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PROMOTING MUSICAL LEARNING IN CHILDREN WITH CEREBRAL PALSY: PARENTS' PERSPECTIVES

ABSTRACT

To promote the attendance of children with Cerebral Palsy (CP) at Arts Education Programmes of Music (AEPM), we initiated an action research project in 2018. Our work included providing initial awareness training for music education teachers, characterising the child with CP who inspired the study, and conducting three literature reviews to examine current knowledge in this area. As a continuation of this work, this study aimed to understand parents' perspectives on music education for children with CP, identify existing barriers to participation in music education, and determine the necessary resources and adaptations required to create truly inclusive musical learning environments. To this end, we conducted interviews with 14 parents of children with CP between January 2021 and January 2022. All participants provided informed consent for the audio recording and processing of their interviews. The interviews were transcribed and validated by the participants. The content was analysed using webQDA software. The analysis revealed several key findings from the parents' perspectives: (i) social and structural barriers continue to limit full access and attendance for children with CP in the AEPM that offers Artistic Schools; (ii) children whit CP demonstrate strong interest in and capacity for musical engagement; and (iii) teachers have little knowledge about the specific needs of children with CP and are unaware of up-to-date technologies, methodologies and strategies that facilitate the teaching-learning processes of children with CP in the AEPM. Ultimately, the results underscore two key needs: the need for enhanced teacher training in this area and the reform of educational policy to make AEPM truly inclusive for all students.

Keywords
Arts Education Programmes of Music; Cerebral Palsy; Content analysis; Interviews; webQDA.

1. Introduction

Cerebral Palsy (CP) encompasses incurable symptoms, affecting 2–3.5 in every 1,000 newborns, with 17 million cases globally (Patel et al., 2020). It is the leading cause of motor difficulties in children, with varying degrees of severity. CP describes a group of permanent disorders of movement and posture that cause activity limitations attributed to non-progressive disturbances that occurr during fetal or infant brain development (Rosenbaum et al., 2007). According to these authors, CP motor disorders are commonly accompanied by disturbances in sensation, perception, cognition, communication, and behavior, as well as epilepsy and secondary musculoskeletal problems (Rosenbaum et al., 2007).

Educational activities tailored for children with CP can stimulate cognitive development, promoting problem-solving and communication skills (Blasco et al., 2023; Davanzo et al., 2023; Kolehmainen et al., 2015). Learning music can help these children improve their motor and cognitive functions, social skills, and emotional well-being while providing a means for them to express their feelings and thoughts (Baydag, 2020; Moreno et al., 2020).

However, children with CP face several barriers to studying music that significantly impact their musical development. These barriers include:

i) Physical limitations: Children with CP often struggle with sensorimotor coordination, which is crucial for playing traditional musical instruments. This can limit their ability to express themselves musically (Bhat, 2010; Vinicius-Filho et al., 2026). For example, a child with hemiplegic CP may struggle with using one side of their body effectively (Valério & Schambeck, 2021).

ii) Inadequate educational resources: Existing music curricula often fail to accommodate the specific needs of children with CP, as they haven't been updated to reflect a contemporary understanding of their capabilities (Davanzo et al., 2023; Moreno et al., 2025; Pang, 2024).

iii) Lack of tailored teaching methodologies: Research indicates that specialized teaching methods and adapted materials are crucial for effective learning; however, these resources are often lacking in music education settings (Moreno et al., 2023; Valério & Schambeck, 2021).

In Portugal, educational inclusion is considered fundamental, as advocated by current legislation (Basic Law of the Education System, 1986; Decree-Laws nº 344/1990, nº 54/2018, nº 55/2018). However, the music courses offered by the Artistic Schools (AS) are still not prepared to welcome children with motor and communication disabilities due to CP. In this context, this article arises from the need to identify both the abilities and challenges of children with CP through interviews with their parents.

2. Objectives

The primary objectives of this study were to understand parents' perspectives on music education for children with CP, identify existing barriers to participation in music education programs, and determine the necessary resources and adaptations required to create truly inclusive musical learning environments.

