial profile designed in collaboration with UNICEF. These profiles can be consulted in **Annex VII**.

In order to guarantee work spaces, the decision was taken to define special times for the meetings of the technical team in charge of developping the materials.

5.1. Agreements and leave during work hours

In order for experts' participation to be effective, there were negotiations with the different general directors for the **appropriate agreements and leaves**, so that each designated professional could count with the adequate time to work exclusively on the project.

It must be noted that for some directors working in this project **was a priority** and it contributed to strengthening professionals to assume their responsibilities; but there were cases in which experts mentionned **the need for more support** from directors and co-workers, estimating that it was possibly due to lack of knowledge or the fact that this kind of activity was new to them.

> *"I had no problem, I always had the authorities' support (Chief and Directors)".*

In the MEC and their general directorates there are other projects and actions that already surpass the needs for technical capacities in which the same professionals were involved.

> *"I did not have permision from the authorities to participate in building tasks, in particular on Mondays".*

*“ (*It was difficult), in particular, *to detach myself from my institution’s tasks to fully concentrate in the team’s work ”.*

Technical team’s meeting spaces for the protocol’s development

Undoubtedly, the fact of chosing professionals for the technical team starting from a strictly technical profile linked to the UNICEF guide, made it easier to carry out the tasks for the different phases.

The group’s consolidation was aided by **roll calls**, since there were professionals asigned to this particular activity, that is why it had continuity. This contributed greatly for everyone to know about the processes and to be able to actively participate in them.

5.2. Publishers’ participation in the process

When the work meeting started, the possibility of including publishing association representatives in the team had been raised, but when consulted with the MEC’s technical team and based on experience, **they agreed not to invite them to this stage but instead once the prototype had been**

completed given that this call was destined to presenting the results of the work they were currently carrying out and of the technical specifications and characteristics necessary for future MEC's tenders.

5.3. Specific work days

There were a series of meetings and work sessions with the technical team which included MEC's and SENADIS' officials. The meetings were **eight hours** long and the professional team worked intensively and with great dedication.

These meetings' goals could be achieved thanks to factors such as regular assistance from proffessionals to **coordinate the work they themselves undertook** and to how meaningful it was to count with a person designated by the Directorate General for the Development of Education.

Once the professional team was conformed, Mondays were designated as their work day from the month of June at Dendritas (Coworking), from 08:00 to 15:00. A very important element for the professional team members was to be able to count with a proper work space and the logistics (comprising the room, ICT equipment, connection, food, reach, etc.), making it possible for members to get together for work since their offices in the MEC are far from each other and going from one to another is not a frequent practice.

5.4. Work based on Universal Design for Learning (UDL)

When work started, the team was organized in groups divided by disabilities (visual, hearing, cognitive and motor), after reflecting on the concepts learned about inclusion and UDL, they came to agreements such as the unification of the team where they would work together to contribute from their experiences and specialities. Towards that end, they identified themselves as having two specific characteristics: professionals in charge of the **educational (or content)** aspect and those involved with the **technology** aspect. This way of organizing themselves contributed to making the work a mixture of specializations that made the adaptation of material based on the guide, smooth and efficient.

A professional and team member said: *"Then, we were: … I don't even know how to turn on a computer (…)**. Some of us were useful, others were useless …"** "…**We had to forget what we already knew to learn more...**" "…The un-learning was very difficult".*

Another team member spoke of the value of conforming a team with such diversity and different disciplines:

> "(…) *each one was looking for the better way, and again, learning, there isn't just one way of learning, **there is a lot of diversity**, no matter if a person has low vision, is blind, deaf or has hearing impairments, it is different, **there is no unique way**.* (…) ***I think we tend to stagnate** searching for the way and* (…) *there isn't one unique way, one day we can teach in this way and the next day a child having the same characteristic does not respond to the same material, it means we need to always look for the way, there is not one answer"*.

5.5. Decision making after reflection and debate

In these work spaces, professionals were trained and reached several agreements in order to make decisions on the material to be adapted. **It was a team exercise, really a multidisciplinary effort**, where each one would participate from his/her point of view, approach and area of expertise, they themselves said they learned to unify the criteria and take decisions based on that.

"It was at consensus level*. Because we were all professionals, (…) we had real consensus".*

> *(…) sometimes **vertical structure has accustomed us to expect someone to lead.** To wait for someone to say: now we go to the next item. Because sometimes our opinions…we are just … **we do not have the power to decide**. So that is why sometimes we tend to feel we are less. Why would I say anything if in the end it won't be considered? (..) Why don't you say it? Come on, suggest it! No, what for? Whatever I say it won't make a difference. **But here, we make a difference.***
>
> *The **challenge was every Monday**, we had already agreed on something and… something else would come up.*
>
> *"***We had to go off the beaten track**. (…) ***we should have done this pilot months ago****. And we never got things on time because we viewed and reviewed content for ever".*

5.6. Transfering knowledge to other MEC projects

At the same time they were working on this project, others projects surfaced at the MEC, and since they were internal projects they were also priority to sections and departaments from were the technical group members came; therefore they had the **opportunity to collaborate from the UDL approach** they were being trained on, thus showing the personnal commitment and professionalism they were bringing to these spaces in order to improve teaching quality and facilitate children's access to learning.

This profesional team developed the prototype which is one unit from a first grade book. They met once a week during 4 months and they developed three UDL adapted lessons.

