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Music for All: An Intervention Project in an Artistic School in Portugal

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Music for All: An Intervention Project in an Artistic School in Portugal

Abstract

In Portugal, in 2018, an action-research project began to find solutions so that children with cerebral palsy (CP) could learn music in Arts Education Programmes of Music (AEPM). When conducting the characterisation of the child with CP, which gave rise to the study, and a series of literature reviews to find out what has been done in this area, we came across several works related to different Accessible Digital Musical Instruments (ADMIs) which can be employed by users with different needs. In the present case of the child under study, two of these ADMIs were chosen and used because of the opportunities they offer: Netytar and Netychords. These instruments allowed the child to access an artistic school near their residence after the respective admission test. In the Intervention Project (IP), which lasted six months, we analysed how the entry process was carried out, so we qualitatively studied the music teachers' field diary records. This situation included several interviews and conversations with the educational community involved. More specifically, the following were analysed: (i) the process of the child's entry into the artistic school; (ii) the work done by the piano teacher in the first three months of the study; (iii) the curricular adaptations proposed by the music teachers (MTs) of the ensemble and music training class so that the child could fulfil the proposed objectives; and (iv) the arrangements and musical compositions adapted so that the child could fulfil the demands of the school programme. As a result, we noticed that the peers of the child with CP adapted much better to the participation processes in favour of inclusion than the adults involved, probably because among the adults there was fear in the face of a still unknown situation, as is the case of working with a child who accesses information and music teaching unusually. We also noticed the urgent need for specific training and supervision among all involved - MTs, operational assistants (OAs), and parents/guardians (PGs). We were faced with the need for training in minor details such as accompanying the child with CP to move and use the toilet. In other words, it is necessary to prevent and prepare, empowering those involved with a series of skills so that children with special needs can fully and actively participate in this type of education.

Keywords

arts education programmes of music, qualitative analise, cerebral palsy, HeaDMIs, inclusion

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Music for All:
An Intervention Project in an Artistic School in Portugal

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In Portugal, in 2018, an action-research project began to find solutions so that children with cerebral palsy (CP) could learn music in Arts Education Programmes of Music (AEPM). When conducting the characterisation of the child with CP, which gave rise to the study, and a series of literature reviews to find out what has been done in this area, we came across several works related to different Accessible Digital Musical Instruments (ADMIs) which can be employed by users with different needs. In the present case of the child under study, two of these ADMIs were chosen and used because of the opportunities they offer: Netytar and Netychords. These instruments allowed the child to access an artistic school near their residence after the respective admission test. In the Intervention Project (IP), which lasted six months, we analysed how the entry process was carried out, so we qualitatively studied the music teachers' field diary records. This situation included several interviews and conversations with the educational community involved. More specifically, the following were analysed: (i) the process of the child's entry into the artistic school; (ii) the work done by the piano teacher in the first three months of the study; (iii) the curricular adaptations proposed by the music teachers (MTs) of the ensemble and music training class so that the child could fulfil the proposed objectives; and (iv) the arrangements and musical compositions adapted so that the child could fulfil the demands of the school programme. As a result, we noticed that the peers of the child with CP adapted much better to the participation processes in favour of inclusion than the adults involved, probably because among the adults there was fear in the face of a still unknown situation, as is the case of working with a child who accesses information and music teaching unusually. We also noticed the urgent need for specific training and supervision among all involved - MTs, operational assistants (OAs), and parents/guardians (PGs). We were faced with the need for training in minor details such as accompanying the child with CP to move and use the toilet. In other words, it is necessary to prevent and prepare, empowering those involved with a series of skills so that children with special needs can fully and actively participate in this type of education.

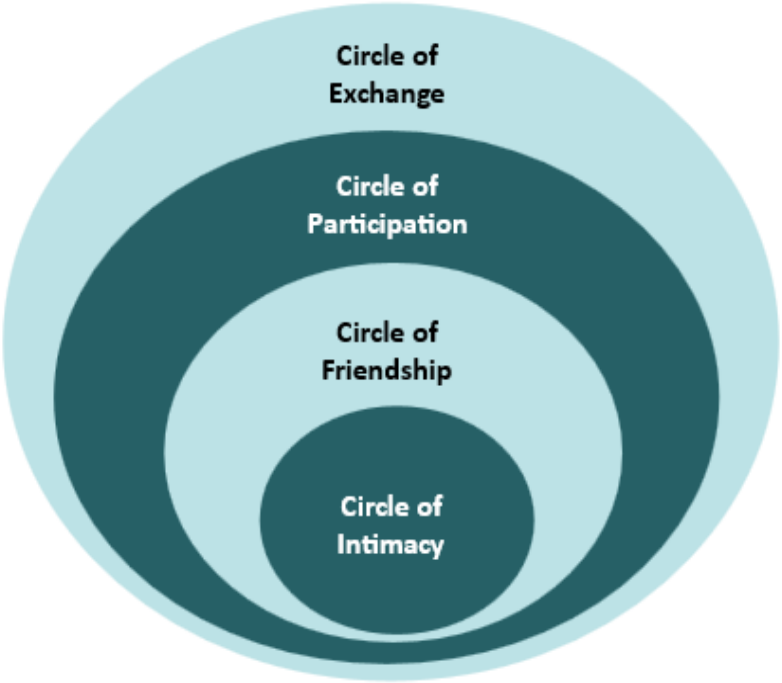
Keywords: arts education programmes of music, qualitative analise, cerebral palsy, HeaDMIs, inclusion

Introduction

In 2018, in Portugal, due to the motivation of a mother so that her seven-year-old son with a motor disability due to cerebral palsy (CP) could attend primary education under articulated teaching, in an artistic school (AS) belonging to the Arts Education Programmes of Music (AEPM), a research-action project began in the Department of Education and Psychology, University of Aveiro (DEP-UA). This project aims to find solutions to facilitate music learning by children with special needs (SN), namely children with CP, in AEPM (Moreno et al., 2020; Moreno et al., 2021a).

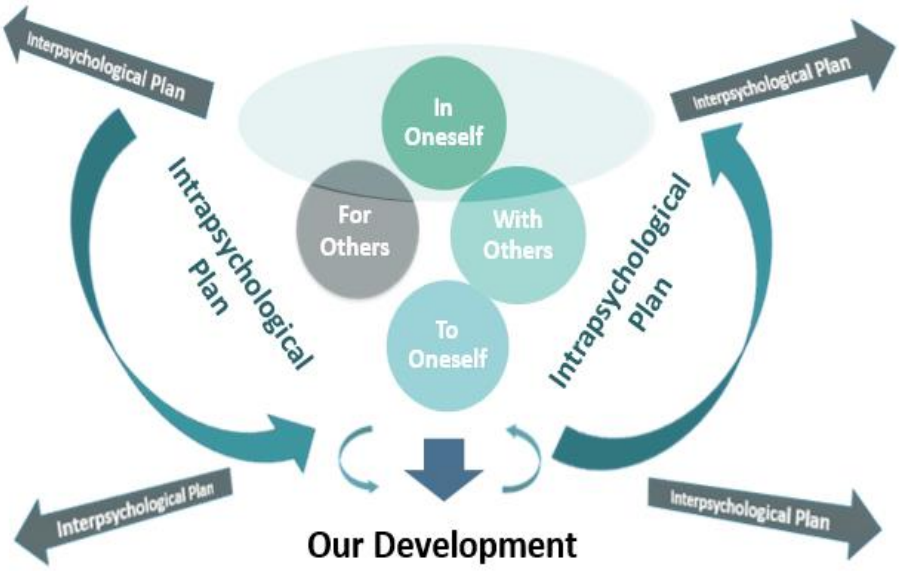
First, we wanted to know what the child under study was like, how they relate, develop, and learn, and which aspects may be related to the context and the environment in which they experience their interactions. In this sense, our first task was characterising the child with CP under study. We then looked for authors or models to help us in this task. More specifically, we considered the circles of support or the circles of friends (Falvey et al., 2011; Fig. 1), Vygotsky's Model of Cognitive Development and Learning (Brown et al., 2003; Fig. 2), and Urie Bronfenbrenner's Ecological Model of Human Development (Tudge et al., 2016; Fig. 3).

Figure 1
Circles of support/circles of friends (Falvey et al., 2011, p. 16)



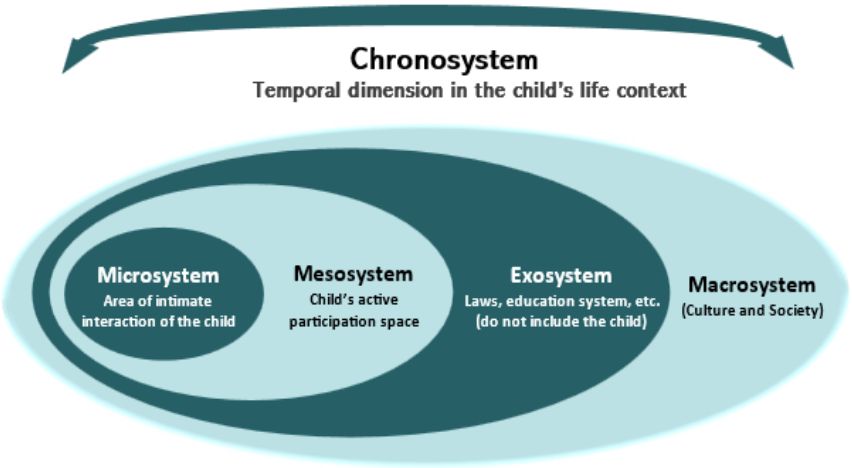
It can be observed in Figure 1 that the circles of support or the circles of friends are composed of different zones, which are related both to the support (people) and to the exchanges or relationships that the child can make to achieve their full development. These are: (i) circle of intimacy – space where we find the most intimate people in the child's life (direct family, mother, father, sister); (ii) circle of friendship – space that comprises the friends, the child's closest friends; (iii) circle of participation – space that comprises the friends from the groups in which the child participates (CCH from school, church, sport, etc); and (iv) circle of exchange – space corresponding to people who accompany and help the child (grandparents, aunts, uncles, teachers, therapists, etc.; Falvey et al., 2011).

