



The effectiveness of an alternative communication program to speech for the benefit of children with cerebral palsy deprived of speech: an empirical study

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Efficacité d'un programme de communication alternative à la parole au profit de l'enfant paralysé cérébral privé de parole: étude empirique

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ملخص

هدفت الدراسة إلى معرفة مدى فعالية البرنامج التواصلي البديل عن الكلام المقترح في تمكين المعاق حركيا عصبيا من التواصل مع المحيط، ولتحقيق ذلك تم الاعتماد على المنهج التجريبي، حيث اختيرت عينة الأطفال المعاقين حركيا عصبيا العاجزين عن الكلام والذين لديهم صعوبات حادة في التواصل اللفظي بعد مرور سنوات من الكفالة الأرتوفونية وبعد اقرار المختصين الأرتوفونيين المتكفلين بهم باستحالة اكتسابهم للغة المنطوقة (حدود الكفالة الأرتوفونية) بطريقة عشوائية وعددهم 30 فردا تتراوح أعمارهم بين (5-14 سنة) ولضمان تجانس العينة حرصنا أن لا يكون فيها ممن يعاني اضطرابات أخرى. قامت الباحثة ببناء قائمة مرجعية للمواقف التواصلية التي استخدمت كمقياس لهذا البحث واعتمدت الباحثة في بنائه على نتائج وأفكار الدراسات السابقة في مجال التواصل البديل لدى المعاق حركيا عصبيا، وكذا استنادا لمضمون البرنامج المقترح من طرفنا والى الأهداف المرجوة من تعلم المعاق حركيا عصبيا طريقة استعمال البرنامج التواصلي البديل عن الكلام. وأظهرت النتائج وجود أثر للبرنامج التواصلي البديل عن الكلام المقترح، حيث تحسنت في عملية ومستوى التواصل لدى الأطفال المعاقين مع المحيط.

الكلمات المفتاحية: الشلل الدماغي؛ العاجز عن الكلام؛ البرنامج التواصلي؛ البديل عن الكلام؛ بيكتوغرامات.

Abstract

This study aims to determine the effectiveness of an alternative Communication Program to speech for the benefit of children with cerebral

palsy deprived of speech. For the reason being, we opted for the experimental method where we randomly selected a sample of 30 children aged from 5 to 14 years with cerebral palsy, speech impairment (children deprived of speech), and having no associated disorders. In order to assess communication in our sample, we developed a referential list of communication situations. We were able to prove the effectiveness of the proposed program in improving communication in children with nonverbal cerebral palsy.

Keywords: cerebral palsy; speech; communication program; alternative to speech; pictograms.

Résumé

Cette présente étude a pour objectif de déterminer l'efficacité du programme de communication alternative propose pour l'aide à la communication chez l'enfant infirme moteur cérébrale. Pour la réalisation de cette étude, nous avons opté la méthode expérimentale où nous avons pris un échantillon aléatoire de 30 enfants âgés de 5 à 14 ans présentant une infirmité motrice cérébrale et des difficultés de communication verbale (enfants privés de parole) et sans troubles associés. Afin d'évaluer la communication chez notre échantillon nous avons élaboré une liste référentielle des situations de communication. Nous avons pu prouver l'efficacité du programme proposé dans l'amélioration de la communication des enfants infirmes moteurs cérébraux privé de parole.

Mots-clés: paralysé cérébral; privé de parole; programme de communication; Alternatif à la parole; pictogrammes.

Introduction

Cerebral Palsy is considered a thorny subject for researchers around the world. This is due to the fact that it is a multi-faceted and multi-dimensional issue; it is medical, social, psychological, and rehabilitative. Cerebral Palsy is defined as a neurological motor disability that occurs during childhood (before, during, or after childbirth). Various bodies in all societies seek to provide medical, educational, social, and psychological care programs to help members of that community focus their energies to exploit their abilities, and in turn, integrate them into society.

