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Perceptions of pre-service primary teachers on the challenges of inclusive education and the pedagogical potential of music

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Abstract
The attitudes and expectations of trainee teachers are crucial for consolidating inclusive education systems that move beyond normative ideals and translate into effective practices. This study examines the perceptions of future primary school teachers (n=213) regarding the challenges of inclusive education and the potential role of music. An exploratory mixed-methods design was employed. Data were gathered through open-ended questions and coded using thematic content analysis with ATLAS.ti, complemented by descriptive statistics and logistic regression models in SPSS. Results indicate that institutional limitations (e.g., lack of resources, excessive student–teacher ratios, insufficient support staff) and training deficits were the most frequently cited barriers. Participants in 3rd–4th year, with supervised school placements, or specialising in Special Needs Education were significantly more likely to report institutional limitations. In turn, the positive impact of music—including emotional regulation, concentration, and creative expression—was emphasised by female participants, those in advanced courses, and those with school placement experience. Regression analyses confirmed that academic year robustly predicted perceptions of institutional limitations, while both academic year and school placement predicted recognition of music's inclusive benefits. These findings highlight preliminary trends suggesting that practical experience, specialised preparation, and the intentional use of music may enhance the capacity of trainee teachers to address classroom diversity.

Keywords: teacher education; special education; primary education; music; music therapy

[es] Percepciones del futuro profesorado de Primaria sobre los retos de la educación inclusiva y el potencial pedagógico de la música

Resumen
Las actitudes y expectativas del profesorado en formación son fundamentales para consolidar sistemas educativos inclusivos que trasciendan los ideales normativos y se traduzcan en prácticas efectivas.

Este estudio examina las percepciones de los futuros maestros de primaria (n=213) sobre los retos de la educación inclusiva y el papel potencial de la música. Se empleó un diseño exploratorio mixto. Los datos se recopilaron mediante preguntas abiertas y se codificaron utilizando un análisis de contenido temático con ATLAS.ti, complementado con estadísticas descriptivas y modelos de regresión logística en SPSS. Los resultados indican que las limitaciones institucionales (p.ej. falta de recursos, excesiva ratio, insuficiencia de personal de apoyo) y formativas fueron las barreras más citadas. Los participantes de 3º-4º curso, con Prácticum o especializados en Educación Especial, son significativamente más propensos a señalar las limitaciones institucionales. A su vez, las participantes femeninas, en cursos superiores y con Prácticum destacaron los efectos positivos de la música, como la regulación emocional, la concentración y la expresión creativa. Los análisis de regresión confirmaron que el curso académico predice de forma sólida la percepción de las limitaciones institucionales, mientras que el curso y el Prácticum predicen el reconocimiento de los beneficios inclusivos de la música. Estos resultados ponen de relieve tendencias preliminares que sugieren que la experiencia práctica, la preparación especializada y el uso intencionado de la música pueden mejorar la capacidad de los profesores en formación para abordar la diversidad en el aula.

Palabras clave: formación de profesores; educación especial; enseñanza primaria; música; musicoterapia

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1. Introduction

Inclusive education has become a fundamental principle in contemporary education systems, promoting the right of all students to receive a quality education, regardless of their personal, social or cultural characteristics. Inspired by international frameworks such as the Convention on the Rights of Persons with Disabilities (United Nations, 2006) and the 2030 Agenda for sustainable development (United Nations, 2015), educational inclusion has evolved from a pedagogical ideal to an ethical and legal responsibility for school institutions (Alonso et al., 2023). However, its actual implementation presents multiple complexities and challenges, especially regarding teacher training.

Recent research has highlighted the 'voice' of teachers, especially pre-service teachers (PST), as a key source for understanding the potential and difficulties of inclusion in the classroom. Teachers often recognise benefits such as improved coexistence, greater sensitivity to diversity and the transformation of the teaching role towards more collaborative and reflective practices (Hassanein et al., 2021; Jiang et al., 2025). Factors such as empathy, teacher motivation and perceived self-efficacy are positively related to more favourable inclusive attitudes (Jiang et al., 2025). Furthermore, direct contact with people with disabilities helps to minimise prejudices and stereotypes, promoting a deeper and more empathetic understanding of functional diversity (Kunz Luder & Kassis, 2019).

These benefits coexist, however, with limitations noted by the teachers themselves, such as the perception of insufficient training to address diversity. This shortcoming generates insecurities in practice and reinforces the idea of inclusion as an unfeasible ideal to achieve. Added to this is the conditioning effect of structural barriers and unfavourable organisational conditions, such as high student-teacher ratios and a shortage of specialised staff (Hassanein et al., 2021; Pérez Castejón & Vigo Arrazola, 2024; Woodcock et al., 2023).