Figure 2
Development and learning processes of the child under study, based on Vgotsky's studies (Moreno et al., 2021a, p. 176)



As we can see in Figure 2, to understand the processes related to the child's cognitive development and learning, we considered the various relationships and social interactions built around them (Brown et al., 2003; Moreno et al., 2021a). These processes accompany the child throughout their developmental process in a constant interrelationship between them. These are: development in themselves, development for themselves, development with others, and development for others. This happens both on an intrapsychological plane – i.e., relationships that have to do with the plane that is generated by the child's interaction with him/herself – and on an interpsychological plane – i.e., relationships that refer to the interaction that the child under study has with others (Brown et al., 2003; Moreno et al., 2021a).

Figure 3
Urie Bronfenbrenner's ecological model of human development (Moreno et al., 2021a, p. 177)



In Figure 3 we can see the aspects related to the context and surroundings in which the child experiences its interactions are established in an "ecological environment." This environment is a set of serial structures or surroundings, each established within one another. These are: microsystem, mesosystem, exosystem, and macrosystem. These surroundings are situated close together and because of this they can exert direct or indirect influences on the child under study. Finally, we have the chronosystem, which has to do with the passage of time and the events that may significantly influence the child's development (Moreno et al., 2021a; Tudge et al., 2016). All these processes that we have just listed are influenced by the relationships that are established: (i) between the different environments (surroundings); (ii) between these environments and the contexts; and (iii) between the environments and the wider contexts, which also come to be included in other environments and other contexts (Moreno et al., 2021a; Tudge et al., 2016).

This theoretical basis helped us build the interview scripts (Moreno et al., 2021a) with which we interviewed the child's family and the professionals working with the child to obtain their characterisation (Moreno et al., 2020).

The results showed us that the child under study has a severe dyskinetic form of diplegic CP in the upper limbs, implying involuntary movements in these extremities. They also have bilateral limitations with some hypotonia, being the most affected lower limbs and presenting epilepsy. They can move with a wheelchair and walker, needing support (people) to perform their daily activities. They cannot speak or write in the "traditional" way, but due to the hard work carried out by their family and the professionals who work with them for the development of their communication and learning, the child can interact with their peers, communicating everything they need through gestures, facial expressions, and the use of digital technologies and support products: a laptop computer, GRID 3 software, and the PC Eye Mini gaze access tool (Moreno et al., 2020; Moreno et al., 2021a). Also, through the analysis of the information compiled in the interviews, we obtained information that "...the interviewees consider that if we provide them access to a ‘musical instrument’ through the use of Support Products, some curricular adaptations and a good support network (people), the child will also be able to attend Music Learning..." (Moreno et al., 2020, p. 701).

In a second moment, with the results obtained in the child's characterisation, we searched for information in the literature on the existence of successful inclusion processes of children with CP in the AEPM. Through this search we found: (i) studies that talk about the inclusion of users with SN in music education (ME) through adaptations to traditional musical instruments that are used by them and/or some curricular adaptations made to the teaching programmes of AEPM; (ii) emerging studies that talk about the positive results obtained for the inclusion of users with SN in ME, through the collaborative work developed between health professionals, MTs, engineers and users for the construction, adaptation, and use, in a personalized way, of digital musical instruments – DMIs (Moreno et al., 2021b; Moreno et al., 2022). As a result of these searches, we concluded that both the adaptability and personalisation of DMIs, user participation, and iterative prototyping, together with the promotion of interdisciplinary development teams, could facilitate the inclusion processes of children with SN in the AS of the ME in Portugal (Moreno et al., 2021b; Moreno et al., 2022). Even so, unfortunately, we have not yet found any results that could guide us, in a specific way, on the inclusion of children with CP in the AEPM.

These literature reviews have taught us that DMIs, when transformed into accessible music control interfaces which can be used in electronic music or inclusive music practice and music therapy settings, can come to be considered ADMIs or, "... accessible musical control interfaces used in electronic music, inclusive music practice, and music therapy settings” (Frid, 2019, p. 3). In this context, Emma Frid (2018, 2019) identified among ADMIs to date, ten types of interfaces used for control, namely: "... tangible controllers, touchless controllers, Brain-

Controlled Music Interfaces (BCMIs), adapted instruments, wearable controllers or prosthetic devices, mouth-operated controllers, audio controllers, gaze controllers, touchscreen controllers and mouse-controlled interfaces" (Frid, 2019, p. 15).

With this new information, we went in search of ADMIs that could meet the needs of the child with CP, which gave rise to our study, by facilitating their access to a musical instrument to be used in the AEPM of the AS that they intended to attend (Moreno & Maia, 2022). This is how we became aware of two ADMIs built and developed at the Laboratory of Music Informatics of the University of Milan (LIM-UM), Italy. These ADMIs are Netytar and Netychords. Both instruments work employing software designed to be installed on the computer. These software items are easily accessible and can be accessed through the computer keyboard or employing support products that enable access through various ways: of the gaze, of breathing, of head movement, or even resonances stimulated in the upper vocal tract, therefore practicable without hands (Davanzo, 2022). These ADMIs could be controlled through interaction channels placed in the user's head. Due to this specificity, these authors named these ADMIs as HeaDMIs. "The name 'HeaDMI' summarizes the wording 'DMIs controlled through interaction channels placed on the user's Head'" (Davanzo, 2022, p. 9).

Due to the ease of interaction and control channels provided by these HeaDMIs, we believed that this research project would meet the needs of the child with CP under study in Portugal since they use the same forms of access to communication and information that the child under study has: through the use of assistive products through access by gaze (computer, GRID3 software, and PCEye mini).

We will now contextualise both inclusive education and the different modalities of inclusive education that are developed in Portugal.

Education in Portugal

With the approval of the Basic Law of the Portuguese Education System (BLES, 1986), education policies were being executed with a double objective: (i) to extend the number of years of compulsory education, ensuring children and young people of school age have equal access to school, and (ii) to guarantee a quality education, providing the best educational opportunities for all. The priority of the education system is focused on ensuring quality learning for all without exception and ensuring the best educational opportunities (Lima, 2018; Sousa-Pereira & Leite, 2019). These policy statements are a single educational referential that, accepting the diversity of existing pathways and realities, ensures both the coherence of the country's education system and provides meaning to compulsory schooling (Sousa-Pereira & Leite, 2019). Thus, in Portugal, school is seen as a place where everyone has the right to learn through a curriculum that directs each student to the limit of their abilities (Pereira et al., 2018; Martins et al., 2017).

With the enactment of Decree-Law 344/1990, of November 2nd, due to the progressive democratization of education, the increase in the dissemination of cultural goods and the proliferation and development of the Arts, whether in terms of creation, interpretation, production, diffusion, or fruition, the general bases for the organisation of pre-school, school and out-of-school Arts Education were established (DL. 344/1990). This diploma considers Arts Education Programmes (AEP) in the areas of music, dance, theatre, plastic arts and cinema, and audio-visual in its different modalities (Table 1).

Table 1
Modalities of arts education programmes in Portugal

Modalities	**Description**
Generic	It is aimed at all citizens, regardless of their specific aptitudes or talents in some area, and is considered an indispensable part of general education.
Vocational	Consists of specialised training, aimed at individuals with proven aptitude or talent in some specific artistic area.
Special Modalities	Consists of Arts Education carried out according to specific models.
Extracurricular	It aims at perfecting, complementing, updating, or reconverting training already received in the field of the Arts.