The care programs also aim to help Cerebral Palsy patients express themselves, their thoughts, their feelings, their problems, and their needs, in a manner that allows them to be understood. Among the salient negative consequences of cerebral palsy that prevent adaptation



and psychological and social stability are difficulties in communication. Communication is a process and a vital ability that depends on the individual's use of words. Effective communication, thus, requires the use of appropriate words that are selected to form sentences that in turn, convey the ideas we wish to say. Verbalising those ideas depends on our cognitive abilities and the status of our speech organs. If these oral conditions are impeded, there are other reliable means of communication to resort to.

These methods are alternative methods of communication, where communication is achieved by a non-spoken language (non-verbal or alternative communication). In the Algerian context, there is an apparent desperate need for such means and programs to assist nonverbal Cerebral Palsy patients. Thus, we decided to address the issue, tackle the subject matter, and design an alternative communication tool for speech for that particular type of CP patients.

1. The theoretical framework of the study

Cerebral Palsy limits the child's ability to benefit from regular educational programs to a large extent, as it becomes necessary to provide special educational services (الفرماوي, 2009). The latter include modified or adapted tools and means designed to assess and meet the patient's special needs while taking into account individual differences. Jamal Al-Khatib (2003) says that a large proportion of Cerebral Palsy patients suffer from a plethora of communication problems, of varying degrees depending on the location of the brain damage (الخطيب, 2003).

The face, mouth, and diaphragm are organs that directly relate to speech. They may be affected by brain damage, and depending on the type of motor disability, there may be a decrease or increase in the level of oral muscle tension (Roustit, 1998). This leads, in most cases, to speech impairment. Hence, we have to develop alternative communication tools that enable people with nonverbal Cerebral Palsy to communicate. He proposed a system of picture communication symbols (PCS) that contain 3000 symbols in an information system (Si Gaffor, 2003).

In this regard, Bloomrang, et al. 1990, have studied a comparison between the logographic systems (image-based) which are REBUS, BLISS, and PCS. The comparison was made on the premises of



transparency and speed of understanding by highlighting the advantages and disadvantages of each system through the results obtained from a group of mute Cerebral Palsy patients. The study found that REBUS is less transparent compared to BLISS, while PCS is in the foreground, which is used with children with neurological disabilities. The REBUS system is also more complex than the other systems (Schlosser, 2008).

Lecnetet Lanni on (1983) also proposed an artificial speech box through which children with Cerebral Palsy can communicate with the external environment and express their needs and desires.

Another tool was proposed by Esser, et al. (1994). It is an electronic device that allows CP patients to use their fingers, legs, or even muscle contractions of the tongue and eyes in the form of electronic signals in order to control the device (Kangas, 2005).

But despite this development, diversification, and the advertising campaigns in media in foreign countries since the seventies, Arab countries fall short in this regard. It is noticeable that the Arab world in general and Algeria in particular, lacks this type of initiative to provide care and support for this marginalized community. Thus, the main question that this study aims to answer can be presented as follows:

- How effective is the alternative communicative program proposed for mute Cerebral Palsy patients in the context of Algeria?

We, hence, formulated the following hypothesis:

- The non-verbal communicative program is effective in improving the level of communication of mute Cerebral Palsy patients.

2. The methodological framework of the study

2.1 Objectives of the Study

The study aims to design a communication tool that enables mute Cerebral Palsy patients to communicate with their external surroundings.

2.2 Related Notions

2.2.1 Nonverbal or alternative communication

Alternative communication refers to the methods that replace the verbal communication of individuals who are unable to develop verbal



language skills. It is an approved strategy to strengthen the linguistic and verbal skills of individuals (Kuder, 2019).

2.2.2 Alternative communication

They are tools and methods that compensate speech, whereby we send a specific message to express a specific idea to one or more specific people in order to achieve communication. (الوهابي، 2009).

2.3 Study Approach

This study seeks to achieve a set of goals. The first of which is to build an alternative communication program for the nonverbal Cerebral Palsy patients, and to train them to use and adopt it as an alternative to speech. This, in turn, aims to assess its effectiveness. To achieve the objectives of the study, we adopted the experimental method, as we find it to be most appropriate for this context. Hence, the study follows a two-group design, given the fact that the one-group design is not suitable (Adnan Al-Jabri, 2009).