This article addresses the need to identify both the capabilities and challenges of children with CP through parent interviews. This study focused on understanding the following research questions:

- What perspectives do parents have regarding their children's capabilities and challenges in learning music?
- What barriers prevent children with CP from fully participating in Arts Education Programmes of Music?
- What resources, adaptations, and teaching approaches are necessary to create truly inclusive musical learning environments?
  Through structured interviews with parents, we gathered insights about their children's capabilities, learning styles, interests, and challenges while exploring their experiences with existing educational programs and technologies.
  Table 1, available in the appendix via this link, outlines the specific objectives of this interview and the corresponding questions asked for each objective.

3. Methodology

Acquiring knowledge is the process of searching, observing, analyzing, and studying to understand what we don't know. This process enables scientific inquiry and the development of knowledge. Knowledge results from solving problems that we, as teacher-researchers, investigate (Amado, 2017; Coutinho, 2018). After reviewing research paradigms—frameworks of assumptions that guide research choices (Coutinho, 2018)—we selected approaches in educational research that help understand the meaning of events for people in specific situations (Coutinho, 2018) and reveal knowledge acquisition procedures (Pardal & Lopes, 2011). We embraced the Teacher-as-researcher model, developing a methodology that recognizes the cooperative and flexible nature of our discipline (Olson, 1991).

For our data collection, we focused on gathering qualitative and subjective data, including people's perceptions, thoughts, feelings, and experiences. To discover the needs and potential of children with CP, we developed an interview script tailored to our research questions and objectives (see Appendix 1 Table I. DOI 10.5281/zenodo.15776855). This interview tool was validated by professionals specializing in technology, music teaching, school inclusion, and health.

3.1. Interview Surveys

The interview survey, which we will now refer to as the Interview, is "... the most widely used technique in the process of empirical qualitative work" (Minayo & Costa, 2023, p. 13). Since our interviews aimed to gather in-depth information, we paid close attention to the sampling process and participant selection. We worked with a carefully selected and intentional sample, choosing participants according to defined criteria: being the parent of a child with CP and having a child in primary school.

The sample was selected in collaboration with the Cerebral Palsy Association (CPA) and the Technology and Communication Resource Centre (CRTIC) in Portugal.

Between January 2021 and January 2022, we conducted interviews with 14 parents of children with CP. All interviewees provided informed consent for the audio recording and processing of their interviews. The interviews were recorded, later transcribed into Word, and validated by the respective interviewees.

3.2. Qualitative data analysis

All collected information was processed using content analysis techniques supported by webQDA[1]software (Costa & Amado, 2018). This software enabled us to organize and systematize data analysis, facilitating the definition of dimensions necessary for our descriptive and qualitative methodology. Specifically, the researchers uploaded interview transcript files to the webQDA Internal Sources system. We began by generating a word cloud of frequent terms (excluding words with fewer than 4 characters). These results guided our initial coding of the interview sources. From this foundation, we made inferences through inductive data reading, examining answers to each question while looking for patterns and comparing data. Since our interview script included open-ended questions, we considered the information holistically rather than limiting our analysis to specific questions. This approach led to inductive categorization by text segments, organizing content thematically based on compiled information rather than the sequence of questions. We then analysed category frequencies related to each theme. Research subjects were indexed to "Classifications" to connect them with categories analysed on the webQDA platform. Based on category frequencies, we proceeded to "Questioning" using the platform's "Matrices" tool.

3.3. Resolution and Approval of the Ethical Issues Involved

This study was conducted in the department of Education and Psychology of the University of Aveiro (UA), which adhered to rigorous research procedures established by European legislation. The lead researcher, with support from supervisors, prepared protocols and statements addressing both the ethical issues inherent in this study and participants' informed consent. The

[1] https://www.webqda.net/

researchers submitted these documents for approval to the University of Aveiro (UA) Council of Ethics and Deontology (CED) and the General Data Protection Regulation (GDPR) of UA (opinion no. 28-CED/2019 in plenary meeting of July 7, 2021) (see Annexes 2). We also obtained free and informed consent from all participants, including permission for the capture of images, video recording, and audio recording.