6. Developing skills and technical assistance in digital textbooks: Meetings with Pedro Milliet

Pedro Milliet, digital textbook expert, had a constant exchange with the professional team and gave them great support. Two workshops with his participation were held **in Asuncion,** from **June 25th to 27th (first meeting) and from August 6th to 9th (second meeting).** Everyone participated in two productive days towards building the protocole.

> *One of the important results produced in these meetings was a **work schedule** destined to organize the necessary meetings for the technicians to generate the prototype they had been trained on: a first grade textbook with UDL approach. (UNICEF Consultant, 2019)*

The first meeting had a main product as a result: reviewing the guide according to disability groups and also the first Work Schedule with specific tasks up to the date of the consultant's next visit.

Below, you will find the schedule incluidng dates from activities that had already been carried out as well as planned meetings:

Date	Event and Place	Goal
June 20th	Work meeting (Dendritas)	Reviewing Universal Design for Learning (UDL) concepts
June 25th to 27th	1st Workshop - Pedro Milliet (Quinta Ykuá Satí)	Acquiring tools to build accessible textbooks
Mondays July 8th, 15th and 22nd	Work meeting (Dendritas)	Work on adapting teaching contents and on ICT
Monday July 29th	Work meeting (Dendritas)	Consolidating content
August 7th to 9th	2nd Workshop - Pedro Milliet (Quinta Ykuá Satí)	Reviewing work done over the month and continue training on tools to design accessible textbooks
September	Technical Team	Software development
September 9th, 16th, 23rd and 30th	Work meeting (Dendritas)	Adapting the guide and preparation of indicators for pilot evaluation
October 7th and 14th	Work meeting (Dendritas)	Adapting the guide and preparation of indicators for pilot evaluation
October 16th	Relay Center	Sign Language recording
October 17th	MEC	Handing in Spanish and Guarani off recordings
October 21st	Work meeting (Dendritas)	Share and review software with the incorporation of sign language and off recordings
October 22nd to 28th	Technical Team	Developping software, adjusting details
October 15th	Informative Meeting	Meeting with schools administrators
October 30th	Training	Training pilot schools' teachers and administrators.
November 4th to 13th	Pilot test with children in schools	Try and test software with children.
November 18th to 22nd	Revision and feedback	Review pilot application and suggest adjustments for software and guides.
November 25th onward	Socialization of the exprerience	To be defined with UNICEF and the MEC
December	Handing in the Final Report	

This work schedule was slightly modified during the process.

The technical group members remember **how important it was to make very clear** those criteria and fundamentals on which the decisions were based, since this will help guide the work:

> *It was time to wrap up, there was a time when I had to intervene: ok we need to do this and that and **they didn't like me**. (…). But we needed to wrap it up. **Round and round…** it never ended and hop another round. It wasn't supposed to be like that.*
>
> *It was a bit complicated because … **we didn't know which were the criteria that would take us forward.** Sometimes someone would say: shall we carry on?", or "are we geting back to this again?". When can we say "it's enough?".*

During the second meeting with MIlliet, in August, we were basically talking about the improvements reached by the team regarding developing materials, and decisions were taken on the steps to follow, in some cases, with differences **to what the international guide suggested**.

The International Guide aims at separating by disability, all adaptations made to the text; nevertheless, this experts' group decided to **do it directly by UDL**, that is to say, by accessibility. They no longer speak of intellectual, sensory or motor disability but they **start thinking from a UDL principles perspective**, based on aspects that should be incorporated for a **better understanding**; what aspects to improve for students to remain **motivated** and with different options to answer to exercises the book presents.

This team decided to work based on **learning styles**, and this change was the greatest learning experience of the second workshop.

In order to have the prototype validated by users (teachers and students), the team elaborated a methodological design proposal[12] and the criteria for choosing pilot schools. This proposal can be seen in Annex VIII.

7. The path towards the firts prototype

The technician in charge of technological aspects' coordination explained how they took the decision of using a different format for Paraguay. He said that at the beginning of the process, following the established steps on the international guide, they encountered specific technical issues such as the need to incorporate a programming specialist, which is the base for the digital tool production process.

7.1. Using a different technological format

[12] The methodological design can be seen in Annex VIII. In the sistematization report emphasis was made on the process.

"*The lack of experts in this area resulted in hiring a company that would be in charge of the programming service. This brought about a new frame of work for the team*".

After the meetings held with the company's technicians, reviewing the deadlines for developing the application and analizing the different development options, they took the decision not to use ePub3 and to change to HTML5 with JavaScript format.

"… we chose to build the tool on HTML5 format with JavaScript to obtain different interaction in the activities chosen and defined by the educational team; the technological environment available to do the pilot was also taken into account".

This technician made a point that it was easy to migrate to ePub3 from the already established format.

The technical team members guaranteed accessibility to IT tools.

7.2. Developing the storyboard (model)

Following the proposal in the international guide, a storyboard was developed. It was one of the firts tasks that carried out the technical group, more specifically the design and graphic content specialists. What they did was basically to elaborate a proposal for programming professionals to consider what they need to incorporate and how it must be clearly seen on the screen.

The format chosen by the techniciens is a PPT (PowerPoint) system where they specify how and where each prototype' page design should go, that is to say, it places the content and how each icon or indication must appear. This is how each page is designed.

7.3. MEC's textbook contents for fist grade

After much analysis and debate, the team had moved forward in choosing the book to adapt, they decided it would be a unit from the first grade book “Leo, pienso y aprendo”, LPA (“I Read, I Think and I Learn”, RTL).