One group represents the control sample, while the other represents the experimental sample, namely the category of the nonverbal Cerebral Palsy patients. These measures aim to identify the extent of the influence of the independent variable (the proposed alternative communicative program) on the dependent variable (communication in the nonverbal Cerebral Palsy patients), and to test the causal relationship between the two variables using the measurement tool represented in the exclusive list of communicative situations.

2.4 Study sample

The study sample was selected after reviewing the medical files of the cases and generating a comprehensive summary about children with CP, which contains information specific to each patient. We excluded cases that had accompanying auditory, mental, and visual impairments and had one of the non-verbal communication skills (eye communication, pointing, joint attention).

The study sample was randomly selected and reached a total of thirty cases, of an age range of (5-14 years), males and females, divided into fifteen participants for the control sample and fifteen participants for the experimental sample.

Characteristics relevant to both samples;

- CP patients who do not suffer from co-morbidities.



- They suffer from a lack of verbal communication.
- They underwent speech therapy for more than two years without acquiring verbal language.
- They do not have movement problems at the level of the upper limbs to facilitate the use of the proposed alternative communication tool.

The sample was distributed as follows after defining its members and ordering them by name and number.

Table 01: The distribution of the sample members in terms of experimental and control groups.

Group	Nonverbal Cerebral Palsy Patients	Ratio
Experimental	15	50
Control	15	50
Total	30	100

2.5 Study tools

2.5.1 Interview

The researcher conducted individual interviews with the members of the research sample and their parents to be familiar with each case, and to fill out forms specific to each case.

2.5.2 Observation

The researcher took note of everything that happened during the interview, as one cannot find it in medical files or psychological reports. This is especially the case in the details that tend to be overlooked, for example, drooling. Some patients can wet the papers of the proposed communication notebook.

2.6 The exclusive (checklist) list of communicative situations

The researcher made an exclusive list of the proposed program sessions, containing a set of communicative situations in order to assess the communication abilities of the nonverbal CP patients. The list took into account the communicative situations that the child is supposed to be able to express in order to assess his/her communicative abilities such as self-expression, description of family members, as well as a description of daily needs such as physiological needs, food, clothing, and his mood.



2.7 Experimental design

The design is the outline that guides the researcher through the practical aspect of the study, as it is a set of procedures that provide answers to the research questions and control all the variables. The best approach for this type of study, the experimental method aims to establish the cause-effect relationship between phenomena or the variables. However, other factors or other variables can interfere with the current experiment and may affect the careful study of the effects of the independent variable on the dependent variable. For the purpose of isolating these undesirable factors, we have adjusted all the variables as much as possible to ensure the quality and validity of the experiment.

3. General framework of the program

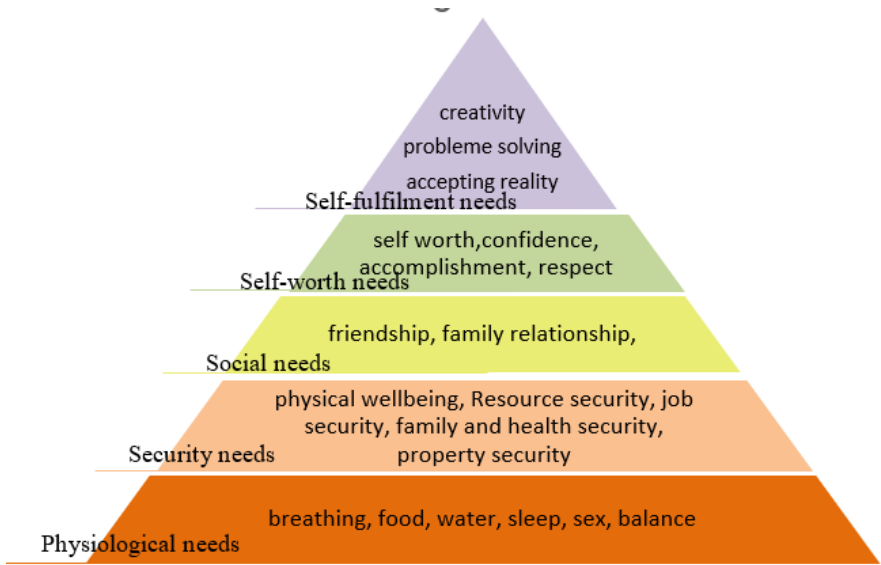
3.1 Designing an alternative communicative program for the nonverbal CP patients:

Theoretical background and sources for building the program:

The theoretical and applied literature concerning the design and construction of alternative communication and their methods has been reviewed on a global scale. The literature review also included the advantages and disadvantages of alternative communication programs, how they are built in general contexts, and the context of Cerebral Palsy. The researcher relied on Maslow's Diagram of Human Needs, and the language scheme assessment program Le Macaton.