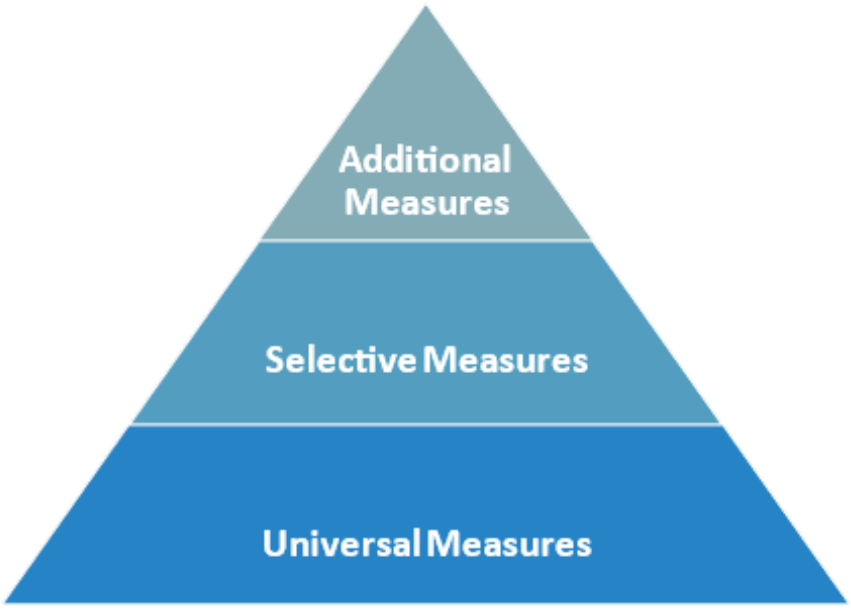
As can be seen in Table 1, the AEP contemplates the existence of multiple strands, these are the modalities: generic, vocational, special modalities, and extracurricular (DL. 344/1990). Regarding the vocational modality (also called specialist arts education or SAE), a school organization was established with different strands in education: integrated education (when students have all their classes in the same school); articulated education (when there is an articulation between two or more schools to organize the students' class schedules); suppletive education (when the student attends music classes beyond their school hours, usually this happens in the afternoon), and free courses (this is a special offer of the schools; they are courses without curricular obligation). As far as special modalities are concerned, this is a teaching modality with specific characteristics, such as: special education; professional education; recurrent adult education; and distance learning. As far as professional education is concerned, it aims at training fast-track performers in various artistic areas, without necessarily having correspondence to academic degrees (DL. 344/1990).

Furthermore, the law contemplates as objectives of AEP the following: (i) to stimulate and develop the different forms of communication and artistic expression, as well as the creative imagination, integrating them in order to ensure a balanced sensory, motor and affective development; (ii) to promote knowledge of the various artistic languages and provide a varied set of experiences in these areas, in order to extend the scope of global training; (iii) to educate aesthetic sensibility and develop critical capacity; (iv) to encourage individual and group artistic practices, aimed at understanding their languages and stimulating creativity, as well as supporting the creative occupation of free time with activities of an artistic nature; (v) to detect specific aptitudes in any artistic area; (vi) to provide specialized vocational and professional artistic training, namely for performers, creators and professionals in the artistic branches, in order to allow them to reach a high technical, artistic and cultural level; (vii) to develop teaching and research in the areas of the different arts sciences and; (viii) to train MTs for all branches and levels of artistic education, as well as cultural animators, critics, managers and artistic promoters. Thus, artistic practice, when it is of a high standard, may also be the object of special protection and regulation when it is primarily aimed at educational purposes and has in view the further development of the exceptional aptitudes peculiar to the trainees AEPM (Azevedo, 2019; DL. 344/1990).

So that all students see their right to learning and educational success guaranteed, the 6 July 2018 new Decree-Laws were included in the Portuguese legislation guidelines (DL. 54/2018; DL. 55/2018). With the application of these Decree-Laws, principles and standards were established that guarantee inclusion as a process that aims to respond to the diversity of needs and potential of all and each of the learners (DL. 54/2018), as well as the access of all students to both the right to learning and educational success through guiding principles that

aim at the assessment of these learnings (DL. 55/2018). Thus, the guiding principles of the design, operationalization, and assessment of learning in the curriculum of basic and secondary education were advocated to ensure that all students acquire the knowledge and develop the skills and attitudes necessary to achieve the competencies set out in the profile of students exiting compulsory schooling (Despacho n.º 6605-A do Ministério de Educação e Ciência, 2021; Pereira et al., 2018; Martins et al., 2017; Sousa-Pereira & Leite, 2019). In this context, some measures have been created to ensure the inclusion of all students in the school environment (Figure 4). Measures that aim to facilitate the school organization, establishing some principles and standards of curriculum management, to ensure access to the curriculum through curricular flexibility given the educational success of each student.

Figure 4
Measures to support learning and inclusion



As we can see in Figure 4, the measures to support learning and inclusion to respond to the needs, interests, and potential of students throughout their school career, can be framed in three major axes:

- Universal measures: educational responses that the school has for all students. The aim is to promote participation and improve learning
- Selective measures: responses that aim to meet the learning support needs not met by universal measures
- Additional measures: responses that aim to meet marked and persistent needs (communication, interaction, cognition or learning that require specialized resources; Periera et al., 2018, Martins et al., 2017; Sousa-Pereira & Leite, 2019)

Finally, regarding our study, the Portuguese legislation poses interesting questions that we highlight: what can be done so that the child with CP that gave rise to the study has access to the AEPM? How can the AS organise itself to meet the needs of the child under study? What

should adaptations to the syllabus be made? How will the space and time be organised so the child can fully develop in music learning? What equipment or musical instruments can the child use? What strategies should be developed to promote their access? What activities should they perform to comply with the music curriculum? How and in what way will we assess their learning?

With these questions, we will present the objectives and methodology used in our study.

Objectives

We intend to know how the development of the inclusion processes of the child with CP, which gave rise to our study, was in the AS located near their residence, throughout the intervention project (IP) that was carried out with a duration of six months. More specifically, we intend to know:

- How was the process of entry of the child to the AEPM of Articulated Teaching in the AS?
- How was the work done by the child's piano teacher during this period?
- What were the curricular adaptations proposed and developed by the MTs of the ensemble and music formation classes?
- Was the child in the study able to fulfill the objectives proposed by them?
- Were adapted musical arrangements and/or compositions made (or not) so that the child could comply with the requirements of the AEPM? If yes, what were they?

Methodology

This is a qualitative-documentary ethnographic research, as we sought to understand and describe the results of the inclusion processes developed through an IP in the AS where the child under study participated. To achieve this, we immersed ourselves in the social context we wanted to study, recording the interactions carried out in the educational community – MTs, operational assistants (OAs), parents and guardians (PGs), and classmate's children (CCH) of the child under the study of this AS. We identified the interactions, the challenges, and the barriers that occurred in the normal working environment of this educational establishment. This is because, "human interactions are permeated with meanings that, in turn, are always part of a cultural universe" (Amado, 2017, p. 150).

In this context and to conduct the study, a flexible participant observation methodology was adopted, given that this "... has as its principle the need for the researcher always to maintain some degree of interaction with the situation studied, affecting it and being affected by it" (Amado, p., 155). In this sense, as observers, we also adopted a "technique based on observation, focused on the researcher's perspective, in which the researcher observes the phenomenon under study directly and in person" (Coutinho, 2018, p. 370). In this context, for the development of this study, we chose to use a "flexible approach that involves performing a naturalistic observation of the different environments, using Participant Observation and the field diary, conducting interviews and analysing different documents" (Amado, 2017, p. 150).

Thus, as this research has a defined objective that is related to the objectives presented throughout the IP that was carried out, the three researchers involved in this study "participated" as "informants" in the ongoing research on the life of the "observed," requiring for the completion of this research work, several records (see Table 3), in the period between September 2022 and December 2022 (Amado, 2017; Coutinho, 2018).

Table 3
Organigramme of the work carried out

Dates	Activities	Instruments and techniques
June to September	Preparation of materials to be used for the whole IP. Preparation of the child's entry contexts in the AS.	Field Diary Participant Observation
September to December	Follow-up and monitoring the teaching/learning process developed in the AS, the child, attends.	
December	Organization and analysis of the compiled material to prepare its subsequent discussion, validation and writing for publication.	webQDA Content Analysis Tool

This was a cyclical process of observation, interaction, and participation with a defined objective and a universe of symbols and meanings, which positioned us in an eclectic, dynamic, experiential way, of (re)interpretation and (re)formulation within the community, so that the constructed and reconstructed reality could be studied in the best possible way (Amado, 2017; Coutinho, 2018).