Initial teacher training is therefore an essential pillar for the development of inclusive education systems, as it largely shapes the skills, attitudes and expectations with which future teachers will approach diversity in the classroom. Several studies agree that the quality and inclusive orientation of curricula are crucial to ensuring that inclusive education is not limited to a normative ideal but is translated into real and effective practices (Muntaner-Guasp et al., 2021; Pinilla Arbex & Villasana Terradillos, 2025; Sánchez-Serrano et al., 2021). That is why it is essential to consider not only the general preparation of teachers for inclusion, but also their mastery of specific pedagogical tools.

In this sense, music —both from an educational and therapeutic perspective— has proven to be a versatile and effective tool for the educational inclusion of students with specific educational support

needs (SNE). Multiple studies highlight that music not only acts as curricular content, but also as a conduit to foster social skills, emotional self-regulation, and group cohesion in shared learning environments (Devolli & Avdiu-Kryeziu, 2020; Gisbert Caudeli et al., 2024; Rizzo & Pellegrini, 2018; Wong & Chik, 2022). For example, musical stimulation has shown significant benefits in improving communication, social interaction, and reducing stereotypical behaviours in students with Autism Spectrum Disorder (ASD) (Felípez-Abad & Castro-Alonso, 2024; Martínez Hernández & Herrada Valverde, 2023).

Inclusive music education promotes environments where functional diversity is addressed from a participatory and collaborative approach, enabling all students, regardless of their abilities, to experience success and recognition (Devolli & Avdiu-Kryeziu, 2020; Wong & Chik, 2022). In this case, specific technological means such as the Soundbeam system have made it possible to expand the possibilities of musical interaction for students with severe motor or communication limitations, reinforcing motivation and the perception of self-efficacy (Cano & Sánchez-Iborra, 2016; Lee & Ho, 2017).

These experiences show that music can be adapted to different profiles and needs, offering a channel of expression that transcends linguistic or motor barriers. Likewise, from the perspective of the intersection between music therapy and music education, Salvador & Pasiali (2017) emphasise that collaboration between therapists and teachers could optimise the design of activities that are adapted and consistent with general pedagogical objectives. This interdisciplinary cooperation is key to overcoming the fragmentation between the therapeutic and curricular aspects, and to promoting the stable integration of inclusive musical strategies into school dynamics.

The effective use of music as an inclusive tool faces significant barriers. Allan (2025) and Salvador (2010) note that many in-service and trainee music teachers feel underprepared to support students with SNE, affecting their confidence in designing inclusive activities. In this regard, Del Barrio et al. (2024) highlight that existing training programmes are partial and unsystematic. This gap limits the realisation of music's inclusive potential and its educational impact.

Given the key role that teachers' attitudes, beliefs and skills fulfil in the implementation of inclusive practices, it is imperative to understand their experience, expectations and needs. This research aims to recognise the meanings that PST attach to music as an ally for inclusive education, framed within a preliminary exploration of their views on the challenges and difficulties faced by in-service teachers.

2. Inclusive education, a look at teacher training in Spain

The number of students with SNE in non-university general education in Spain has grown steadily over the last five academic years. Between 2019-2020 and 2023-2024, the percentage of students with SNE rose from 9.0% to 14.0% (Ministerio de Educación, Formación Profesional y Deportes, 2024). This growth reflects not only greater detection and visibility of diversity but also increasing pressure on the human and material resources of the education system.

Initial training for primary school teachers in Spain includes the possibility of taking optional specialisations such as Special Needs Education (SNE), aimed at providing knowledge and strategies for working with students with diverse educational needs. This specialisation course incorporates content on developmental disorders, curriculum adaptation design, psycho-pedagogical intervention and inclusive strategies in the classroom. In addition, it qualifies teachers to perform functions such as Therapeutic Pedagogy teachers. However, it should be noted that the dissemination of this SNE training is not uniform across the country and that, on occasions, a predominantly clinical or deficit-based approach is adopted (Muntaner-Guasp et al., 2021; Pérez Castejón & Vigo Arrazola, 2024). The paucity of hours and compartmentalised nature of SNE training have also been highlighted, which complicates transfer to real contexts (Muntaner-Guasp et al., 2021; Pinilla Arbex & Villasana Terradillos, 2025).