Having established the methodology for this study, which includes Interview Surveys, Data Analysis, and Resolution and Approval of ethical issues, and considering our research objectives, we now proceed to present the data obtained and its analysis.

4. Analysis and Results Parents' Interviews

With the collaboration of a CPA and a CRTIC located in Portugal, we interviewed 14 Parents of children with CP (see Appendix 1 Table II DOI 10.5281/zenodo.15776855). The population surveyed consisted of 12 mothers, one father, and one grandfather of children with CP. All respondents, as well as the children with CP they represent, are Portuguese (see Figure 1).

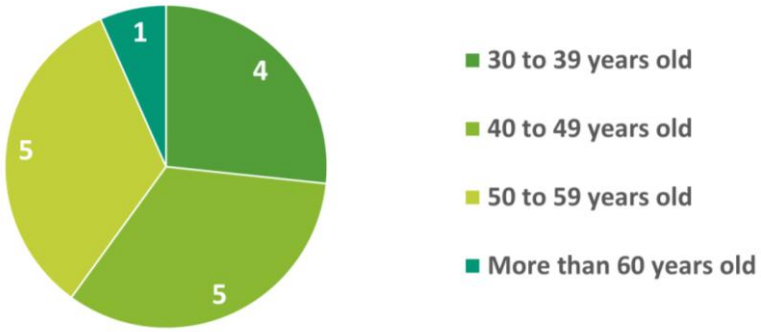


Figure 1. Parents of children with CP - age of interviewees

As shown in Fig. 1, regarding the age range of the 14 Parents interviewed, most are under 50, with four aged between 30 and 39 and five aged between 40 and 49. Only one of the Parents is over 60 and five are aged between 50 and 59.

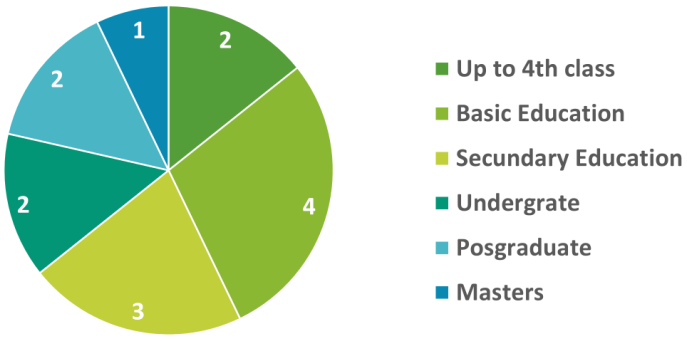


Figure 2. Parents of children with CP – Education Level

Regarding the education level of the Parents interviewed, the majority (4 in total) declared that they had completed primary school, followed by three interviewees who declared that they had completed secondary school (Figure 2). We also found two interviewees who said they had an Undergraduate, two who said they had Postgraduate studies and one who said he had a Master's degree. In addition, two interviewees stated that they had only completed fourth grade (currently the fourth year of primary school).

We will now present the information compiled on the aetiology and typology of the children with CP in the care of the Parents interviewed (Table 1).

As can be seen in Table 1, both the age and the type and aetiology, according to the area of injury, of the children with low CP under the responsibility of the Parents interviewed are varied and diverse. This detailed characterization is vital for developing a music teaching program for children with CP, which is planned as part of this doctoral project. Understanding each child's specific type of CP, associated impairments, and comorbidities informs appropriate educational interventions and adaptive technologies. By recognizing the diverse profiles in our sample—from diplegic to quadriplegic CP and various additional challenges—we can create programming that addresses individual needs while leveraging strengths.