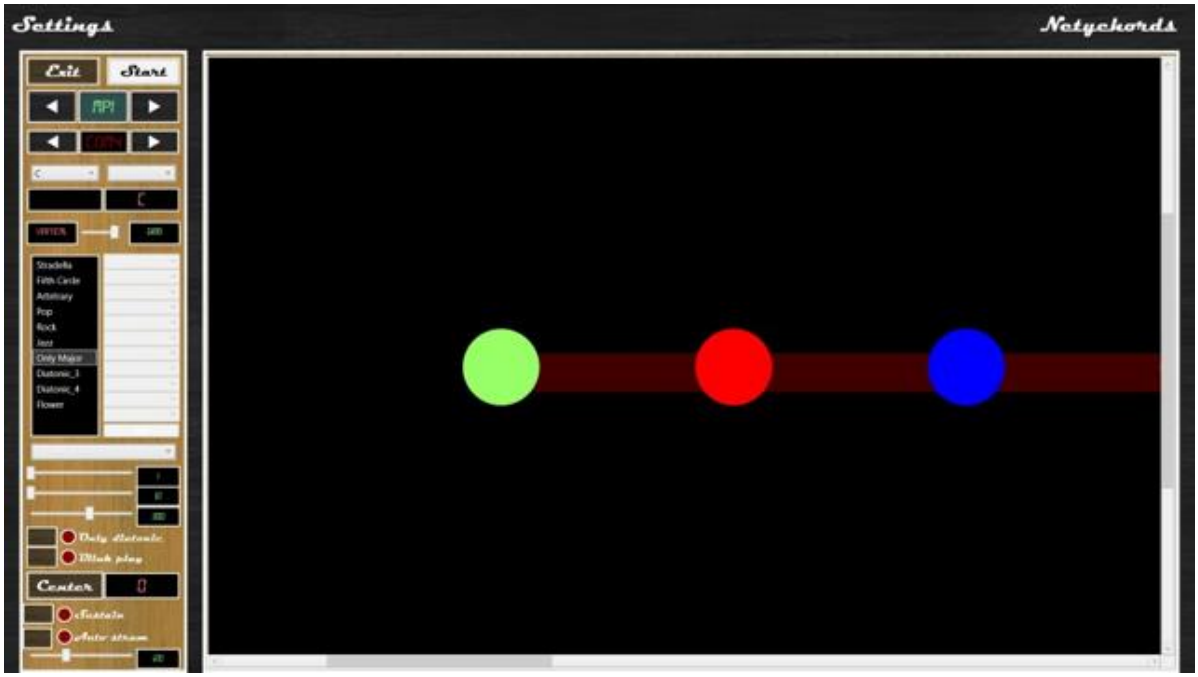
Thus, as the child under study cannot sing, percussion, or blow any musical instrument in a "traditional way," the months from June to September (see Table 3), were fundamental to raising awareness among the MTs in charge of the performance of the music training selection test, making known and preparing the materials that the child under study will use to perform this test through the use of GRID3 and the HeaDMIs (Netytar and Netychords). In addition, it was necessary to prepare the contexts of the child's entry to the AS so that they can fully develop their skills in the AEPM. The preparation of these contexts included the following actions: raising music teachers' awareness to consider the use of HeaDMIs for music teaching; promoting the existence of support (people) in the AS; promoting curricular adaptations or adapted materials when necessary; and promoting the formation of collaborative work teams, facilitating accessibility in the different contexts.

As the formative offer of the AS includes the piano instrument and the child liked this musical instrument, it was registered as their first option. They were admitted by the MTs responsible for the key instruments department, as a piano instrument student in the current academic year 2022/2023. Also, in this period, we recorded in the field diary. These coordination meetings were held with the director of the AS and the board of MTs responsible for the Curricular Department of Key Instruments. Some of the materials to be used (for example, adapted scores, which can be seen at the following link: https://enriquenopiano.blogspot.com/) were prepared; the processes of participation and inclusion of the child with the other children were promoted; and it was ensured that all conditions were in place so that the child could attend the teaching of music in this AS (accessible physical spaces; support - people/technologies, etc.).

From September to December (see Table 3), after the MTs for the piano, music training, and ensemble courses were selected through a competition, the lessons of these courses were

recorded in the field diary. These classes were held continuously, following a schedule of two teaching hours of 45 minutes each, twice a week. Due to some communication problems between softwares Grid3 and Netytar, it was decided together with the Italian Engineers (LIM-UM researchers) to focus on the use of HeaDMI Netychords (see Figure 1), which were easier to use, so that the child could comply with the AEPM requirements of the piano discipline and feel more secure and willing to experiment the learning of music (see Figure 5).

Figure 5
Layout for HEADMI Netychords



As can be seen in Figure 5, the child under study uses the HEADMI Netychords following a relation of chords between musical notes and their relative ones based on the American notation La-A; Si-B; Do-C; Re-D; etc; following a simple sequence of chords related to the major and minor scales, which could be repeated, following the colours already previously established in this instrument. More specifically, the chords represented by the colours red, blue, and green, are related to the major chord of the tonality in which we intended to work, in this case. As observed in the control panel on the left side of Figure 1, it is the tonality of C major. Therefore, the major chord, in C major (letter C), is in the centre, in red colour. Next, the fifth degree of the C major scale, which is the G major chord (letter G), is on the right, coloured blue. Finally, the fourth degree of the C major scale, the F major chord (letter F), is on the left, coloured green. This layout was developed in all major and minor scales and the tonality can be changed at will, looking for the possibilities of tonality change through the control panel on the left of the image.

For the development of this study, the activities carried out between the week of September 19th and the week of December 19th were registered in the field diary, totaling 14 weeks (three months of intervention). Finally, in December 2022 (see Table 3), all the material compiled using the webQDA was organized to prepare its subsequent analysis, discussion, validation, and academic writing for publication, which resulted in this article.

In this context, the main author of this article, as a participant observer, thoroughly examined the actions performed by the different actors present in the educational community of the AS, the child is attending. This researcher introduced himself to the school culture,

recording the actions as a whole and in their parts. The other two researchers involved in the research work had both the task of reviewing the veracity of the information compiled and validating the categories that would be constructed from that information. To achieve this end, techniques based on Observation were used, "...centred on the researcher's perspective, in which the researcher observes directly and in person the phenomenon of study (Coutinho, 2018, p. 370) ..." and techniques based on conversation, "...centred on the perspective of the participants framing ourselves in environments of dialogue and interaction..." (Coutinho, 2018, p. 370). In addition, the phenomena, interactions, and events that occurred in everyday life were studied, obtaining the information as these phenomena emerged and recording them in a field diary (see Table 4).

Table 4
Different types of recordings were made in the field diary

Types of records	**Record quantity**
Field Notebooks	34
Field Notes	16
Photographs	15
Audio recordings	6
Videos	10
Interviews and conversations held	36
Meetings	6

The field diary was used as a personal document in which observations, comments, and reflections, obtained through observation and conversation techniques, were recorded (See Table 4). After eliminating all the records made in the field diary which were not related to the purpose of our study, a total of 123 different types of records were selected. More specifically, 34 written records from field notebooks, 16 records from field notes, 15 photographs, six recordings, ten videos, and 36 written records of informal interviews conducted were selected. Six meetings were also included, which aimed to solve possible problems that could be encountered both in the use of the HeaDMI Netychords and so that in the future the HeaDMI Netytar could be used, as well as in the processes of Inclusion of the child in the AS. In these meetings, different professionals from the areas of music, engineering, education, and health were integrated. More specifically, for this study, both the records made in the field notebook were considered, as well as: the computer notes, the messages recorded in the WhatsApp Group that was created for this purpose, the emails sent and received related to our research topic, the notes and summaries of meetings that were held, the videos and the conversations made to the different stakeholders of the educational community of the AS – MTs, OAs, PGs, and CCH of

the child under study (see Table 5). The anonymity of each of the people involved was always preserved.

Table 5
Questions with their objectives

Population to be surveyed	**Objectives**	**Questions**
Music Teachers (MTs)	• To know: i. Whether the MTs had to modify (or not) their teaching way due to the presence of the child under study, and if so, what were those changes? ii. MTs' perspectives on the frequency of students with disabilities (communication; intellectual; visual; hearing impairment; motor) in music classes in the AS. iii. The level of preparation that MTs feel they have, after undertaking the IP, to teach students with motor and communicative disabilities. iv. The MTs' specific needs regarding this preparation. • To assess MTs' satisfaction with their participation in the IP. • To gather suggestions on how to improve the IP. • To give enough space for them to express some aspects they find	➢ How are the music lessons going? Do you consider that the presence to children with CP, a student with motor and communication disabilities, changes the way you teach music? If you answered yes, which were the changes that you did? ➢ What do you think about the attendance of students with disabilities (communication; intellectual; visual; hearing impairment; motor) in music classes at the AS? ➢ In your opinion, after participating in this IP, do you consider yourself better prepared to teach students with Motor and Communicative disabilities? ➢ In your opinion/experience, what was the biggest challenge in teaching music to children with CP in this IP? ➢ In your opinion, what was the most rewarding for you in teaching music to children with CP in this IP? ➢ Did you feel that throughout the development of the IP you needed support and resources for teaching music to children with CP? ➢ What do you consider necessary to feel more prepared to teach students with Motor and Communication disabilities? What other skills would you like to develop? ➢ What suggestions do you have to improve the IP? ➢ Would you like to participate in this IP again in the future? ➢ Is there anything else you would like to share about your experience teaching music to children with CP in this IP?

	interesting and/or relevant about this subject.	
Operational Assistants (OAs)	• To know if: i. The OAs, due to the presence of the child under study, had to modify (or not) their way of working. If so, what were the changes. ii. After the development of the IP, the OAs consider themselves prepared to give support to other students with SN. iii. To assess the satisfaction of the OAs with their participation in the IP. iv. To collect suggestions on how to improve the IP. • To leave enough space for them to express some aspects they find interesting and/or relevant about this subject.	➢ Do you consider that the presence of children with CP changed the way you work? ➢ In your opinion, after the IP, do you consider yourself better prepared to support students with disabilities (communication, intellectual, visual, hearing impairment, motor)? ➢ Did you feel that throughout the development of the IP you were provided with opportunities to collaborate and to learn from other OAs and/or MTs? ➢ Did you feel that you had all the necessary support and resources to meet the child's needs throughout the IP course? ➢ What other skills would you like to develop? ➢ Is there anything else you would like to share about your experience as an OA in this IP?
Classmates Children (CCH)	• To know: i. If the CCH have the perception that one can learn music in several ways: Conventional and/or "unconventional". ii. Children's perception of how the child with CP learns music. iii. To assess CCH's satisfaction with their participation in the IP. iv. To collect suggestions on how to improve the IP.	➢ Can you tell us about your experience of learning music? What did you like the most? What didn't you like? ➢ Do you think that everyone learns music in the same way? ➢ Did you like to meet with Child with CP? ➢ Do you know how the child with CP learns music? ➢ What do you think could be improved so that children like the child with CP can learn music even better?