Rojo-Ramos et al. (2021) emphasise that teacher training students who have received more specific training and who have had inclusive practical experiences express more favourable attitudes and a greater self-perception of professional competence. Furthermore, the curriculum for the Primary Education Degree includes two compulsory periods of supervised practice in real educational institutions. These supervised school placements (SSP) promote a professionalising approach in which PST can compare academic content with professional practice, observing strategies, barriers and

facilitators to inclusion (Rojo-Ramos et al., 2021), even enabling the overcoming of prejudices and stereotypes (Hassanein et al., 2021; Kunz Luder & Kassis, 2019; Metsala & Harkins, 2019). However, in the absence of a genuine commitment to diversity within the host context, this experience does not invariably guarantee inclusive learning (Muntaner-Guasp et al., 2021; Sánchez-Serrano et al., 2021) and may even result in a distorted view or the encouragement of scepticism regarding its viability.

3. Objectives

In line with Ferguson & Lunn Brownlee (2018), it is assumed that 'the beliefs pre-service teachers hold about knowledge and knowing will likely have important consequences for the nature and content of their future classrooms and practice' (p. 94). The overall objective is to explore and analyse the perceptions of future primary school teachers regarding the challenges of inclusive education and the potential contribution of music as a pedagogical resource for the inclusion of students with SNE. This is articulated in the following specific objectives (SO):

> SO1. To identify the main challenges and limitations perceived in relation to the inclusion of students with SNE.
> SO2. To examine the perceived benefits of music for addressing these challenges and promoting inclusive practices.
> SO3. To analyse whether these perceptions differ according to trainees' background variables (academic year, gender, SSP, or specialisation in SNE), and to assess which of these factors significantly predict such perceptions.

These objectives guided both the qualitative content analysis of open-ended responses and the subsequent quantitative comparisons and regression models.

4. Methodology

This study employed a mixed exploratory design using an ad hoc questionnaire. The analysis reported focuses on two of the open-ended questions: 'What kind of challenges or difficulties do in-service teachers (primary education) face in relation to students with SNE in their day-to-day work?' and 'Do you think that the use of music could have a positive impact on working with students with SNE? If so, please provide an example'.

The inclusion of open-ended questions was motivated by the exploratory nature of the study and by the aim of eliciting spontaneous responses in participants' own words (Popping, 2015). In studies exploring university students' perceptions, open-ended questionnaires allow researchers to gather a broad range of detailed responses efficiently. This approach enables the identification of emergent dimensions, the discernment of novel cultural profiles among contemporary student cohorts, and the monitoring of shifts in attitudes concerning pedagogical models (Aznar-Mas et al., 2023). While this strategy enabled the collection of broad and diverse responses suitable for mapping perceptions at scale (Popping, 2015), it does not provide the qualitative depth that interviews, focus groups, or ethnographic observation might offer.

The full questionnaire was validated by a committee of experts and was based on previous qualitative research involving interviews with in-service primary school teachers. In any case, the inductive proposal aims to acknowledge the PST vision that is not constrained by the selection of predetermined responses, a characteristic of closed questions: 'the open-ended question is supposed to catch information that is not seized by a closed question' (Popping, 2015, p.25).

4.1. Participants

The sample comprised 213 PST (77.0% female, 22.1% male, 0.9% not reported) enrolled in the Primary Education Degree at the University of A Coruña (Spain). This pattern is consistent with the feminised profile of the education field in Spain and, more specifically, with the strong female presence in university studies in Education (Ministerio de Ciencia, Innovación y Universidades, 2025). Nevertheless, this imbalance should be considered when interpreting the findings, particularly those related to gender-based differences in the perceived positive impact of music. Although gender did not remain a robust predictor in the final regression models, the predominance of women may have influenced some descriptive trends.

The target population consisted of 576 students, meaning that the achieved sample of 213 represents 37.0% of the population. This sample provides a 95% confidence level with a margin of error of ±5.3%, which supports its adequacy for exploratory analysis within the target population. In the degree programme examined, the first substantial contact with school reality usually takes place in the 3rd academic year through SSP, which continue in the 4th year. In parallel, specific training in music didactics is concentrated in the 3rd year.

This curricular sequencing is relevant for interpreting the associations observed between academic year, SSP, and the perceived inclusive potential of music. Participants were distributed across the four academic years (39.9% 1st year, 19.2% 2nd year, 29.6% 3rd year, 12.2% 4th year). A total of 26.3% were doing a specialisation in SNE and 39.4% had completed one or more SSP.

4.2. Data collection

The questionnaire was administered in April 2024 via a QR code linking to an anonymous digital form (Google Forms). Participation was voluntary and no incentives were offered. It should be noted that participants specialising in Music Education were not included, as this specialisation is not offered in the programme offered at the University of A Coruña.