Figure 01: Maslow's scheme for grading human needs



(Si gaffor. 2003).

3.2 Defining an alternative communication program

It is a set of training sessions on the use of the proposed alternative communication program adapted to the Algerian environment, and that is made up of pictograms, i.e., pictures. Each picture expresses a specific thing, a specific act, a specific name, or a specific situation, i.e., a specific communicative situation where the patient is trained to choose the appropriate pictogram in a non-verbal way of communication (visual communication, indication, and joint attention).

3.3 Program content

The proposed alternative communicative program included primary stages and secondary stages. In each stage, the patients are trained to comprehend and apply the instructions included in them. The sessions are planned as follows;

❖ Session One

The topic of the session: an introductory session between the researcher, the patient, and the parents.



Session Procedures:

- The researcher created an environment for the nonverbal CP patient and their parents that inspires trust, respect, and sympathy. Parents are encouraged to talk about the difficulties they face with their child's disability and communicative problems. The examiner, then, proceeds to explain the content of the alternative communication tool and its goals so that the parent is presented with an overview of the upcoming sessions. This ensures that the parents are involved in training their child to use the proposed tool through continuity of use, outside the training sessions.
- The researcher also listens to every concern and question parents may have and answers them openly.
- Doing some exercises to develop the skill of good and accurate choice by asking the patient to choose between objects, for example, then photographs, then drawings...etc.

❖ **Session Two**

Session topic: The communicative situations specific to the patient, their family, those close to them, and companions.

Session Procedures:

We give patients their pictograms and make sure they understand how to use them. They should be able to understand that they can express themselves, their surroundings, and their environment by pointing out to those pictograms.

❖ **Session Three**

Session topic: Communicative attitudes about food.

Session Procedures:

We present patients with pictograms of vegetables and fruits, and converse with them about their favourite fruit, for example, by giving clear and direct instructions. For instance, do you like yogurt? What is your favourite taste?

❖ **Session Four**

Session topic: Household communicative situations.

Session Procedures:



We present patients with the pictograms of items found in every house, such as furniture, utensils, rooms, electrical appliances, electronic devices, keys...etc. We address them clearly and directly, and discuss with them the house contents, and what they personally use on daily basis.

❖ **Session Five**

Session topic: Communication situations related to clothing.

Session Procedures:

- ❖ Patients are presented with pictograms of each item of clothing (shirt, pants, shoes, dress...) and are addressed directly, for example: What are you wearing today? The patients answer using the provided pictograms to denote the clothing item, as well as accessories.

❖ **Session Six**

Session topic: Special communicative situations, physiological needs.

Session Procedures:

We show patients pictograms of each physiological condition; the examiner used facial expressions and pictograms to explain the condition. For example, a cup when thirsty, food when hungry, or a bed when drowsy...etc.

❖ **Session seven**

Session topic: Communicative attitudes of verbs

Session Procedures:

We explain to patients the pictograms specific to verbs and explain to them how to use them in daily communicative expressive situations, primary verbs (drink, want, eat, sleep, go ...), secondary (puke, wander, exercise...).

❖ **Session eight**

Session topic: Communicative postures of body postures.

Session Procedures:

We present the pictograms of each body posture to the patients and show them how to express a specific posture.



❖ **Session nine**

Session topic: Communicative situations related to body parts.

Session Procedures:

Patients are presented with pictograms of all anatomical organs, including the hand, chest, legs, stomach, heart...etc. They get introduced to each organ and its representation in the pictograms. We then proceed to converse with them about where they usually feel pain for example.

❖ **Session ten**

Session topic: communicative situations related to spatial concepts.