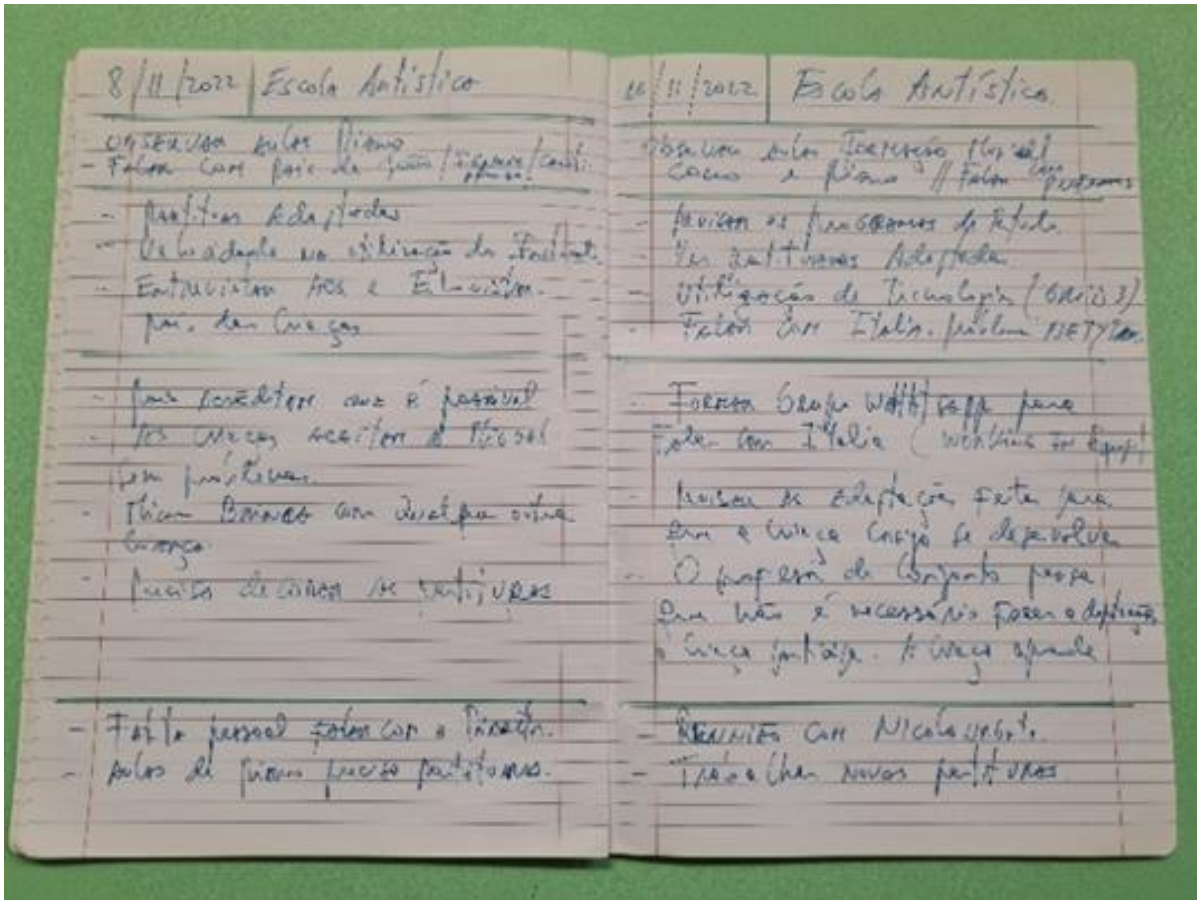
	• Leave enough space for them to express some aspects that they find interesting and/or relevant about this subject.	
Parents and Guardians (PGs)	• To know: i. The impact that the participation of the child under study, in music classes, produces on the other children. If they talk at home about the child with CP. If so, to know what they said about him. ii. Whether there is any specific impact that PGs perceived on the participation of children with SN in music lessons. • To assess CCH's satisfaction with their participation in the IP. • To gather suggestions on how to improve the IP. • To leave enough space for them to express some aspects they find interesting and/or relevant about this subject.	➢ Does your child talk about any CCH who have motor or communication disabilities? ➢ Do you feel that your child's AS is inclusive and welcoming to all children including the child with CP? ➢ What were the advantages and/or disadvantages for your child of attending music lessons with a child with Motor and Communication Limitations? ➢ What do you think about the attendance of students with disabilities (communication; intellectual; visual; auditory; motor) in music classes in the AS? ➢ Are there any aspects of music lessons that you would like to mention? ➢ Would you recommend this IP to other PGs? ➢ What suggestions do you have for children with CP to learn music?

As you can see in Table 5, to understand whether there is any impact due to the attendance of the child's music classes in the study, we prepared some questions that could guide the processes of conversations or interviews carried out with: (i) MTs of the child with CP; (ii) OAs who work in the AS that the child with CP is attending; (iii) CCH of the child with CP; and (iv) PGs of the children who attend, together with the child with CP, the AEPM of the AS that is close to their homes.

All data compiled were subject to content analysis carried out by two subjects simultaneously. A “unit of registration” was defined as follows: in the cases of written text, each segment of text, which referred to a specific subject corresponding to a category, was considered a unit of registration. Each time the text changed its subject, it was considered a new unit of registration and consequently placed in a new category. Each category was only

considered valid when both subjects agreed. Below we present some examples of the records made throughout this study (see Figure 6 and Figure 7); in the case of the videos and audio, these were divided into frames. For each frame, a small piece of video or audio was considered that referred to an idea, thus being categorised. The photos were considered separately, referring each photo to a unit of registration, and consequently, a category.

Figure 6
Field notebook



As we can see in Figure 6, the field notebook used comprises the records which include the various annotations – field notes – made daily. For a better organisation of the information to be recorded, we made a layout with subdivisions in the field notebook. In these subdivisions, we recorded the date and place where the activity was taking place, the people or teams involved, the objectives, the actions carried out, and finally a summary of what happened. More specifically, in these field notebooks, we took notes of our records and observations of the concrete facts, the events, the feelings, the relationships that took place, our personal experiences, and the reflections, comments, and descriptions made during the activity. We paid special attention both to the events experienced in the daily life of the child under study with their peers and to the work developed by the piano, music training, and ensemble class MTs.

As can be seen in Figure 7, in addition to the daily field notes (see Figure 6), the interactions performed by the child in different contexts and with different people were considered, and, to this end, the respective image and audio authorisations of the interviewees were obtained, photographed and/or recorded (Figure 7). All video, image and audio records

that were used for the development of this research work, were fully authorized for use through signature and informed consent.

Figure 7
Picture records of the activities carried out

Finally, all the information recorded and compiled in the different records used in the field diary was processed using the content analysis technique supported by the webQDA software (https://www.webqda.net/).

The webQDA software (Costa & Amado, 2018) provides the user the possibility of performing content analysis through the organisation and systematisation of information, a situation that includes both the observation and analysis of photographs and videos and non-numerical and unstructured data, enhancing the definition of the dimensions required for the type of ethnographic, qualitative-documentary methodology that we used in this study (Costa, 2023; Costa & Amado, 2018; Minayo & Costa, 2018). More specifically, in the internal sources system in webQDA, the text files referring to each record made in the field notebook (including the recording of the interviews) and the field notes were inserted, which were transcribed and stored in the software's internal sources.

Then, observing the records, we started by performing a search for the most frequent words, eliminating the words with less than four characters, which gave rise to a word cloud. These results were used as guidelines to start the source coding. On this basis, we started to make inferences, by reading the data inductively. Readings were made of the answers to each question, looking for patterns and comparing each of the data compiled in the software. As the records made in the notebooks and field notes contained open information, this was compiled and considered globally. Thus, the categorisation was made by text segments – text units – inductively. This led us to an organisation by themes according to the information compiled and not according to the order of the records made.

Concerning the audio recordings and the videos recorded, these were stored in the external sources of webQDA. Because of this, it was possible to listen to them or watch them and review them, as many times as necessary, to identify significant references, until all

possibilities were exhausted. During this observation, the researchers tried to find meaningful units that subsidised the categories and subcategories of analysis, corresponding to frames and small divisions of each of the stored audio or films. In other words, while the videos and recordings were being watched and listened to, we paused and signalled in small excerpts to categorise the frames. This construction process implied an ideographic approach since the categories were defined inductively, according to the frames of the videos and audios that were established. Finally, the analysis of these frames was done down to detail to saturate the categories (Minayo & Costa, 2019). Furthermore, a detailed and rigorous description was sought to ensure the validity and credibility of the qualitative study (Amado, 2017).