4.3. Data processing

Responses were analysed using a combined qualitative–quantitative approach. A representational thematic text analysis applied to survey data (Popping, 2015) was employed, manually assigning codes to text fragments with ATLAS.ti 25. As part of the coding process, both researchers independently coded an initial subset of responses. Discrepancies (mainly interpretative, such as whether a response reflected a general belief or a specific classroom practice) were then discussed and resolved through consensus, often leading to broader and more inclusive code definitions.

This process refined the coding framework and enhanced conceptual consistency before proceeding with the full dataset. The final scheme comprised 33 codes across five categories. Given the exploratory nature of the study and the size of the research team, reliability was established through iterative intercoder consensus (Eickhoff & Wieneke, 2018) rather than by calculating a formal coefficient such as Cohen's kappa.

This procedure enhanced credibility and transparency by combining independent evaluation with collaborative validation. To integrate qualitative and quantitative strands, the responses were quantitized by dichotomising the presence or absence of each category per participant (coding for existence). As Nzabonimpa (2018) points out, quantitizing allows statistical testing while preserving the qualitative insights that generated the codes. This strategy does not replace qualitative interpretation but complements it, enabling the combination of descriptive narratives with inferential analyses.

For the quantitative strand, codes were exported from ATLAS.ti to Microsoft Excel and processed in SPSS v28. Descriptive analyses included absolute frequencies and percentages. Significance testing was restricted to categories, guided by three reproducible criteria: (1) absolute frequency ($n \geq 20$), ensuring valid application of Pearson's χ^2; categories with <20 cases were analysed using Fisher's exact test or limited to descriptive reporting; (2) percentage-point difference ($\Delta \geq 10$ p.p.) between groups, considered practically relevant; and (3) theoretical relevance in relation to the study's objectives. Inferential analyses assessed group differences through Pearson's χ^2 or Fisher's exact tests, with results reported as odds ratios (OR) and 95% confidence intervals (CI). Binary logistic regression was then used to evaluate predictors of two outcome categories: *institutional limitations* and *positive impact of music*.

First, bivariate tests identified significant associations; second, univariate logistic models estimated effects of promising predictors; and finally, simple multivariable models combined relevant variables. Academic year was recoded into two categories (1st–2nd vs 3rd–4th year) for analytical stability. For each model, OR with 95% CI, and p-values (< .05) and explanatory capacity with Nagelkerke R^2 are reported.

4.4. Ethical considerations

This study involved adult university students and was based on voluntary participation through an anonymous questionnaire. Participants were informed of the purpose of the study before completing

the questionnaire and provided informed consent. Participation was not linked to course assessment or academic performance, thereby minimising any pressure or conditioning. No personally identifying data were collected, and responses were processed anonymously and confidentially. Access to the data was restricted exclusively to the two authors and used solely for research purposes.

5. Results

5.1. Perceptions of challenges, limitations, and benefits of music in SNE inclusion

The subsequent stage of the process is the aggregation of the results from the analysed open-ended questions. The exemplificative quotations presented are translations of the original Spanish text, provided by the authors.

Table 1 presents a breakdown of categories based on the analysis of PST responses, including absolute frequencies and percentages.

Table 1

Categories of content analysis

Category	Freq.	Percent.
Institutional limitations	78	36.6
Theoretical and practical limitations in teacher training	98	46.0
Sociocultural limitations	16	7.5
Consequences	68	31.9
Positive impact of music	148	69.5

In identifying challenges or difficulties of inclusive education, the category *institutional limitations* (n=78) include arguments related to:

- *Excessive student-teacher ratios* (n=35), co-occurring with certain narratives with *lack of time for individualised teaching* (n=16): 'when a class has several SNE students, in order to keep the class cohesive and united, more than one tutor or teacher per classroom would be necessary, as attending to special needs often requires a lot of time' (PST178).
- *Lack of resources* (n=28), one of the most frequently mentioned codes: 'after being in a class with many students with SNE, I can confirm that there is a severe shortage of resources' (PST175). Some PSTs specify *lack of adapted materials and spaces* (n=7), e.g., '[challenges] facing the difficulties of dealing with these students [SNE] without having the appropriate materials to work with them' (PST142) or 'the spaces need to be prepared' (PST196).
- *Lack of specific training opportunities* (n=10), in terms of a shortage of continuing training courses or from the perspective of curricula: 'all teachers will have students with SNE in our classrooms, and without compulsory subjects [on this topic], many [teachers] will not have the necessary knowledge' (PST201).
- *Lack of specialised support staff* (n=7) with a profile linked to Special Education, Therapeutic Pedagogy or Hearing and Language, according to the narratives: 'more professionals from these specialities are needed in educational centres' (PST184).