In order to move forward with the prototype, they adapted one unit from the book. It is very important to mention that a clarification needed to be made to the technical team so they would not give too much time to a content in-depth discussion since it is a matter of material that is being implemented and the adaptation to be made has to do with accessibility. In this way, the team members had to do the experience of **differentiating curricular content adaptations from UDL adaptations**. When working with UDL we are dealing with instrumental accessibility, it is not a matter of modifying content (programmatic accessibility) but of making the tool accessible.

“It took several meetings to understand the differentiation. They were focused on changing the book’s content and not on adapting the curricula”

*“Because the **content was already there and we wanted to modify the content.** It was a discussion. Then, from wanting to change it we moved to a thousand things*.(…) ***It seems we should have focused more on aiming at our objective rather than thinking about other things**”*

Team work was essential, **they saw themselves putting inclusion principles into practice inside the ream.**

Below is a member’s account of those early moments:

“(during the process) ***there were so many different opinions*** (…) *at the beginning it was like this … and then listening again, put yourself in someone else’s place, and I saw people being **so respectful** of one another, and being able to listen to each other* (…) *it was very difficult at the beginning but since we started making adjustments and reviewing material to be used… it is also a process … among us, we were inclusive because each one of us thought differently, we discussed, we agreed on something, some did not like it … but **we grew together**.*

Team members test ICT tools accessibility.

7.4. Incorporating professional interpreters from the Planning Technical Secretariat (STP)'s Relay Center.

Once there was an agreement on the the content to be adapted and once those contents were finished, came the process of cross-institutional alliance between MEC and the Planning Technical Secretariat (STP) to incorporate professionals from the Relay Center to the developing team since they would be the ones in charge of making the prototype's sign language videos.

Achieveing this kind of joint work was **a great challenge for the team** because they had to comply with institutional demands that did not come easy; for example, there already existed oral agreements on some of the work terms but there was no formal document to make the work effective.

This situation brought about the need for work strategies planned jointly among State institutions, defining actors with whom to interact since the beginning so that it is clear what are each party's objectives, roles and engagement. Advocacy strategies and the time insumed in defining lines of action, set a precedent about the possibilities to improve these processes.

7.5. Paraguay's prototype in Guarani language

An essential characteristic of Paraguay's prototype is that it allows customization of the material in Guarani.

The following account about building that part of the material, is done by the Director General for Professional Teacher Training who took the lead taking into account her expertise in the area and the support from the Directorate authorities she represents:

> *"We started the process reviewing the LPA material but with the unit chosen for Spanish, none of the lessons were in Guarani, and since selection and adjustments of the activities in Spanish had already been done, we could not make changes, so I translated the material into Guarani."*

Once the **translation into Guarani** was finished there came the validation by a jury of experts: Guarani language specialists such as the MEC's Teaching Innovations Director and other specialists in the area. Then the suggested adjustments were introduced and in this way the written production process was completed.

On the following phase, the Guarani written text had to be **converted to audio**, the specialist recalls:

> *"I asked the director from Teaching Innovations to do the necessary management with the MEC's General Director on Communications to record the Guarani audio, who said that at that moment at the MEC it was not possible to do the recording but nevertheless said yes and spoke with the Director of **Paraguay National Radio** in order to do the recordings there. The radio's director was very open to it and authorized the recording and designated a very effective technician for the task".*

Once the recording was finished the technician handed in a digital format product that was taken to the company in charge of programming to insert the product in the rest of the material.

"The kind of Guarani used was a functional one, typical of Paraguay, one that most of Paraguay's population use, easy to understand and not too academic. This was confirmed during the validation done during the Pilot with a third grade students from Niño Jesús School, in Lambaré, whose mother tongue is Guarani and with students from 6th grade from the Medalla Milagrosa School, in Limpio, and the students understood the text".

After the pilot, we became aware of the need to do further adjustments, these will be taken into account to improve the following production.

7.6. Population change: from first grade to first cycle

The prototype was built based on the book used in first grade and; therefore, it was the grade on which the (pilot) testing would be conducted. Later on, **we saw the possibility to open it to the whole first cycle**, because **the cycle's skill** is literacy and not only on first grade. Different **learning styles** were also considered. [13]

8. Prototype's Testing and Validation

8.1. Choosing pilot schools

As it was mentionned above, testing and validation's methodological design can be found in Annex VIII. To do the pilot in schools the team took into account the international guide's indications and criteria, and at the beginning they reached agreements where the following points were proposed:

- Educational centers should be in Central and Asuncion areas.
- Educational centers would be identified based on boys and girls with disabilities in first grade of an inclusive school.
- Consider the possibility to cross MEC's data so that schools to be visited coincide with some 200 institutions equipped with technological tools through other projects done by the MEC, in this way the posible lack in technological equipement can be alleviated considering the country's reality in this aspect.

[13] For the MEC, first cycle students can pass grades even if they have pending subjects in the field of reading and writing, this is why, at the end of the cycle they have to be proficient in reading and writing.

Once in the field, and when consulting with MEC's schools information, there were **information gaps** with regards to girls and boys with disabilities in schools that have access to technological equipment. The following step was to consult the RUE[14] and it was not possible to obtain the list of schools with these characteristics.

Given that the team did not have the data needed for the pilot, it could not guarantee information about inclusive schools with the technological tools necessary. The initial strategy had to change.

Through professionals that knew state schools and subsidized schools that had experiences in inclusive education, that is to say with girls and boys with disabilities in the classroom, the team got in contact with those schools.

Three of those centers are under the Directorate General of Basic Education and one of them depends from the Directorate General of Inclusive Education.