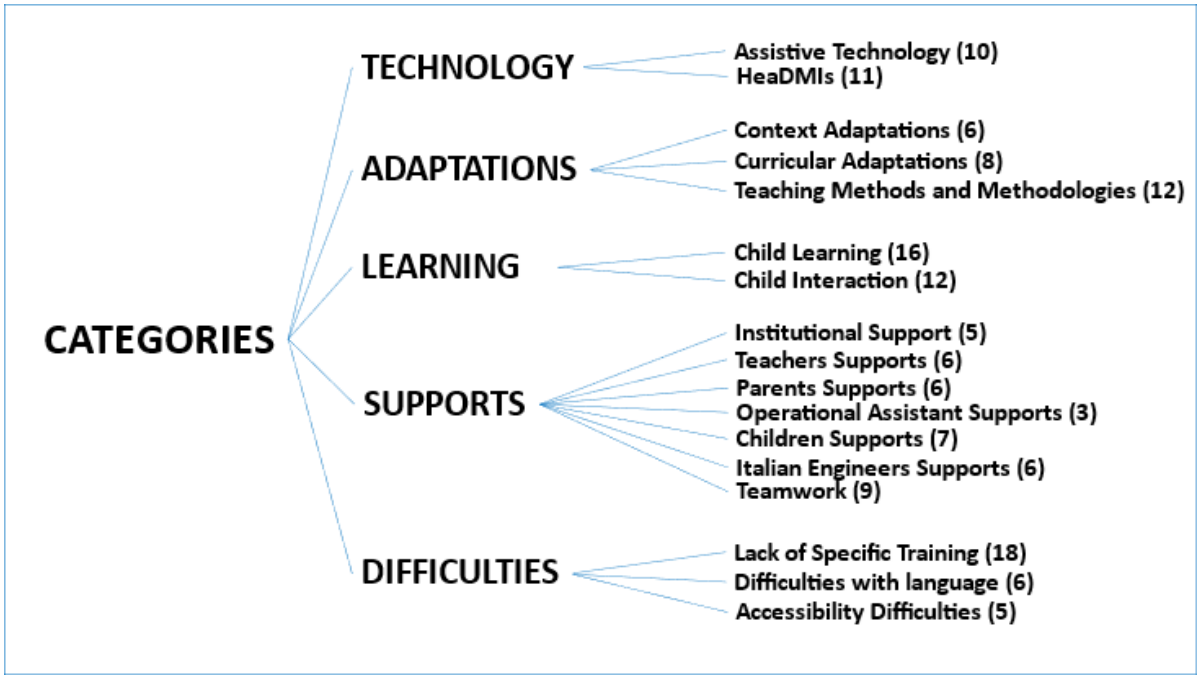
Finally, an analysis of the frequencies of the categories related to each of the themes that were compiled by each of the field diary records described here was performed. To maintain the confidentiality of the studied context, as well as the participants' anonymity, all information was only viewed by the researchers and authors of the study. The data collection and analysis procedure were carried out in December 2022, in Portugal (See Table 1), and anonymity and all ethical issues involved were always safeguarded.

Next, we will present the analysis and discussion of the observed data.

Analysis and Discussion of Results

As a result of the actions performed, categories were inductively constructed, and differentiated by action records. More specifically, categories related to all the information recorded in the field diary (see Figure 8).

Figure 8
Categories and subcategories tree



As shown in Figure 8, the information compiled in these groups of information is related to categories that refer to aspects catalogued as: technology; adaptations; behavior; supports; difficulties. Next, we will explain each of these categories and subcategories:

Technology: Among the categories related to technology we have the following: assistive technology (ten categories) and HeaDMIs (eleven categories). Below are some examples of sentences taken from the field notebook, which were compiled and then categorised using webQDA software as an analysis tool: "The child is learning to use the Netychords and to make music using the computer, very well"; "The child needs to master the eye-tracker to be able to access the Netychords even faster"; “if the child works regularly with the HeaDMIs Netychords and also when he is ready the HeaDMI Netytar will do the same. This will facilitate even more their learning overcoming more and more the technological barriers that have been found”; "it is important to always have a pedagogical point of view, to propose changes, so that step by step, in sequence, the necessary adaptations for an effective use of the HeaDMIs can be made"; "we can write some rhythmic figures in Grid3 so that the child can use them in music classes"; "the child has already learned to use very well the PCEye mini. But he will have to learn to use the new PCEye5 very quickly. This eye-tracker is much faster and more functional”; “Yes, the child knows how to use Netychords very well, but they still need to learn how to use Netytar. But, with the use of Netychords, we will be able to meet the requirements of the First Year Piano Programme”.

These categories and their evidence make us think about the importance that technologies has for the child under study to be able to attend the teaching of music in the AS. Even if the child is not able to have the psychomotor coordination required by the Curricular Department Program of Study – key instruments of the piano disciplinary group – with the use of these technologies; and as the evidence compiled in this study shows us, the use of the computer, the eye-tracker PCEye mini, and the HeaDMI Netychords; can help the child to fulfill the requirements requested by the mentioned program of study. The images, videos, and written records in the field book, demonstrate that the use of these technologies facilitates both good musical performance and good artistic performance of the child under study in this AS.

Adaptations: Next, among the most frequent categories related to adaptations we have the following: context adaptations (six categories); curricular adaptations (eight categories); and teaching methods and methodologies (twelve categories). Below are some examples of sentences taken from the field notebook, which were compiled and then categorised using the webQDA software as an analysis tool: "We are going to have a concert with the choir, we have to see if there are minimum conditions in the transport and in the place of performance for the wheelchair to go"; "In the oral part of the lesson the student strives to do the same as their colleagues”; “So far, the student can say the interval number, i.e., two for second, three for third, four for fourth, etc. In the future, with the identification of the type of interval (bigger/smaller), it may be more complicated, but these strategies and adaptations will continue to be created”; "For the time being there are no adaptations in the Ensemble Class (choir), in this class, the child participates actively together with the other children being for the time being evaluated in a continuous form, with evidence".

As we can see, these categories highlight some situations of curricular adaptations that were carried out by the MTs in the AS. In this case, besides the evidence stated here, we also want to highlight here the curricular adaptations presented by the piano teacher and the music training teacher. Adaptations in piano: (i) composing/arranging accompaniments to melodies (created or existing) for performance in the Netychords programme; (ii) adapting and adding new modes in the Netychords programme to include some of the items required by the piano instrument programme (examples: "diatonic 3" mode serves for major scales; mode “only major” serves for accompaniments with grades I, IV, V); and, finally, (iii) adaptation of scores with major notation, to allow simultaneous reading and playing. Adaptations to music formation: (i) definition of codes for different rhythmic cells (example: 1 – quarter note, 2 – eighth note, 4 – semi-eighth note, etc.). As it is quicker for them to respond in writing, the

student writes using Grid3 and eye-tracker, in Word using a text box on the computer; and (ii) auditory identification of chords through different facial gestures for major and minor chords.

All the adaptations made by the AS teachers have positively facilitated the participation of the child under study in the organised musical and artistic activities. This situation is completely in line with the curriculum management, flexibility, and autonomy measures proposed by the School Leaving Certificate Profile Policies (see Table 6).

Table 6
Curricular management, flexibility, and autonomy measures

Management measures	**Definition**
Curricular accommodations	School curriculum management measures that allow access to the curriculum and learning activities in the classroom, which have been planned to respond to the different learning styles of each student promoting educational success.
Non-significant curriculum adaptations	Curricular management measures that do not compromise the learning foreseen in the curricular documents, which may include adaptations at the level of objectives and contents, because of developing the competencies foreseen in the Profile of the students upon graduating from mandatory schooling.
Significant curriculum adaptations	Curriculum management measures that have an impact on the learning outcomes set out in the curriculum documents, requiring the introduction of other substitute learning, to enhance autonomy, personal development, and interpersonal relationships.

As we can observe in Table 6., the measures of curriculum management, flexibility, and autonomy, are part of an approach that aims to ensure that all students have access to the curriculum (Periera et al., 2018; Sousa-Pereira & Leite, 2019). In this context, the promotion of better learning and the development of skills is established both by the effective exercise of autonomy by schools and by the curricular flexibility to be developed for the participation and educational success of each student (Periera et al., 2018; Martins et al., 2017), a situation that is positively evidenced in the records made in the field diary. In the case of this child, only Curricular accommodations and non-significant curriculum adaptations are performed since the child can follow the normal planned curriculum.

Learning: Among the categories related to learning we have the following: child learning (16 categories); child interaction (twelve categories). Below are some examples of sentences taken from the field notebook, which were compiled and then categorised using the webQDA software as an analysis tool: "The child has shown a good capacity for learning and even more for self-improvement"; "Good, you managed to master the Netychords, now we will be able to make music together"; "I really enjoyed playing together with you"; "it is wonderful to see a child with such a will to learn, I wish we all had the vital force they have"; "In the video recording of the performance made at the Christmas concert, we can observe that the child is concentrated and involved in their performance. They are interacting musically, using

the Netychords, together with their colleague and the Piano teacher who is at the piano making music for four hands, they are all interacting and making music"; "In the image, it is possible to observe the children involved in learning, they are so concentrated interacting with each other that it seems that they are in a magical trance".