The perceived lack of institutional support for training in inclusive education expands its meaning in the category *theoretical and practical limitations in teacher training* (n=98). Most frequently, it refers to the limiting effect of a widespread *lack of knowledge* (n=50) among in-service teachers: 'I believe that in many cases there are teachers who do not feel fully prepared to deal with certain situations that arise in the classroom with SNE students' (PST193). Others mention the incidence of *lack of practical knowledge* (n=9), although their arguments are based on their own academic feelings: 'the limited training given on these cases during the [Primary Education] Degree [...] is never put into practice' (PST119). Another codes incorporate limitations in more specific areas of knowledge:

- *Curricular adaptation* (n=17) in terms of activities, curricular contents and assessment.
- *Providing appropriate methodologies/strategies* (n=15): 'in many cases, due to a lack of this training, they [teachers] are unable to adequately address these difficulties or find appropriate strategies to deal with the needs of the students in their classrooms' (PST205).
- *Providing/adapting adequate resources/materials* (n=12).
- *Capturing attention* (n=5).
- *Identifying cases with SNE* (n=4).

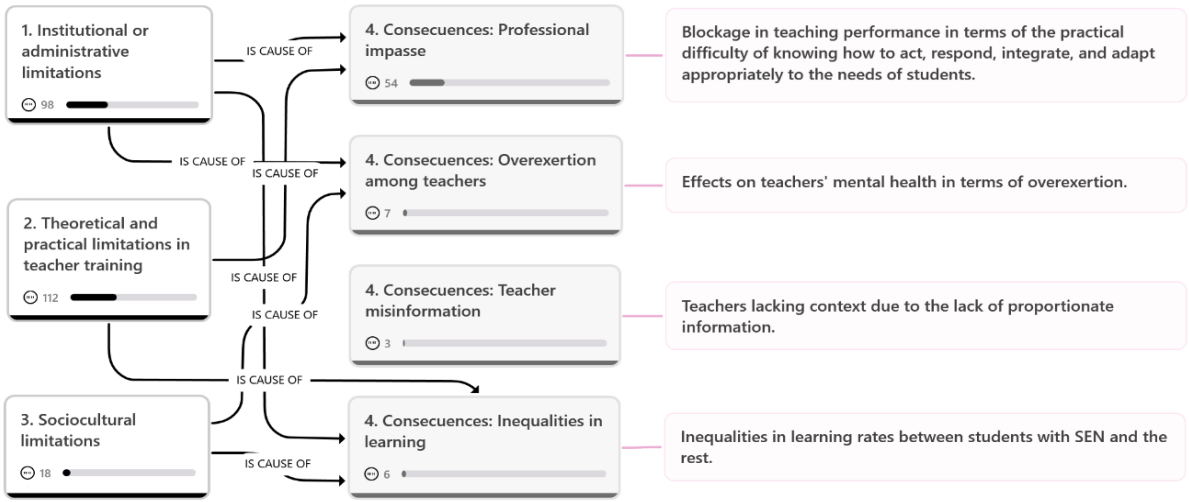
The identification of *sociocultural limitations* (n=16) includes aspects such as *lack of collaboration among teachers* (n=3) or *from families* (n=2), *lack of empathy/understanding among teachers* (n=10) or *among students* (n=3), as well as *apathy of teachers to retrain* (n=1):

> Lack of empathy due to ignorance [on the part of teachers] of what it means to be a student with SNE. Prejudices. (PST078)
>
> The lack of [...] normalisation by other students towards their classmates with special needs. (PST026)
>
> [In-service teachers] do not receive continuous training or keep themselves informed about these issues once they are teachers; they simply tend to think, 'I'm already a teacher, I don't need any more training, I'm ready for anything...' (PST120)

Other perceptions of participants have been categorized as *consequences* (n=68), which represent a relatively lower specific recognition of causal factors in the practice of in-service teachers; although they do not constitute structural limitations in themselves, do represent direct manifestations of the institutional, training and sociocultural limitations described above (Figure 1).

Figure 1

Challenges and difficulties of inclusive education as perceived by the PST: cause-effect relationships between categories



Regarding the specific benefit that music could bring to the education of students with SNE, the responses categorised as *positive impact of music* (n=148) include tangible examples linked to one or more of the following codes:

- *Relaxation and emotional regulation* (n=62) is the benefit most directly associated with music, as a way of calming and reducing student agitation. In this regard, the combination of music with the implementation of routines is emphasised, along with its utilisation in a range of relaxation techniques and personal expression activities: 'drawing freely and creatively with music in moments of tension' (PST098).
- *Motivation and interest* (n=34) includes the significance of music as a stimulus to the teaching-learning process, promoting dynamism and establishing connections with students:

'[music] can motivate [students] because they feel it is more familiar and fun' (PST081) or 'music can make those students more interested and more engaged in learning' (PST112).