These schools' Heads said they were available to carry out the experience. An expert from the technical team representing the Directorate General of Basic Education was the woman in charge to maintain contact with the four educational centers' directors[15], in order to decide on dates and times for the team to carry out the pilot, information meetings and training for teachers and administrators and for the test itself.

Dates were set and each professional was in charge to carry out the necessary administrative procedures to obtain the permission from their hyerarchy and to assist to these classes, where they did the appropriate observations concerning the protype's efficiency for students in the classroom. These observations were carried out based on the indicators built by them and they can be found in Annex X.

8.2. Training teachers and administrators from selected schools

After the call for school selection from the corresponding Direction, it was decided to carry on two training days previous to the arrival of the registration and observation team:

a. 1st day: Selected schools' directors and/or technical team
b. 2nd day: Teacher training

a) First training day: school directors

It was hosted at the MEC, there assisted the selected schools' directors and a regional supervior. They worked based on a program with themes related to the projects contextualization and accessible text and UDL basic concepts[16], discussed in point II of this material (page 11).

[14] RUE: Registro Único del Estudiante (Unique Student Register)
[15] In Annex IX, there is a list of the educational centers with the dates and times in which pilots were carried out and who were the tecnicians present for observation.
[16] To be found in Annex V

Training session with directors from schools selected for testing

b) Second training day: teachers

During the teachers information and training day, they worked with the same material used with the directors' group.

Following a talk on the projects' contextualization and UDL concepts, teachers were able to test the prototype to get to know it before the pilot testing when they had to teach the class. The also had the possibility to ask questions based on their experience using the material.

During this session, the goal set for teachers was achieved, since most of them showed interest in the prototype.

Only on one case, it was necessary the intervention of the level coordinator since it was difficult for the teacher to leave her group.

Teacher training before school testing

8.3. ICT equipment

One of four selected schools had the technological tools, the other three centers did not have it.

In face of this reality, the technical team members themselves, carried out institutional and personal actions to obtain the equipment, by recuperating used or donated equipment or using their own to carry out the pilot.

As well as providing the equipment to educational centers, they were modified to make them appealing to users. This shows how very professional the team was: their involvement with the project and their efforts to guarantee students' motivation.

8.4. Testing Population's Characteristics

Niño Jesús School in Lambaré: This is a subsidized school, the work was carried out in third grade where there is a girl with a physical disability that uses a technological tool to communicate (Tablet). The proptotype was tested in this tool and she was able to use it with the teacher's support, and in another class she was helped by a classmate.
Medalla Milagrosa School in Limpio: In this school, the work was carried out in a class of 16 chidren, 5 did not attend so there were only 11. Five of them can hear, one of them uses sign language by choice (diagnosed with ASD the student chose to use that language).
Mcal. Estigarribia School in San Lorenzo: In this state school they profit from the MEC's program which provided them with IT tools (notebooks), and they could try the prototype in a firts grade classroom with 27 students working in groups.

Medalla Milagrosa School, Limpio

Niño Jesús School, Lambaré

CEPPE School, Asuncion

8.5. Schools testing observation Indicators

In order to carry out the prototype experience observation, the team built **well defined observation indicators**[17].

The goal to building these indicators was to prove whether the prototype was useful for students to learn or not; whether it is accessible in terms of content and as a tool as such, assuming that content makes reference to class situation. The idea is that the prototype **support the teacher's work** inside the classroom and not that the prototype be for self-teaching.

These indicators don't intend to evaluate the prototype's impact in children's education. In the words of one of the experts who helped writing the indicators:

"the prototype's value is supporting teachers' work. It must be used in the context of classroom practice, with educational goals that must be planned and with technological tools. For it to be effective there are two things to take into account; on the one hand, the prototype itself - whether the software works or not, is understood or not, is used or not; and on the other hand, the prototype in a classroom situation …"

Another goal for the adapted material is to stimulate **collaborative learning** in the classroom and in this way promote children with disabilities' participationn with their classmates.

Niño Jesús School, Lambaré

[17] They can be found in Annex X.

Niño Jesús School, Lambaré

8.6. The pilot experience seen through the educator's perspective.

a. Teachers who participated in the experience.

Interviews were made to testing schools' teachers[18]. Below you will find some of the comments they made based on the questions:

One of the questions was whether they thought that **ADT is a teaching resource to stimulate learning** for students with and without disabilities and they gave the following answers:

It is excelent material, it helps us move forward, some things must be adjusted along the way but children are enthusiastic and avid to learn. All o f a sudden, they are tired of using the book but technology cheers them up to continue learning.

Yes, I agree for this type of teaching strategy to be implemented. However, the ideal will be that ***each student have its own computer,****in order to concentrate on its own because working in twos, in threes, they all want to participate at the same time, they are not very happy to have to share the material. They were hooked to it, they had fun. It is very good. I would love to see this kind of strategy being implemented all the time, with different texts, according to the classes we teach. I want a digital curricula; based on that we will work with our students.*

[18] The teachers interviewed who participated using the prototype in their classrooms are: Julia Benítez –Niño Jesús School, Lambaré; Jessica Yuruan –Medalla Milagrosa School, Limpio; Galdys –Mcal. Estigarribia School, San Lorenzo.