As can be seen, these categories highlight actions related to the child's learning and interaction. These processes are related to the interactions that the child builds around them and how these interactions are managed by the child himself/herself or are built in the interaction with others. A situation that is related both to Vygotsky's processes of development and learning (Brown et al., 2003; Moreno et al., 2021a) as well as to circles of support or circles of friends due to the exchanges that take place between teachers, friends, and CCH (Falvey et al., 2011).

Supports: Among the categories related to supports we have the following: institutional support (five categories); teachers' support (six categories); parents' support (six categories); operational assistant supports (three categories); children support (seven categories); Italian engineers supports (six categories); teamwork (nine categories). Below are some examples of sentences taken from the field notebook, which were compiled and then categorised using the webQDA software as an analysis tool: “Rest assured, we realised that we can only hold the concert if all children can participate, this means that the AS Management together with the City Council are taking care that all the accessibility conditions that are requested are given, such as adapted transport and access ramps”; "in the picture, you can see how the MTs facilitate the action by helping the child to sit in the wheelchair"; "Gonzalo knows very well how to help, even better than the adults, he blocks the wheelchair and explains to the Teacher how the child should be placed in the Walker"; "the Operational Assistant is helping the child in the bathroom"; "the mother is present in all the activities that are possible, she is a true support for the child"; “the Italian Engineer is attentive to perform all the adaptations that we request to be made in the HeaDMI Netychords. Moreover, he is communicating with the Piano Teacher to adapt the HeaDMI Netytar so that promptly this instrument can be used using the new eye-tracker PCEye5”; "in the image, it is possible to observe the collaborative work that everyone is doing"; "The teamwork developed between the MTs, the child's relatives and the Italian Engineer are very important"; "this frame of the video shows how the collaborative work developed between the children facilitates everyone's learning, look at their Happy face".

As we can observe in the examples of the most frequent categories, related to supports, examples can be found connected to the support and participation performed by all the agents of the educational community who are involved in the action, in the spaces in which the activities take place and in the child's learning. Furthermore, the promotion of the collaborative work that is developed among teachers of the artistic school, PGs, and Italian engineers, who have been always working to make the HeaDMIs that the child is using more accessible, meet aspects related to the context and the environment in which the child experiences its interactions, contexts that in this situation, we can relate to Urie Bronfenbrenner's Ecological Model of human development. These exert direct or indirect influences on the development and learning of the child under study (Moreno et al., 2021a; Tudge et al., 2016).

Difficulties: Among the categories related to difficulties we have the following: lack of specific training (18 categories); difficulties with language (six categories); and accessibility difficulties (five categories). Below are some examples of sentences taken from the field notebook, which were compiled and then categorised using the webQDA software as an analysis tool: "As the child can neither speak nor sing and has no motor control of his extremities, his biggest difficulty is in being able to play some musical instrument in the usual way"; "At the moment our eye-tracker doesn't work, if we don't have the necessary support

products, he can't communicate with the computer"; "you can't understand very well what they want to say, but with ‘some way’ they can communicate"; "We lack training, we lack specific training, we need the training to know how to work with these children"; "I believe that we are going to have some difficulties for the child under study to access the music teaching curriculum because we lack the training to help us"; "Even with the use of this HeaDMI, the child is going to have difficulties to access the AS curriculum, we are going to have to make curricular adaptations"; “what worries me most is the patience and the ability to wait that MTs can have with my son/daughter. For them to be in music lessons, we need to arrive with the wheelchair to the classroom, after that, we must install the computer and wait for it to be ready. Next, we must calibrate the eye-tracker and only then they can start using the Netychords. All this takes about 15 minutes and sometimes, unfortunately, the system and/or even the MTs don't have all that time available. Even so, we will see how it goes, I believe that everything will work out”; “Even with the use of these HeaDMIs, the child will have difficulties in accessing the curriculum, we will have to make some curricular adaptations”; “The student even manages to respond in class with some difficulty, being more or less on the same level as his colleagues in terms of speed, I'm talking about the auditory rhythmic part. In the remaining dictations, the student writes using the Technologies. But we must consider that it is necessary to repeat many times what is dictated which slows down a little the course of the lessons”.

As we can see, these categories highlight some of the difficulties encountered or experienced which were recorded in the field diary between lack of specific training in addition to difficulties of access and communication. This means that not everything recorded was 'rosy,' although in most cases, these difficulties were overcome. However, at times this required a great deal of effort for those involved. We observed and recorded how often when the child encountered some difficulty, they did everything in their power to overcome this difficulty, with willpower and a spirit of overcoming. An example of this was experienced and registered by the constant development that the child under study has had to overcome their difficulties and thus manage to learn music with their peers.

Figure 9
New Netychords layout

Even with some difficulties encountered and registered, we must point out the enthusiasm and joy of the child for learning. The involvement of the MTs and the willingness of the Italian engineer to correct possible communication problems between software and facilitate the child's access to the instrument by developing a more accessible and user-friendly layout for a ten-year-old child (see Figure 9).

Regarding the HeaDMI Netychords layout shown in Figure 5. As we can see in Figure 9, a new layout has been developed by the Italian engineer. In this new layout, the functions overlap on the computer screen according to the user's needs. In this case, on the left side of Figure 9, we can see the user interface and on the right side, we can see the virtual keyboard (coloured balls with the chords established). Thus, Netychords has been optimised to: (i) fully style the user interface; (ii) the settings panel can be hidden, to give full space to the virtual keyboard; (iii) in this new version, the interface is fully operable by eye-tracking only. The buttons are large enough and can be selected by eye-tracking, and "clicked by double blinking;" (iv) a settings saving system has been introduced – now settings and the last custom layout are automatically saved; (v) a self-test system was added; and (vi) a bug logging system was introduced: when the application crashes, a log file with an error report is created and a dialogue window is displayed, etc. Other small changes, bug fixes, and new elements will always be updated and incorporated when it corresponds.

Next, we will present the conclusions of our study.

Conclusions

About the overall objective of this study, we can say that the data previously presented contribute fully to an overview of all the work developed. As the main objective of this work is to know how the development of the inclusion processes of the child with CP, which gave rise to our study, in the AS located in the area of their residence, it was especially important to be present as a participant observer with the child, because in this way it was possible to plan and promote a real adaptation directed to the existing contexts in the AS, supporting MTs, in favour of concrete solutions that could respond to the challenges posed by the child's characteristics. Moreover, with the networks built and the support provided by the University of Milan, it was possible to customize the HeaDMI Netychords to the real needs of the child. This kind of work reinforces the idea that it is essential to promote collaborative work, to foster the specific and necessary networks and supports for each child: and to customize in each situation because each child is unique.

You may ask if all this work is necessary so that there is effective access for all children to AEPM. We believe it is because it is our duty as professionals not to leave anyone behind. Our intention is and will be to describe as much as possible the whole process so that it is possible to replicate it whenever necessary. We need to look for solutions and modify our practices, to achieve music learning for all, but often we do not know how this is done. We hope that with this work we can provide some clues in that direction. The problem is never in the child, it is in us.

We will now highlight some aspects that seem important to us:

- The use of the webQDA software was an excellent methodological support as tool to support the content analysis technique. In addition to facilitating the categorization of the data compiled in the field diary and all its records (field notebooks, field notes, photographs, audio recordings, videos, interviews, and conversations held, including emails and meetings), it allowed questioning the possible relationship between them, which eased their categorization.

- The analysis of the categories gave us a picture of the whole process. We observed that the use of technologies is considered important for the development of the child. The importance given to the contexts as spaces for participation, involvement, and inclusion should be highlighted. They promote the use of technologies and their dissemination. Personal and institutional support was also highlighted as fundamental for the participation of all. In this context, we consider that the various relationships and social interactions, which are built as "structures" around a child's development (Brown et al., 2003; Moreno et al., 2021a), the ones that work as scaffolding of the educational process, collaborating positively with the learning processes of the child under study. We need to promote the development of these supports (scaffolding), which help all children to expand their learning limits beyond what they would be able to do on their own. The importance of collaborative work is also highlighted, as without it, it is difficult to achieve success.
- Throughout this work, we have observed the importance of planning activities well. Even more importantly, it is necessary to keep good records of the activities that are carried out, as this is the only way to conduct a rigorous and detailed investigation of the object of study.
- We believe that for the development of this type of qualitative-documentary ethnographic studies, it is essential that researchers are empathic and good listeners. We realised that professionals sometimes just need to have someone with whom they can express their ideas and vent their difficulties to be able to find solutions to their problems. The responsible researcher also shared this need. For him, it was very important to have "a critical friend," who became a good listener, a situation that helped him to discuss and organise and systematise the information compiled so as not to lose the direction of the research. Furthermore, it is important to emphasize that the "critical friend," being an element external to the investigative process, enables a more objective and guiding view of the situations, given that the investigator is involved and immersed in the action, running the risk of getting lost in the objectivity of the study.
- When we develop work in a network, with several people involved, there are some problems of communication and socialization. In this case, as we worked with people who had different tastes and different objectives, it was necessary to develop different ways of communicating and socialising. The fact that the researcher experienced and actively participated in each context, maintaining a good informal relationship with the people involved, contributed positively to this process.