- *Facilitates academic learning* (n=26) supports the benefit of music in conveying the understanding, reinforcement and memorisation of curricular content from other subjects through songs 'on a topic they are trying to learn' (PST075), or through interdisciplinary proposals: 'it could be that students with dyslexia or dyscalculia could use music (musical language) to learn these contents (eighth notes = units, quarter notes = tens...)' (PST174).
- *Attention and concentration* (n=26) specifies the contribution of music in capturing and maintaining the concentration of students with SNE in the classroom, mainly through sound environments: 'playing quiet music in the classroom while they [students] do an exercise can help a person with ASD who has problems with loud noises [...] to concentrate on the exercise' (PST106).
- *Creativity and personal expression* (n=26) refer to the potential of music as an alternative means of emotional communication: 'it can help students with SNE to express themselves in other ways' (PST090). The quotes reflect the inclusive component of music, in which even children 'can express themselves without knowing a language' (PST147).

Less frequently, participants mention the educational value of music or music therapy for improving *language and verbal communication skills* (n=8), *multisensory development* (n=8), *social interaction, conflict resolution and integration* (n=7) or *self-concept and self-esteem* (n=5):

> Music is a means of expression that can reflect the feelings of the author [...] for someone with some form of ASD, it could make them reflect on their emotions. (PST122)
>
> By working from a more perceptive format, it [music] helps to develop skills associated with auditory perception and production. (PST198)
>
> [Music therapy promotes] the inclusion of almost all students, conflict resolution, dealing with feelings of inadequacy. (PST121)
>
> Music is an easy way to bring people together, to share, and even to create bonds [...] it helps you get to know yourself and others better. (PST049)

In this sense, the code *rehabilitation benefits* (n=5) refers to the therapeutic potential of music as a relief for certain pathologies or complex situations: 'I think it can be very effective since most people turn to music when faced with various problems, and it relieves or helps them' (PST091).

5.2. Influence of background variables on perceptions

In descriptive terms, notable differences can be observed in the emergence of certain categories according to specific cohorts. *Institutional limitations* are more recurrent in the responses of PSTs in their 3rd–4th academic years (Δ +18.2 p.p.), those who have experienced an SSP (Δ +16.2 p.p.) or those studying SNE (Δ +15.7 p.p.).

Meanwhile, the identification of positive impacts of music is more frequent among female PSTs (Δ +18.5 p.p.), with SSP (Δ +18.2 p.p.), or who are in their 3rd–4th years (Δ +17.7 p.p.). The following quotes from female teachers with these profiles illustrate these trends: 'I had a student with ASD in the SSP who really liked music and found it relaxing' (PST171), 'during my SSP, I observed that doing the practice exercises with classical music stimulates concentration in all students' (PST180), or 'from what I saw in the SSP, [music] is essential for their well-being and that of the whole class' (PST191). The remaining categories show smaller percentage point differences, generally less than Δ 10 p.p., with no consistent pattern. Detailed results for all variables and categories are provided in Appendix A.

The descriptive trends noted above acquire statistical significance in the bivariate analyses (Table 2), which displays only the significant results, whereas the full set of tests, including non-significant results, is provided in Appendix B. Academic year, SSP and SNE were significantly associated with the perception of *institutional limitations*. However, in adjusted logistic regression models, only academic year remained a robust predictor when recoding the variable (3rd–4th vs 1st–2nd). PSTs in the 3rd–4th year are 2.18 times more likely to perceive institutional limitations than those in the 1st–

2nd year (OR = 2.18; 95% CI = 1.24–3.86; p = 0.007). The model explained 4–5% of the variability (Nagelkerke $R^2 = 0.046$) and showed adequate fit (Hosmer-Lemeshow p = 1.000).