We present pictograms of each spatial concept and represent them in front of patients to improve their comprehension and ensure the correct choice of the pictogram fits each concept. This is done through conversations and using the environment for illustration, such as the things that are in the room.

❖ **Session eleven**

Session topic: Communicative attitudes related to the concepts of temporality.

Session Procedures:

Patients are presented with temporal concept pictograms. The latter is explained through examples, asking questions, and reinforcement.

❖ **Session twelve**

Session topic: Communicative situations about shapes, colours, and sizes.

Session Procedures:

We present patients with pictograms that indicate colours and ask them about the colours of things and clothes, for example.

❖ **Session thirteen**

Session topic: Communicative attitudes about school tools.

Session Procedures:



For the patients, we present pictograms of school tools in the communication file. For instance, we show them the pictogram of the pen, and we give them a pen and do the same for all tools while talking about them, and how they could learn to use them to draw, write, or do simple handicrafts.

❖ **Session fourteen**

Session topic: Communicative situations related to events.

Session Procedures:

Patients are presented with pictograms related to each occasion and we talk about any occasion patients have or might experience, for example, weddings and birthdays. Religious holidays are also included such as Eid al-Fitr and all that comes with it, from wearing new clothes, games, and sweets to family visits, as well as Eid al-Adha and the sacrifice and the accompanying atmosphere of joy. National holidays, such as the Independence Day are not neglected either.

❖ **Session fifteen**

Session topic: Health-related communication situations

Session Procedures:

Provide status pictograms of doctors, hospitals, clinics, medications, wheelchairs...etc.

❖ **Session sixteen**

Session topic: Communication situations related to transportation.

Session Procedures:

We present pictograms that include cars, planes, buses, trains, tramways, metros, bicycles, and motorcycles and ask patients, for example: How did you get here? What transportation medium flies?

❖ **Session seventeen**

Session topic: Communication situations related to professions.

Session Procedures:

We present patients with pictograms of various professions and name them one by one, then ask them about their father's



profession, their mother's profession, their brother's profession...etc. We also ask them what do they aspire to be. Patients need to use the appropriate pictograms for each profession.

❖ **Session eighteen**

Session topic: Communicative situations for entertainment and recreation.

Session Procedures:

We present the case with pictograms of hand-held games (puzzles, Lego, cars, dolls...) and electronic games (X Box, Play Station, PSP...) and ask them some questions related to their favourite game, the game they always play, or for example, the game their brothers play...etc. Regarding the places they like to go and visit, parks are a good example, or any places that make them feel comfortable and entertained.

❖ **Session nineteen**

Session topic: Animal communicative situations.

Session Procedures:

We present pets with pet pictograms, name them, and interview patients about whether they have a cat or a dog? What is their favourite animal? The same applies to wild animals: What is their favourite animal, for example, and what animal do they like to watch on TV?

❖ **Session twenty**

Session topic: Communication situations specific to sports.

Session Procedures:

Patients are presented with pictograms relating to sports and pronounce the name of each type. We ask them questions about their favourite sports, for example, the sports they, their siblings, or their parents play...etc. (ميموني, 2010).



4. Results

4.1 Results of the experimental sample:

The results for the experimental sample for the communicative situations checklist are the following: With regard to the degree of variance or the (F) value of homogeneity between the experimental and control samples in the pre-measurement, the results were insignificant and therefore the two samples were homogeneous. As for the results of choosing (t) for the experimental and control samples, the differences were insignificant, as its value was estimated at (-0.11); this is shown in Table 02.

Table 02: Pre-measurement results for the experimental and control sample with regard to the reference list of communicative situations.

Statistics sample type	Sample size	Arithmetic average	Standard deviation	Standard error of average	Value of F of homogeneity	significance	Value of T	Degree of freedom	Significance level
Experimental sample	15	22.46	6.54	1.68	0.010	0.92	-0.11	28	No significance
Control sample	15	22.20	6.53	1.68					

This indicates that the results of the study sample members with regard to the reference list of communicative attitudes did not differ in the pre-application between the members of the experimental and control samples. They were, however, close, as the arithmetic average of the experimental sample was estimated at (22, 46), as for the control sample, it was estimated at (22, 20). Thus, the two samples are homogeneous, as there are no statistically significant differences between the averages of the experimental and control samples.