In a way, we can say that a responsible researcher, with their attitude and personal involvement as an active, immersive, and participatory agent in the action, can positively promote the development processes of the work carried out. By being aware of the daily activities of those being observed, he can contribute to the establishment of links between the Italian engineers involved and all the participative entities of the educational community in which the child is inserted. The Netychords (and in the future also the Netytar) has shown to be an effective instrument as an accessible digital musical instrument, which enhances democratization and equity in access to music learning. These HeaDMIs open a window so that AEPM can be attended to by any child with motor limitations.

We are experiencing a scenario of evident change, especially regarding the use of technologies in education and mainly DMI, ADMI, and HeaDMIs in ME. Perhaps with more

investment and research, there may be the possibility of promoting more positive results for its users and all the professionals involved. It is important to highlight the work done in articulation between elements of the University of Aveiro (Portugal) and the University of Milan (Italy). This allowed bringing the real world closer to the researchers, which facilitated the development and more effective adaptation of the HeaDMIs used by the child under study.

Finally, we believe that it is important to promote teacher training, regarding the use of ADMI technologies and HeaDMIs in music learning, in favour of a true participation of all. Another implication will be the possible creation of a discipline related to digital technology, also in conservatories, as it is being promoted in schools in Portugal under the Digital School Development Action Plans (PADDE) based on the conceptual framework of the guiding documents of the European Commission: DigCompEdu and DigCompOrg (Lucas et. al., 2022).

The implementation of training directed to professionals to promote digital competence to know "what to do" and "how to do" using these technologies for teaching in AEPM, can be beneficial for the promotion of a ME for all.

References

Amado, J. (2017). *Manual de investigação qualitativa em educação* (3ª edição). Imprensa da Universidade de Coimbra/Coimbra University Press. ISBN: 978-989-26-1389-5

Azevedo, J. P. F. T. d. (2019). Os “Jogos” pianístico-pedagógicos de György Kurtág. Instituto Politecnico de Porto, ESMAE. http://hdl.handle.net/10400.22/14464

Basic Law of the Educational System. (1986). Law nº 46/86, Diário da República nº 237/1986 of October 14 (1st Series), 3067–3081. https://dre.pt/application/conteudo/222418

Brown, J. S., Heath, C., & Pea, R. (2003). *Vygotsky's educational theory in cultural context*. Cambridge University Press. ISBN: 9780521821315

Coutinho, C. P. (2018). *Metodologia de investigação em ciências sociais e humanas: Teoria e Prática*. Coimbra: Almedina. Ministério da Educação/Direção-Geral da Educação (DGE). ISBN: 978-972-40-5137-6.

Costa, A. P., & Amado, J. (2018). *Análise de conteúdo suportada por software*. Aveiro (PRT): Ludomedia.

Costa, A. P. (2023). Qualitative Research Methods: do digital tools open promising trends?. *Revista Lusófona de Educação, 59*(67-76). https://doi.org/10.24140/issn.1645-7250.rle59.04

Davanzo, Nicola (2022). *Accessible Digital Musical Instruments for Quadriplegic Musicians, Dipartimento di informatica "Giovanni Degli Antoni"* (Doctoral Thesis), Università degli studi di Milano, Itália. https://hdl.handle.net/2434/920339

Decree-Law N.º 344/1990 do Ministério de Educação e Ciência (1990). *Diário da República: 1.ª série — N.º 253*. https://dre.pt/dre/detalhe/decreto-lei/344-1990-566188

Decree-Law N.º 54/2018 do Ministério de Educação e Ciência (2018). *Diário da República: 1.ª série — N.º 129*. https://dre.pt/dre/detalhe/decreto-lei/54-2018-115652961

Decree-Law N.º 55/2018 do Ministério de Educação e Ciência (2018). *Diário da República: 1.ª série — N.º 129*. https://dre.pt/dre/detalhe/decreto-lei/55-2018-115652962

Despacho n.º 6605-A do Ministério de Educação e Ciência (2021). *Diário da república* (2ª série) – N.º 129. https://files.dre.pt/2s/2021/07/129000001/0000200003.pdf

Falvey, M. A., Forest, M., Pearpoint, J., & Rosenberg, R. L. (2011). Toda a minha vida é um círculo. *Oliveira de Frades: ASSOL*. ISBN: 978-972-99103-6-4

Frid, E. (2018, August 5-10). Accessible digital musical instruments: A survey of inclusive instruments presented at the NIME, SMC and ICMC conferences. In *Proceedings of the international computer music conference* [Conference presentation] (pp. 53-59).

Daegu, South Korea.

Frid, E. (2019). Accessible digital musical instruments—a review of musical interfaces in inclusive music practice. *Multimodal Technologies and Interaction, 3*(3), 57. https://doi.org/10.3390/mti3030057

Lima, L. C. (2018). Lei de Bases do Sistema Educativo (1986): Ruturas, continuidades, apropriações seletivas. *Revista Portuguesa De Educação, 31*(Especial), 75-91. https://doi.org/10.21814/rpe.15077

Lucas, M., Moreira, A., & Trindade, A. R. (2022). *DigComp 2.2: Quadro europeu de competência digital para cidadãos com exemplos de conhecimentos, capacidades e atitudes*. UA Editora. https://doi.org/10.48528/4w7y-j586

Martins, G. D. O., Gomes, C. A. S., Brocardo, J. M. L., Pedroso, J. V., Carrilo, J. L. A., Silva, L. M. U., Encarnaçao, M. M. G. A. d., Horta, M. J. d. V. C., Calçada, M. T. C. S., Nery, R. F. V., & Rodrigues, S. M. C. V. (2017). Perfil dos alunos à saída da escolaridade obrigatória. *Ministério da Educação e Ciência*. ISBN: 978-972-742-416-0. http://dge.mec.pt/sites/default/files/Curriculo/Projeto_Autonomia_e_Flexibilidade/perfil_dos_alunos.pdf

Minayo, M., & Costa, A. (2019). Técnicas que fazem o uso da palavra, do olhar e da empatia: pesquisa qualitativa em ação. In *Técnicas que fazem o uso da palavra, do olhar e da empatia: Pesquisa Qualitativa em Ação* (pp. 63-63). ISBN: 978-989-54476-0-2

Moreno, D., Moreira, A., Tymoshchuk, O., & Marques, C. (2020). Análise de conteúdo utilizando o webQDA: Opção metodológica para caracterizar uma criança com paralisia cerebral. *New Trends in Qualitative Research, 2*, 687-702. https://doi.org/10.36367/ntqr.2.2020.687-702

Moreno, D., Moreira, A., Tymoshchuk, O., & Marques, C. (2021a). A child with cerebral palsy in arts education programmes: Building scaffoldings for inclusion. In A. P. Costa, L. P. Reis, A. Moreira, L. Longo, & G. Bryda (Eds.), *Computer supported qualitative research. WCQR 2021. Advances in intelligent systems and computing* (Vol. 1345). Springer, Cham. https://doi.org/10.1007/978-3-030-70187-1_13

Moreno, D., Moreira, A., Tymoshchuk, O., & Marques, C. (2021b). Finding solutions to promote the inclusion of children with Cerebral Palsy in Arts Education Programmes of Music: An integrative literature review using webQDA. *Indagatio Didactica, 13*(3), 537-558. https://doi.org/10.13140/RG.2.2.17674.59845

Moreno, D., Moreira, A., Tymoshchuk, O., & Marques, C. (2022). Studying inclusion in music education - An integrative literature review as a support in the choice of methodology, using WebQDA. In A. P. Costa, A. Moreira, M. C. Sánchez-Gómez, S. Wa-Mbaleka (Eds.), *Computer supported qualitative research. WCQR 2022. Lecture notes in networks and systems* (Vol. 466). Springer, Cham. https://doi.org/10.1007/978-3-031-04680-3_12

Moreno, D., & Maia, A. (2022). Accessible music for everyone: Discovering resources. In A. Mesquita, A. Abreu, & J. V. Carvalho (Eds.), *Perspectives and trends in education and technology*. Smart innovation, systems and technologies (Vol. 256, pp. 883-893). Springer, Singapore. https://doi.org/10.1007/978-981-16-5063-5_73

Pereira, F., Crespo, A., Trindade, A. R., Cosme, A., Croca, F., Breia, G., Franco, G., Azevedo, H., Fonseca, H., Micaelo, M., João Reis, M., José Saragoça, M., Carvalho, M., & Fernandes, R. (2018). Para uma educação inclusiva: Manual de apoio à prática. *Ministério da Educação/Direção-Geral da Educação.* ISBN: 978-972-742-418-4

Sousa-Pereira, F., & Leite, C. (2019). Política do perfil dos alunos à saída da escolaridade obrigatória e desafios para a formação de professores. *Educação, Ciência e Cultura, 24*(1), 113-122. https://doi.org/10.18316/recc.v24i1.5603

Tudge, J. R., Payir, A., Merçon-Vargas, E., Cao, H., Liang, Y., Li, J., & O'Brien, L. (2016).

Still misused after all these years? A reevaluation of the uses of Bronfenbrenner's bioecological theory of human development. *Journal of Family Theory & Review, 8*(4), 427-445. https://doi.org/10.1111/jftr.12165

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