Table 2
Bivariate analysis: significant results

Outcome (category)	Predictor	χ^2	OR	CI95%	p
Institutional limitations	SNE (Yes vs No)	4.40	1.93	1.04-3.60	0.036
Institutional limitations	SSP (Yes vs No)	5.75	2.00	1.13-3.54	0.016
Institutional limitations	Academic Year (3rd–4th vs 1st–2nd)	7.36	2.18	1.24–3.86	0.007
Positive impact of music	SSP (Yes vs No)	8.60	2.60	1.36–4.99	0.003
Positive impact of music	Gender (Male vs Female)	5.89	0.44	0.23-0.86	0.015
Positive impact of music	Academic Year (3rd–4th vs 1st–2nd)	7.64	2.41	1.28–4.53	0.006

Conversely, in bivariate analyses, gender, academic year, and SSP were significantly associated with the identification of *positive impact of music* (Table 2). Bivariate regressions showed two significant and consistent predictors:

- Being in the 3rd-4th year increased the probability of recognising the benefits of music for inclusive education by 2.41 times compared to the 1st-2nd year (OR = 2.41; 95% CI = 1.28–4.53; p = 0.006), explaining 5% of the variability (Nagelkerke $R^2 = 0.051$).
- Having taken SSP increased the probability of recognising the benefits of music for inclusive education by 2.60 times compared to those who had not (OR = 2.60; 95% CI = 1.36–4.99; p = 0.003), with a slightly higher explanatory power (Nagelkerke $R^2 = 0.058$).

However, in the multivariate model combining academic year and SSP, neither remained significant (academic year: OR=0.92; p=0.925; SSP: OR=2.83; p=0.275), probably due to collinearity of both variables. This overlap is consistent with the curricular structure of the participants' institution, previously described in the methodology section.

Finally, although gender showed differences in the bivariate analysis (with men less likely to point out the benefits of music), it did not remain a significant predictor in the regression models (p=0.477).

6. Conclusions

Given the exploratory nature of this study, the findings should be interpreted as preliminary trends rather than statistically generalisable results. Nonetheless, the results indicate that pre-service teachers' perceptions are strongly associated with their academic and practical experiences, particularly through supervised school placements (SSP) and specialisation in Special Needs Education (SNE), suggesting that the combination of theoretical and experiential training plays a key role in shaping awareness of inclusive practices.

In relation to the study objectives, SO1 was addressed through the identification of the main perceived barriers to inclusion, especially training-related and institutional challenges. SO2 was addressed through participants' recognition of music as a potentially useful resource for emotional regulation, motivation, attention, and creative expression in inclusive settings. SO3 was addressed through the comparative and regression analyses, which explored how these perceptions varied according to background variables such as academic year, gender, SSP, and specialisation in SNE.

Participants identified several structural challenges in inclusive education, highlighting training (in terms of lack of theoretical or practical knowledge) and institutional limitations (e.g., lack of resources, excessive student–teacher ratios, insufficient support staff, among others). These

descriptive findings align with prior research stressing that inclusive practice requires not only teacher willingness but also specific knowledge, professional skills and supportive institutional conditions (Hassanein et al., 2021; Woodcock et al., 2023).

Significant associations were observed between perceptions of institutional limitations, recognition of music's positive impact, and variables such as academic year and SSP. However, due to the curricular structure —where students in their third and fourth academic years undertake SSP and specific training in music teaching, which is a compulsory subject only in the third year— collinearity limits the attribution of these effects to any single component. Similar developmental patterns have been reported in other teacher education contexts, where students' learning profiles evolve over the course of their studies in response to contact with specific didactics and practicum experiences (Diego et al., 2016). Furthermore, prior research has highlighted the value of understanding and addressing diverse learning styles through targeted strategies in higher education, underscoring the need for personalised and structured approaches to enhance teacher preparation (del Valle de Moya Martínez et al., 2009).

Nevertheless, the pattern indicates that advanced-year trainees with practical and specialized curricular exposure are more aware of structural barriers and more likely to express tangible benefits of music for inclusive education. Participants mainly associated the inclusive potential of music with emotional regulation, increased motivation and attention for academic learning, and creative expression. Those with specialised training or SSP experience provided more concrete, practice-oriented examples. Less frequently, cognitive, communicative, and therapeutic applications noted in the music-therapy literature were mentioned, likely reflecting limited curricular exposure to evidence-based musical interventions (Felípez-Abad & Castro-Alonso, 2024). These trends suggest that practical experience and targeted musical education enhance recognition of music as a tool for inclusion.

Training in diversity continues to vary across institutions, influencing the quality of preparedness of future teachers (Sánchez-Serrano et al., 2021). The findings therefore point to the need for more robust, interdisciplinary and practice-oriented training in inclusive education that is widely accessible, not limited to specialists. The relatively modest occurrence of advanced music applications in participants' responses suggests that many trainees lack systematic exposure to music as a pedagogical or therapeutic resource, with only one specific music didactics subject across the four academic years, which may explain limited confidence in designing music-based inclusive activities (Allan, 2025; Salvador, 2010).