Table 1 - Information on children with CP according to their area of injury and aetiology

Age	Information	Limitation
9	Diplegic/dyskinetic CP	motor
8	Hemiplegic CP	motor and communication
9	Ataxic CP w/chromosome 2 alteration	motor and communication
6	Diplegic/dyskinetic CP w/epilepsy	motor
9	Quadriplegic/hypotonic CP w/multi-disabled	motor and intellectual
5	Diplegic/dyskinetic CP w/epilepsy	motor
8	Monoplegic CP	motor
10	Diplegic/spastic CP w/visual impairment	motor and visual
6	Diplegic/spastic CP w/fragile X	motor and intellectual
9	Diplegic/dyskinetic CP	motor
6	Diplegic/dyskinetic CP w/epilepsy	motor and communication
7	Diplegic/spastic CP w/trisomy 21	motor and intellectual
7	Diplegic/spastic CP w/hearing impairment	motor and hearing
10	Diplegic/dyskinetic CP w/epilepsy	motor and communication

The webQDA platform was used to analyse the interviews, as it enables in-depth qualitative analysis, allowing the whole team to work in a shared online environment. The researchers

created an analysis tree with seven dimensions according to the objectives of the interviews: Characterisation of the children, Family, Teachers, Technology/AT, Needs, Music, and Context. For each dimension, sub-dimensions were added, as shown in Figure 1.

After creating the analysis tree, the researchers implemented a systematic coding process. Each interview transcript was carefully reviewed multiple times to ensure accurate categorization of the participants' responses.

To safeguard the participants' anonymity, each Parents has been given a number (e.g., P1; P2, etc...).

The coding combined deductive and inductive approaches, with initial codes from survey questions and additional codes emerging during analysis. Two researchers independently coded a subset to establish reliability, resolving discrepancies through discussion.

Cross-case analysis identified patterns across participants' experiences by examining code relationships and co-occurrences. For instance, analysing connections between "Technology/AT" and "Music" revealed how assistive technologies affected musical participation opportunities.