Mcal. Estigarribia School, San Lorenzo

Another question asked to the teachers was about **what aspects of the material they liked best**. Below are the answers:

*In **language selection**, for example, each student chooses what they want to use: sign language for deaf students for example, but even hearing students choose it because they know it quite well.*

***Drawings are flashy and they are appealing to children**, they can use their imagination when they look at them. In the lesson "water is life", they were telling the entire story from the drawing, and they added a thousand things, they are stimulated to add more, if images are dull they don't appeal to them… interactivity, each time I showed the tree, it seemed as if it lit up, they loved that. It helps them use new vocabulary.*

*For deaf children, it would be to insert **second language (L2) which is written language**. They identify with sign language for example,* the house*, but they build their vocabulary when they realise it could also be* cabin*,* hut *since all these words have the same meaning in sign language.*

The texts were very good. Some were not long and some were simplified. They really liked that I read to them, some cannot read yet. There were very few not reading, but it helped them that it was a directed activity.

It caught their attention. Some of them asked why someone was making those signs in there. There was a person signing and they wanted to know what the person was doing. They kept asking me: Why does he do that, what is it? I said: That is for people that cannot hear.

c. When asked if **there was something missing in the prototype**, they answered the following:

Reading out loud the text before by the teacher. Because in my case, I read out loud the text first and then we all read together. It would be good **to have the text at hand on paper**, the teacher reads first and they follow. Because that is what we do. I read, then we read all together and then we make hypothesis, etc. That's all.

*Part of the material, in the experiment, had no sign language and a few things they asked because they were not there … (*technical questions*) and we had to explain.*

***Spelling** can be presented along key words in the glossary. Key words and spelling as well because that helps them quite a lot with their second language (L2), their mother tongue is developed but to improve written language it would be interesting. For example. C A B I N (each letter signed), because if not they might get B mixed up with D, the position can confuse them.*

Yes. A few little things, for example, they felt comfortable because we had done the work in the classroom before. So, using it: sometimes the first thing they do is touch … **teach them how to use it.** And the excercises, make them more varied, for example… to have more options …

Medalla Milagrosa School, Limpio

Teachers were asked if **they thought the digital textbook can impair learning** and they answered:

As a teacher it is a bit difficult for me because **my IT skills are minimum**– that already is my impairement – I need training. But I think there are no problems with the material in itself. It helps them a lot, it is very good.

At the beginning I thought it could be difficult for those (children) who do not use technology, that it could represent an obstacle, but ***curiosity makes them search*** *and that is why we are constantly learning … and* ***it is good for them to see that it is not all about pencil and paper****, that there are many ways to learn. That is not only about the concrete world but that we can use the technological world and they need to know it from an early age …*

Medalla Milagrosa School, Limpio

It is a quite good tool and enriching as well, because nowadays mathematics are completely digitalized and they can do many things with technology already.

To the question: **What would you change in the contents?** They answered:

In the classroom, I added more concrete things, for example: work on the words beforehand, syllables too, so that it is easier for them when we develop the lesson.

It depends very much on the teacher's strategy*, because textbooks and guidebooks, that's what they are, and we are the strategy, we know how it will work better, where children will get hooked … it could be the spelling, an image, it is a complement we add, it depends very much on the teacher's strategy and didactics.*

d. The following are **the suggestions** to be incorporated to the material made by the interviewed teachers:

Truth is I don't know, but I think it is great as it is. The only thing it lacks is stimulating writing, it is essential for children.

For children ***who have difficulty copying****, they were cruising, I was surprised to see how it worked, they understood perfectly, only transcribing is already difficult for them and this tool helped them improve, at a certain point I had to ask a child to go back, that we were not there yet, because he was going faster than the rest of the class.*

Activation and motivation

After the first class, children were really enthusiastic and they asked when they were going to work again with the computers, they went to speak to the Principal, ask if they couldn't buy computers because they wanted to work with them. They said they no longer wanted a book, only the computer.

Parents also came to see us, ask what was that they said at home about computers. (…) they are enriched … the experiment was a novelty, they loved the game …

Some children needed more help to understand the game and they were wondering why others understood faster … but that's part of the process, you learn to win and to lose, they have to experience that, it will help them solving problems … it is part of learning to know how to look for a strategy … it is a part of life to fall and know how to get back up again…

I think it would be easier **for each one of them to have their computer** and that they know how to use it. I explain in front of the class and they work with their own material. It was new, very new for them. And they loved the visit. I hope there will be more material like this for the other subjects.

Mcal. Estigarribia School, San Lorenzo

8.7. Analyzing the experience, as seen by the technical team

The technical team members got together after prototype testing in schools, and they worked based on a methodology called "***Thinking Routines***"[19], where, taking into account evaluation indicators, three questions were made to each participant and each one answered according to their evaluation during the experience with the prototype. The three questions were:

- What did we see? (goal)
- What do I think about what I saw? (goal)
- Challenges (proposal for future actions)

The answers provided by professionals to these points were grouped based on aspects that could better guide decision making in future similar experiences since they can make positive aspects, difficulties experienced and learning visible.

[19] Results can be observed in Annex XI.

Positive Aspects

- It is an opprtunity for all children to learn through ICT.
- High level of interest and motivation from children without disability when they access the prototype by themselves. **Children are open to the challenge of using a notebook.**
- Children with hearing, motor and psychosocial disabilities acces with assistance. Collaborative learning is stimulated.
- According to their need, children selected and customized the ADT **once they understood the options.**
- Children manipulated the controls very well since they were not difeferent to those they already know.
- Both students with and without disabilities, **correctly understant** the use of different elements.
- The interphase elements' dynamics motivates students.
- They used the tool on their own without major difficulties. It was easy for them to use once they started.
- They all interact without difficulties with the Digital Textbook prototype, according to their motivation/atention.
- In general, design and illustration are very appropriate.
- Students went from page to page, interacting well with activities.
- Learning objectives were clearly stated. There is a description of the goals, the heading in the material is consistent. Each lesson has a good inherently consistent structure. *"They quickly understood how the structure was organized"*.
- Students understood instructions for the ADT activities.
- ADT activities contribute to classroom learning achievement. Excercises are varied, interesting and they allow students to evaluate their learning.
- The glossary works well. Children liked it above all. It is very interesting to use for hearing disabilities.