4.2 The results of the hypothesis of the study:

The study hypothesis states the following:

The non-speech communicative program is effective in improving the level of communication of the neurologically impaired and speechless in the Algerian clinical field.



To check the validity of this hypothesis, the researcher calculated the significance of differences between the averages of the experimental and control sample using the choice (t) in pre and post measurements, as shown in Tables (3) and (4).

Table 03: The results of the pre- and post-measurements for the experimental sample related to the reference list of communicative situations.

statistics sample type	Sample size	Arithmetic average	Standard deviation	Standard error of average	Value of difference between averages	Standard deviation of averages	Standard error of average	Value of t	Degree of freedom	Significance level
Pre-measurement	15	22.46	6.54	1.68	-58.06	4.86	1.25	-46.25	14	0.01
Post-measurement	15	80.53	4.62	1.19						

Table 04: post-measurement results for the experimental and control sample with regard to the reference list of communicative situations.

statistics sample type	Sample size	Arithmetic average	Standard deviation	Standard error of average	Value of F of homogeneity	significance	Value of T	Degree of freedom	Significance level
Experimental sample	15	80.53	4.62	1.78	3.61	06.	-26.73	28	Significant at 0.01

It appears in Table 03 that there are statistically significant differences between the averages of the experimental group with regard to the results of the reference list of communicative situations before and after the application of the alternative communication program in favour of the dimensional measurement. The value of (t) was equal to (-46.25) at the level of (0.01) as shown in Table 04. This indicates



statistically significant differences between the averages of the experimental and control samples in the pre and post-measurements, where the value of t was estimated at (-26.73) at the level of (0.01). This verifies the hypothesis and proves the effectiveness of the alternative communication program in improving the level of communication of nonverbal CP patients. Concerning the control sample, it is clear to us through Table 05 that there are no statistically significant differences between the averages with regard to the reference list of communicative attitudes in the pre- and post-measurements. Therefore, the difference in pre- and post-measurements for the experimental sample came as a result of training the children to use the program, which in turn, proves the effectiveness of the program.

Table 05: Pre and post measurement results for the control sample

statistics sample type	Sample size	Arithmetic average	Standard deviation	Standard error of average	Value of difference between averages	Standard deviation of averages	Standard error of average	Value of t	Degree of freedom	Significance level
Pre-measurement	15	22.20	6.53	1.68	-1.00	1.06	0.27	-3.62	14	
Post-measurement	15	80.53	4.62	1.19						

4.3 Result Discussion

This study aims to verify the effectiveness of the alternative communication program in improving the level of communication for nonverbal Cerebral Palsy patients. Results state that the experimental group members had higher scores than the results of the control group members in the post-measurement. Where the result of the t-test is (-26.73), making the difference significant at the level of (0.01). This agrees with numerous studies, such as the study of Sylvestre (1981), which aimed to highlight the benefits and advantages of using the communicative system. The researcher concluded that this



communicative system has enabled CP patients to be expressive in a more organized and complex manner from a morphological and a grammatical point of view. This is due to the fact their memory underwent activating training making them more alert and attentive to their surroundings.

However, one may note that this pictogram system (Bliss) is a complex model that a child with Cerebral Palsy may be unable to comprehend. This can be drawn to the fact that it requires the use of more than one pictogram to express one idea, and this is not consistent with the study we conducted, as we deliberately trained the child to use the “One” pictogram to express “One” idea.

Several studies that aimed to suggest communication tools have proven their effectiveness, such as the study (Lec Netand Lannion, 1983), in which an artificial speech box was proposed as an alternative to normal speech. The researchers were able to confirm the effectiveness of the proposed speech box enabling the children with CP to communicate with the external environment and express their needs and desires.

Similar to our study, the study of (Colman and Cook 1987), also aimed to provide an alternative communication tool for children with nonverbal CP. The researchers were keen to adapt the tool to accommodate more patients’ needs.

The researchers also concluded that the technological development in this field enables Cerebral Palsy patients to choose the electronic communication tools adequate to their disabilities and abilities. However, in the Algerian clinical context, electronic or pictogram alternative communication tools are not available, making the program we put forward the first of its kind.