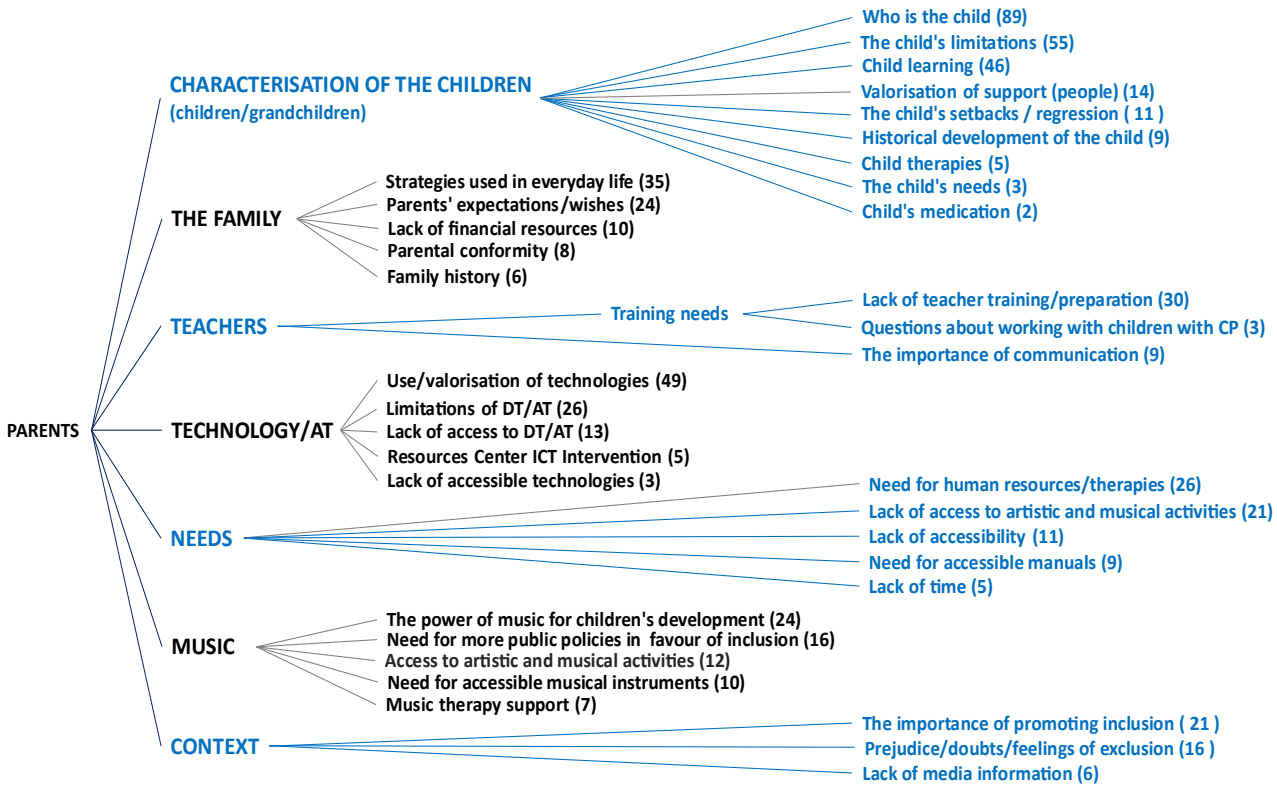


Figure 3. Categories obtained from the interviews with the Parents of children with CP

Figure 3 shows the frequency of mentions for each subcategory across the interviews. The webQDA tool enabled detailed analysis and comprehensive processing of the results. Examples of parents' responses to our questions, relating to each issue, are presented below (see Appendix 1 Table II. DOI 10.5281/zenodo.15776855). Table 2 summarizes the key findings from our interviews, organized according to each of the proposed research objectives.

Table 2. Some examples of answers and their discussion

OBJECTIVES	Results
1. To know the image that parents have of their children, their development, daily life at home and their characteristics.	Analysis of the parents' interviews shows that despite the physical limitations their children experience due to CP, parents emphasize their children's personalities, cognitive abilities, and developmental progress. Parents consistently highlight their children's positive traits (describing them as "lively," "clever," "good-natured," and "happy") while acknowledging the ongoing challenges they face. The interviews reveal the critical importance of therapeutic interventions in enhancing motor skills, improving communication abilities, and promoting overall development. Many parents attribute significant progress to consistent therapy sessions provided by specialized professionals, demonstrating that with appropriate support, children with CP can achieve meaningful developmental milestones despite their physical limitations.
2. Identify what interests the child and what they like to do, to better characterise the child taking part in the study.	Children with CP demonstrate diverse interests like typically developing peers. Music is important for many, with one parent reporting their daughter sings songs even without fully understanding them. Some enjoy physical activities like ball games despite motor challenges, while others prefer imaginative play with kitchen items. Many are drawn to intellectual and creative pursuits, including technology, mathematics, and art, showing enthusiasm for new experiences. These varied interests reveal rich inner lives beyond physical limitations, highlighting the need for diverse educational opportunities that match their interests and strengths.
3. To check whether Parents are aware of how their child assimilates knowledge.	Parents recognize their children's capacity to learn despite physical limitations. They describe children with CP as "quick learners" who absorb knowledge, especially through music and repetition. These children demonstrate remarkable persistence—one parent highlighted her daughter's resilience as her "strongest point," noting she "never gives up" despite needing multiple attempts. Parents observe that cognitive abilities often remain intact or advanced despite motor impairments, suggesting educational approaches should build upon these learning capabilities rather than being limited by preconceptions about disabilities.
4. Identify what Parents perceive as necessary for their child to learn better.	Parents identify four key factors needed to improve learning for children with CP: specialized knowledge among educators (without which early learning opportunities are missed); accessible teaching methods (dynamic, visual, and playful approaches); continuous support (as interruptions lead to developmental stagnation); and true inclusion. Parents emphasize that inclusion remains largely theoretical, with both physical barriers (inaccessible facilities) and attitudinal obstacles excluding children despite their intact cognitive abilities, revealing a gap between inclusive education policies and their practical implementation.
5. Check whether Parents are aware of Digital Technologies (DT) and Assistive Technology (AT), and how and how regularly they use them.	Parents report varied access to assistive technologies. Some families utilize advanced tools, such as eye-tracking devices (PC Eye Mini) and specialized software (GRID3), which enable their children to communicate effectively. Not all technologies prove successful, with one parent noting that head-tracking technology (SmartNAVE) failed for their child. Several parents report that their children lack necessary tech support at school, highlighting a gap between available technologies and their effective educational integration. Parents recognize the potential of these tools to facilitate learning and communication, with one parent noting how an adapted tablet could help their non-verbal child express themselves.
6. Identify what kind of artistic activities children with CP attend, in what contexts, where, how and with whom.	Parents emphasise in their answers that their children enjoy music, singing, dancing and participating, but in many cases, they don't have access to musical activities or affordable musical instruments, even though they think these activities would be an asset for the children. They also mention the music therapy support that is available in some schools - even though music therapy is not recognised in Portugal.