Difficulties experienced

- Entering the book on their own was easy for some and difficult for others.
- Some students **could access on their own simply by trying,** in many cases they did not follow language selection, they just moved to the next page.
- High motivation; however, it could be observed that some children had not much contact with computers.
- For the most part, it was interesting to use the application **but it was too short**.
- Some of them had **problems browsing or moving long texts.** It might be necessary to give explanations for one or two activities. Children without disability and children with hearing

impairements worked on their own, but children with intellectual disabilities and ASD, **needed guidance** in some cases.

- **It was noted that teachers felt insecure when using the digital textbook, since they might not be familiar with ICT.**
- In sign language, the objectives were not included. "*I don't know how important it was for the development of the lesson, I know it's part of the LPA textbook strategy to include the objective at the beginning but I don't know if it really added to the lesson's development*".
- In some of the pages the audio was not the same as the written text. There are different lengths of time for different languages (sign/Guarani), and translations and interpretations in off were not in sync.
- Glossary images' size need to be improved.
- It is necessary to incorporate persons with hearing disability in the development team (or during validation).
- Adapting the Tablet belonging to the girl with physical disability who uses AAC[20], could be solved on the spot thanks to the presence of some of the technical team members.
- Children with hearing disability do access on their own, those with intellectual disability do not.
- More **information on using the interphase elements was needed, some were not in sync.**
- In some equipment the audio did not work.
- It should always be possible to customize excercises.
- **Excercises are varied but they are not all accessible** to all disabilities.
- In sign language there were missing elements in the experiment, **a possibility could be not to have a heading so that it would be less of a book and more of a digital book**, I don't think it is that important to maintain the quality and all that.
- In San Lorenzo School, there were no students with specific disabilities but some children with reasonable adjustments, the teacher could not develop the lesson again because they had already done it during the year; nevertheless, children were hooked to the digital aspect of it.
- Instructions in the material were not customized as expected, they were the same for everyone. It was suggested to developers that the change icons do not appear in all pages, that they only appear at the beginning (for customization) and that users go to the beginning when they need to change something.
- One of the students in the pilot school said: "the man doesn't talk to me" (because the voice was not being reproduced). Another child said he liked the material but "*they have to solve the technical problems*".

What We Learnt

[20] Augmentative and Alternative Communication (AAC)

- **The innate curiosity and interest of children can overcome any technological or adaptative obstacle.**
- Children need teacher's assistance in using the material; therefore, the teacher needs to be trained in working with the material. *"With the teacher's help, most students understood the instructons. 90% understood on their own and the other 10% were assisted by the teacher. I think the excercise "for/and/with" was the most confusing one (especially in SL)"*
- **Children spontaneously worked cooperating with one another. "**They only asked for help when **they touched too much, got out of the application or it bugged.** We only intervened so that they could work at the same time with the rest of the class."
- **It is essential** to have **discipline, to have behavioral guidelines established to maintain order in the classroom**.
- **ADT is an innovation for students to feel motivated. "**Using ADT appropriately ***would accelerate the learning process****. It is obvious that being interactive ADT overstimulates them, it is new, it generates curiosity, it's more fun*".
- Guarani language is easy to understand since **it is the mother tongue of the student the pilot was developed with. Guarani's colloquial form** was used**.**
- For the Glossary, it could be good to incorporate **more words and more precise definitions**. "*they could be better chosen, some were too obvious*".
- "*Some exercises were too simple, I think more amusing and appealing aspects could be incorporated*".
- The ADT video narrator is **a deaf person with academic training,** that reads the content and does not give an interpretation but narrates in sign Language **(with** certain characteristics**). It is advisable** that these persons participate in UDL development/adaptation process.
- Signed Spanish is different to sign Language (SL). It must be taken into account that for hearing students, reading and writing is already a second language (L2). It is also good to remember that what is said in SL **will never exactly coincide** with the written text since it is not a translation but an interpretation.
- **Voice tones** between those who read a story and those who read the exercise instructions. It should be different in the narration and in the instructions (for blind persons).
- Children **operate by trial and error**, some copied their classmates that seemed to be more familiar with ICT.
- It is very important to insist in **teacher training and educaction** in the use of this technology. The material must be useful for CA with and without disabilities to learn.
- Technology will not solve an underlying problem which may be **the attitude of the teacher**. Children learn, regardless of their teacher's attitude.
- It could be suggested that the teacher work with the material projected via **infocus**.
- It could also be considered to have an ADT with didactic games only.

Medalla Milagrosa School, Limpio

9. Socialization of the prototype

The developing team's systematic work made it possible to reach the **foreseen goals**: experts' training and education; follow-up to building the guide that includes adapting the textbook up to building the prototype; the pilote for schools' validation; evaluation of the process. All these efforts took place in spaces dedicated to them and in other spaces that the team members found in order to reach to more actors and administrators to make this work known.