Our study also agrees with the study (Esser, et al. 1994), which aimed to suggest an alternative communication tool that uses a device that functions with fingers, feet, head and even muscle contraction of the eyes and the tongue through the form of electronic signals.

Lucie Abullo (2010) also studied the benefits of alternative communication represented by the audio installation device (The Grid), where the researcher selected a sample of 4 children and adolescents (08 and 19 years) and trained them to use the audio



installation device 6 months. The researcher concluded that the device allowed patients to develop non-verbal communication skills, especially joint attention, and developed social interaction and enriched relational abilities. It does require a complex learning process, and the child's motor abilities may make lead to facing difficulties in using it. Besides, communication resulting from using the device is not as spontaneous as normal speech.

Through this recent study, we are approaching remarkable development in the field of alternative means of communication for Cerebral Palsy patients in Algeria and the Arab World.

Lucile Giry and Muriel Verin (2013) have also studied the contributions and benefits of the free computer-assisted communication program (PLAPHOONS) in assisting children with nonverbal Cerebral Palsy. The study concluded that the (PLAPHOONS) program facilitates and simplifies communication between CP patients and their surroundings.

Conclusion

Researchers' interest in providing alternative communication tools for children with nonverbal Cerebral Palsy dates back for years. That is also when many speech therapy treatments were unable to assist patients with Cerebral Palsy, leading them to fail to interact with the outside world and be only limited to the small family, especially the mother and father.

Thus, numerous alternative communication systems sprung into existence, and their effectiveness has been put under scrutiny. We can mention the "Bliss" system, which was proposed by Bliss in 1965. It is based on a set of symbols indicating certain meanings, which are taught to the patient.

PECS is another system; it was proposed by Bondy Andrew and Frost Lori in 1944, which is a system based on the exchange of pictures. The child is taught that communication is a process of exchange in which the child makes spontaneous social initiations, by giving a picture or a symbol.

Technological development has effectively contributed to the development of alternative communication, as they adapt patients'



individual conditions. It is worth mentioning the lack of alternative means of speech in Algeria, be it pictograms or electronic.

Our work was based on the gradation of human needs of Maslow Braham and the lexical hierarchy of the Makaton system, generated by Walker Margarite in 1972, and used pictogram systems from foreign countries.

We have opted for communicative situations that people encounter in daily life. To evaluate the effectiveness of the proposed alternative communicative program, we have created a checklist for communicative situations. The latter was presented to two scholars from the University of Algiers 2, and two practicing speech therapists. The program was then discussed in order to achieve a final version of the program.

The experiment was conducted on 30 children with nonverbal Cerebral Palsy. The result of the correlation coefficient was high; hence, we adopted the checklist as a measurement tool and decided to limit the number of sessions to twenty sessions. The sample members were selected on a random basis and were thirty individuals belonging to the Department of Functional Rehabilitation at Ben Aknoun Hospital. The sample members were divided into two groups, a control group and an experimental group.

We applied the checklist in the pre-measurement to the sample members and we subjected the experimental group to training on the suggested program. Afterward, we subjected both groups to the dimensional application to determine the effectiveness of the program, and the statistical results of the pre-measurement them using the (t) test. The results demonstrated no statistically significant differences between the two groups; as for the (F) value of the variance, the differences were not significant, which means that there is homogeneity between the experimental and control samples. We then checked the results of the post-measurement of the experimental sample, where the differences were significant concerning the (t) test. This only proves that the alternative communication program we suggested is effective.

In light of the results of this study and based on the theoretical framework, the researcher suggests the following:



- Developing the alternative communication program into software so that it is compatible with the neuromotor abilities of people with Cerebral Palsy.
- Create alternative communication programs for speech that include most of the vocabulary available in the local communication lexicon.
- Providing and marketing various types of alternative communication tools, from low technical performance tools (images, communication boards, tables, pictograms, and graphics) to high technical performance tools (speech boxes and computer programs) so that everyone can acquire a tool that is in line with their physical needs.
- Organizing conferences and scientific meetings, encouraging research and scientific studies, and following up on therapeutic initiatives that address these topics.

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