7. To check whether Parents are aware of the type of adaptations that are possible so that their child can have access to artistic/ musical activities.	Parents report significant barriers to musical participation for their children with CP, primarily due to a lack of adapted instruments and accessible technology. They highlight the need for digital solutions that could compensate for limited manual dexterity, such as computer software that provides access to virtual instruments. Parents also criticize the rigid approach in schools where all students are expected to play the same instruments (e.g., flutes) without considering physical limitations or providing alternatives. Their responses indicate awareness of potential adaptations that could enable participation but frustration that such accommodations are rarely available in educational settings.
8. Open questions for any issues that Parents feel are relevant to raise.	The information compiled here talks specifically about the needs that parents must cope with day-to-day life with their children. The time they spend with their children to take them to therapies and the lack of financial resources mean that parents always feel hard done by and, in a way, excluded from life in society. There is an urgent need for the state to develop more supportive public policies to facilitate the development of children in favour of inclusion.

To summarise, as shown in Table 2, parents of children with CP face significant challenges while remaining dedicated to supporting their children's development. The findings reveal several key insights:

- Parents emphasize their children's positive traits and cognitive abilities despite physical limitations, highlighting the importance of therapeutic interventions in enhancing development.
- Children with CP demonstrate diverse interests—including music, physical play, and intellectual pursuits—suggesting the need for varied educational opportunities aligned with their strengths.
- Parents recognize their children as capable learners who often show remarkable persistence and determination, with many learning effectively through music and repetition.
- Five essential factors for improved learning were identified: specialized educator knowledge, accessible teaching methods, continuous support, access to assistive technologies, and inclusion—with current inclusion efforts often remaining theoretical rather than practical.
- While children enjoy and benefit from music, many lack access to musical activities or affordable adapted instruments that could support their development.
- Parents identify significant barriers to musical participation, including a lack of adapted instruments and rigid educational approaches that fail to accommodate physical limitations.
- The substantial time and financial resources required for therapies and support create additional burdens for parents, pointing to the need for more comprehensive public policies to facilitate inclusion.

5. Discussion

These results reveal a significant gap between the musical learning potential of children with CP and the opportunities available to them. One participant reported: "I tried to enrol my daughter in music lessons. But they said they didn't have the necessary number of 'students with disabilities' to create a course exclusively for them and thus form a class" (P3). Parents also identified a lack of teacher training and the use of adapted musical instruments as key barriers. As one parent

explained: "There aren't enough people with the specific knowledge to know how to work with our children, and that's a shame, because when my son was little, he never felt motivated to learn, and now that he's older, it's much more difficult" (P7). Another parent noted that "the school is limiting children by not providing differentiated solutions. For example, at school, they require all students to play the flute, but my son cannot. There should be alternative musical instruments" (P10). These findings align with international studies, such as those by Davanzo et al. (2023), Kiburu et al. (2019), and Moreno et al. (2025), which have found that children with CP face difficulties accessing music lessons, including inadequate curricula that are not adapted to their needs and abilities, as well as limitations related to their physical condition.
Despite these barriers, parents report that their children genuinely enjoy music.