9.1. The prototype reaches the authorities and the population

During the last month of work in 2019, it took place the first prototype's socialization with MEC and SENADIS representatives, as well as its presentation to the general public in open participation spaces.

Team members, linked to the UNICEF initiative mentioned in the background to this systematization, participated in the event organized in Asuncion where the following program was carried out.

PROGRAMA

8:00	Inscripción de participantes
8:30 – 9:00	Palabras de bienvenida. **Robert Cano**, viceministro de Educación Escolar Básica, Ministerio de Educación y Ciencias (MEC). **Rafael Obregón**, representante de UNICEF en Paraguay. **César Martínez Fariña,** ministro de la Senadis.
9:00 – 9:40	Accesibilidad y derechos humanos: su visión desde el Plan Nacional de Promoción de Derechos de las Personas con Discapacidad. **César Martínez Fariña,** ministro de la Senadis.
9:40 – 10:00	Preguntas y comentarios.
10:00 – 10:30	Receso.
10:30 – 11:00	DUA: entendiendo el concepto de diseño universal de aprendizaje y su impacto en las prácticas educativas. **Claudia Pacheco,** consultora de UNICEF.
11:00 – 11:20	La experiencia de video cuentos en Paraguay. **Natalia Ojeda**, Dirección General de Educación Inclusiva, MEC.
11:20 – 11:40	La experiencia de la guía de accesibilidad de textos impresos. **Teresa Oviedo,** Dirección General de Desarrollo Educativo, MEC.
11:40 – 11:50	Preguntas y comentarios.
11:50 – 12:00	Experiencia de interacción con prototipo DUA.
12:00	Cierre de actividades .

** Translation of Program at end of document*

For this year's work closing event, the goal was to ensure decision makers to be present (Under Secretary of Education, SENADIS' Minister, General Director of Inclusive Education); during this event they have the oportunity to experiment and be guided by the technical team in the use of the protocol.

Another event, organized by the MEC and where protocol developing team members assisted, was an open training session for teaching professionals, where the theme of Teaching Innovation was presented.

During this event, apart from presenting the prototype, the Minister of Education and Sciences had the possibility to live the experience and get to know the prototype.

9.2. Advocacy actions to give continuity to the experience.

Advocacy strategy conversations were held with representatives from Fondo para la excelencia de la educación y la investigación, FEEI (Excellence in Education and Research Fund), within the Educational Transformation Project - Paraguay 2030. Upon finishing this document we are able announced that the date for meeting with MEC's main authorities has been agreed. The objective is to show them all the work that has been done and to establish with them the steps to follow in the construction of new initiatives and processes to be done by the MEC -above all those related to school textbooks and materials.

IV. FINAL CONSIDERATIONS… ITEMS TO TAKE INTO ACCOUNT FOR PROCESS CONTINUITY

In conclusion, and once the collected information in this document was reviewed, we present some considerations that could help in establishing lines of action for the second part of the experience during 2020.

Considerations are grouped under four aspects, according to the observations done all along the systematization. These aspects are: 1- Building the technical team 2- Developing the prototype 3- Prototype's testing and validation 4- Socialization of the prototype.

Each one of these aspects is organized under four axes that summ up information that can be of use for the project's continuity. The axes are: Achievements, Main Obstacles, What was Not Achieved and Lessons Learnt.

1- BUILDING THE TECHNICAL TEAM

ACHIEVEMENTS

- The initiative took place in one of the MEC's Departments and the team members were called and designated by their directors.
- Changes in team members' knowledge, attitudes and professional practise.
- Multidisciplinary team's work experience, where each one of the members could contribute with their presence and technical experience in a respectful professional atmosphere.
- Having a set place and time for work, where MEC's professionals from different sections - that usually are in offices far apart, with all the difficulties this entails (leaves, space, connections, technical team, etc.).
- Representations were nominal which made the proposal's sustainability possible since the same person attended each work session and was the the link to the corresponding Directorate in matters of UDL.

MAIN OBSTACLES

- Some of the MEC's directorates did not asume as a priority that the assigned professionals needed to participate in the technical team, this showed in lack of continuity in attendance to work spaces.
- Each directorate's priorities and experts' responsibilities in those priorities.
- Difficulty in keeping times as proposed because too much time was given to decision making debates.
- The technical team decided not to invite publishers to this stage of the process.

WHAT WAS NOT ACHIEVED

- At the beginning, some of the team's member did not completely understand the proposal, they thought it was just training, they did not take into account the rest of the process and the involvement it entailed.
- Some actors suggested in the guide (such as persons with disabilities or their representatives) were not part of the team and their absence was felt.

LESSONS LEARNT

- Make sure explanations are clear to all persons and institutions involved in the process since, in some cases, this entails responsibilities and decision making towards structural change.
- **Have one person in charge of recording agreements and fundamentals through which decisions were taken in the technical team.**
- Incorporating the designer and the illustrator in UDL training and as part of the technical team was an important contribution to the perspective on the general material.

2- DEVELOPING THE PROTOTYPE

ACHIEVEMENTS

- Building a technical team trained on the subject, and having the possibility to count on them for the implementation of UDL in other MEC's educational innovation processes.
- Involvement from the authorities for the elaboration of the Guarani language section and for the connection with the Relay Center.

MAIN OBSTACLES

- Burocracy when trying to settle agreements between State institutions.
- Be clearer as to the fact that UDL adaptations have to do with instrumental accessibility and that textbook content is not to be adapted (programmatic accessibility)

WHAT WAS NOT ACHIEVED

- Developers were not a part of the team and they did not know what the guide was about.
- The prototype's testing could not be tried with persons with visual disabilities.

LESSONS LEARNT

- Having the possibility to get out of the international guide and suggest different ways to adapt material not only by disability but from different learning styles.
- Group work from the beginning at the Relay Center so that particular situations can be taken into account regarding sign language and specific characteristics about people with hearing disabilities' learning.
- Involve authorities from institutions that are part of the initiative in political decisions and team work in order to make the work more effective. (Eg.: Relay Center)

Summary of points to take into account to improve the protocol

- Improve the **visuals** when entering the prototype.
- In the teachers' guide, improve **the instructions and the tool.** Eg.: infocus with the material.
- That the **customization selection** be available for the entire application and that it be more intuitive so that students can achieve at the first try. And that the application have the button for it present all along.
- Improve, **correct programming mistakes** since students identified these mistakes.
- A **better distribution of texts on the page**, avoid making them so long, divide them and include more illustrations.
- Give more **guidance and support to children that need it.** The teacher must understand that interest and motivation *are* **UDL (principle III)**
- Create **socialization spaces for the exercises carried out.**
- More adapted exercises.
- Go through the pilot experience with persons with visual disabilities.
- Extend the sign language glossary.

3- PROTOTYPE'S TESTING AND VALIDATION

ACHIEVEMENTS

- The possibility of reaching schools, and administration and teachers openness to testing.
- Children's and parents' motivation to do the testing.
- The possibility to detect achievements and points needing improvement.

MAIN OBSTACLES

- Dates for testing were not the best, since they coincided with the last month of the school year and each school had many activities programmed for those dates (exhibitions, closing activities, exams, etc.)

- Not having access to ICT equipment in schools.
- Teachers lack of ICT knowledge.
- Define if the LPA (RTL) scheme for the class will be used or not, since it is confusing for some.
- It is important to let students access the digital textbook before developing the lesson so that they get to know it.

WHAT WAS NOT ACHIEVED

- That the application allows to go from activity to activity only when the previous one was correctly done.
- The need for several technical adjustments having to do with programming was detected.
- Review the material after the technical adjustments following validation were done.

LESSONS LEARNT

- There is predisposition to innovation from the teaching community.
- There are educational spaces from the private sector that use inclusive methodology that could be good practice for MEC.
- In order to develop these initiatives, training and investment are needed.

4- SOCIALIZATION OF THE PROTOTYPE

ACHIEVEMENTS

- Presenting the prototype in spaces where MEC's main authorities were present.
- It was possible to reach teachers and technicians from other institutions, both State and private sectors.
- Publishing representatives that work with the MEC were also present.

MAIN OBSTACLES

- Need to widen reach to the population, specially to technicians, teachers and students.
- The logistics involved in installing the equipement to reach more spaces.
- Technicians' working hours to devote to guiding interested parties in getting to know the prototype.

WHAT WAS NOT ACHIEVED

- Due to the novelty of this proposal, it is necessary **that authorities from** MEC's different direction **participate more** in training sessions since they are responsible to set the priorities in agendas and to better use the opportunities to consolidate these matters in the MEC.
- This presentation could be done in other teaching spaces and in another time of year to guarantee more participation.

Recommendations/Challenges

Following is a summary of points to be considered based in the situations that rose during the experience when it comes to the need for technical training and ICT resources and considerations for the MEC.

Technical Training

- **Generate ICT training opportunities for teachers as well as on UDL and the use of ICT tools to enhance learning. "***Better trained teachers that are convinced of the positive aspects of using ICTs***"**
- Incorporate **group work** methodology. Collaborative learning.
- **Prepare, train and educate students in the use of ICT equipment.**

ICT Resources

- Have **more digital resources** for students with/without disabilities.
- Frequently use already installed **ICT tools** (telecenter).
- Allocate budget to training students and maintaining equipement, when they have it.

For the MEC

- **Consolidate this project's proposal in the MEC as part of the Textbook Unit and the Educational Development Secretariat.**
- Elaborate more UDL material. Really incorporate UDL to classroom practise.

V. ANNEXES

I – Marrakech Treaty Ratification

II – Phot reportage – 3 life stories

III – International Guide

IV – Accessible Texts Diagnosis - Paraguay

V – UDL Theoretical Base

VI – Systematization of the February 2019 Seminar

VII – Technical Team members' professional profile

VIII – Validation's methodological framework

IX – List of pilot educational centers

X – Pilot's evaluation indicators

Translation of program from page 44.

8:00am	Participants enrollment
8:30 – 9:00am	Welcoming address **Roberto Cano**, Basic School Education Deputy Minister, Ministry of Education and Science (MEC). **Rafael Obregón**, UNICEF Representative in Paraguay. **César Martínez Fariña**, Minister of SENADIS.
9:00 – 9:40am	Accessibility and human rights: his vision from National Plan of Action for the Rights of Persons with Disability. **César Martínez Fariña**, Minister of SENADIS.
10:00 – 10:30am	Break
10:30 – 11:00am	UDL: Understanding universal design for learning and its impact on teaching practices. **Claudia Pacheco**, UNICEF Consultant.
11:00 – 11:20am	The video stories experience in Paraguay. **Natalia Ojeda**, General Director of Inclusive Education, MEC
11:20 – 11:40am	The printed texts' accessibility guide experience. **Teresa Oviedo**, General Director of Educational Development, MEC
11:40 – 11:50am	Questions and comments
11:50 – 12:00pm	Interactive experience with the UDL prototype.
12:00pm	Closing address