For example, one mother said: "My daughter loves to sing—sometimes you can't understand a word, but she is always humming the songs she hears" (P12). Other parent shared: "My son loves music and could play, for example, the xylophone. I have one and he likes to play it. I would like my son to learn music, but he does not have access to musical activities" (P11).
Research shows that students with CP maintain a strong interest in music and can successfully learn to play instruments when supported through targeted interventions (Alves-Pinto et al. 2016; Kiburu et al. 2019; Serafini, 2017). Practical approaches include adapting curricula and teaching methods, improving accessibility, modifying assessment practices to accommodate unique needs, and developing accessible musical instruments (Baydag, 2020; Moreno et al., 2020; Moreno et al., 2023; Valério & Schambeck, 2021). These findings suggest that with appropriate adaptations and support, children with CP can fully participate in and benefit from music education, reinforcing the parents' perspectives highlighted in our interviews. The consistency between parent observations and research validates parent insights as a valuable resource for informing inclusive educational practices.

6. Final Considerations

This study provides valuable insights into the experiences and perspectives of parents of children with CP regarding musical learning and education. Our findings highlight several important considerations for advancing inclusive music education practices.

First, despite physical limitations, children with CP demonstrate significant cognitive abilities and a genuine interest in music, confirming the importance of providing accessible musical experiences. Parents consistently emphasized their children's determination and capacity to learn, particularly through musical engagement and repetition.

Second, our research reveals a substantial gap between inclusive education policies and their practical implementation. While legislation promotes inclusion, the reality faced by families

includes both physical barriers and attitudinal obstacles that limit children's participation in musical activities.

Third, access to appropriate assistive technologies and adapted instruments remains insufficient. The development of digital solutions that compensate for physical limitations could significantly enhance musical participation for children with CP.

Fourth, parents face considerable challenges in supporting their children's development, including financial burdens and time constraints associated with therapies and specialized care. These challenges underscore the need for more comprehensive public policies that effectively support families and promote inclusion.

The findings from this study contribute to our understanding of how music education can be made more accessible and beneficial for children with CP. Future research should focus on developing and evaluating specific adaptations and methodologies that address the barriers identified by parents while building on children's strengths and interests. Longitudinal studies tracking musical development over time would also contribute valuable knowledge to the field.

Beyond these findings, this study contributes methodologically to qualitative research. By integrating webQDA in data analysis, we showed how computer-assisted qualitative data analysis software (CAQDAS) enhances analytical rigour, reflexivity, and collaboration. The systematic use of webQDA enabled transparent coding, facilitated team triangulation, and supported the management of large datasets. This approach demonstrates how digital environments transform traditional content analysis into a more dynamic, interactive process, fostering deeper interpretative engagement with data.

Additionally, adopting a cooperative and reflective stance; consistent with the Teacher-as-Researcher model; reinforces the value of reflexivity in qualitative inquiry. The research team's iterative discussions, coding verification, and reflection on interpretative biases strengthened the credibility and trustworthiness of the findings. This study contributes to both inclusive music education knowledge and methodological practice by demonstrating how webQDA serves as a pedagogical and analytical resource for future qualitative studies in education, the arts, and health contexts.

By listening to parents' perspectives and experiences, we can work toward creating truly inclusive musical learning environments that recognize and accommodate the diverse needs and abilities of all children, including those with CP.

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Ethical Approval: Ethical approval was obtained from University of Aveiro, the Council of Ethics and Deontology and the General Data Protection Regulation (nº 28-CED/2019 in plenary meeting of July 7, 2021).

Informed Consent: Informed consent was obtained from all participants involved in the study, ensuring respect for confidentiality and voluntariness principles.

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