The study did not aim to evaluate institutional performance —an endeavour that would require triangulation with multiple sources (Aznar-Mas et al., 2023)— but rather to map trainee teachers' beliefs, which may shift through substantive practical experiences or 'gestalt' transformations (Leonard et al., 2010). In this sense, practical placements that deliberately integrate music-based strategies could be a useful setting for transforming beliefs, reducing prejudice and fostering collaboration between classroom teachers and specialists (Hassanein et al., 2021; Kunz Luder & Kassis, 2019; Metsala & Harkins, 2019; Salvador & Pasiali, 2017).

This study has several limitations. First, the sample was drawn from a single institution, which limits transferability to other teacher education contexts. Second, although the gender distribution is consistent with the feminised profile of Education degrees in Spain, the predominance of female participants may have influenced some descriptive tendencies. Third, there is substantial overlap between academic year, SSP, and curricular exposure to music and inclusion, which complicates the attribution of effects to any single variable. This pattern may also be partly context-specific, since in this university the first substantial contact with school reality takes place in the third academic year through SSP. In teacher education programmes with a different sequencing of supervised placements and music didactics, the timing and configuration of these associations might differ.

A key limitation is therefore the collinearity between academic year, SSP completion, and enrolment in the music didactics subject, which prevents precise attribution of effects to individual curricular components. Future research should seek designs that allow this overlap to be disentangled, such as longitudinal tracking across the degree or comparisons between programmes that schedule practicum and music didactics in different years. Fourth, the use of open-ended questionnaire responses enabled broad access to participants' perceptions and allowed the collection of diverse responses suitable for mapping perceptions at scale (Popping, 2015), but did not provide the depth that

interviews, focus groups, or ethnographic observation might have offered. Finally, the quantitisation of qualitative responses allowed statistical exploration, but inevitably reduced part of the nuance and contextual richness of the original accounts. Accordingly, the findings should be interpreted as exploratory and hypothesis-generating rather than fully generalisable.

Overall, the findings consistently indicate that the combination of practical experience and specialized curricular training is associated with heightened awareness of structural barriers and a more concrete recognition of music's inclusive potential. These preliminary trends support the value of integrating practice and music didactics within teacher education to better prepare future teachers for diverse classrooms.

References

Allan, A. (2025). Three Inclusion Barriers: An Examination of Elementary Music Teachers' Preparation to Teach Learners With Exceptionalities. *Journal of Music Teacher Education*, *0*(0). https://doi.org/10.1177/10570837241307249

Alonso, R., Araújo, P., & Delgado, P. (2023). Desafios para a participação e a inclusão numa escola burocratizada. *Revista De Estilos De Aprendizaje*, *15*(EspecialII), 103–115. https://doi.org/10.55777/rea.v15iEspecialII.4592

Aznar-Mas, L.E., Atarés-Huerta, L., & Marin-Garcia, J.A. (2023). Effectiveness of the use of open-ended questions in student evaluation of teaching in an engineering degree. *Journal of Industrial Engineering and Management, 16*(3), 521-534. https://doi.org/10.3926/jiem.5620

Babbie, E. & Mouton, J. (2001) *The Practice of Social Research*. Oxford University Press.

Cano, M.D., & Sánchez-Iborra, R. (2016). On the use of a multimedia platform for music education with handicapped children: A case study. *Computers in Human Behavior, 55*(Part B), 1120–1128. https://doi.org/10.1016/j.chb.2014.09.063

Del Barrio, L., Casanova, O., & Vernia, A. M. (2024). Music Teacher Competences Oriented Toward Inclusive Education: An Analysis of Proposals in the Initial Pre-Service Teacher Training Phase. *SAGE Open*, *14*(4). https://doi.org/10.1177/21582440241293599

del Valle de Moya Martínez, M., Hernández Bravo, J. A., Hernández Bravo, J. R., & Cózar Gutiérrez, R. (2009). Un estilo de aprendizaje, una actividad. Diseño de un plan de trabajo para cada estilo. *Revista De Estilos De Aprendizaje*, *2*(4). https://doi.org/10.55777/rea.v2i4.895

Devolli, A., & Avdiu-Kryeziu, S. (2020). Music as an inclusion tool: Can primary school teachers use it effectively? *Rast Musicology Journal, 10*(3), 345–363. https://doi.org/10.12975/rastmd.20221032

Diego, M. G., Ferragut, E. M., & Morales, J. M. M. (2016). La relativa estabilidad de los estilos de aprendizaje en estudiantes de Magisterio: Estudio longitudinal. *Revista De Estilos De Aprendizaje*, *9*(17). https://doi.org/10.55777/rea.v9i17.1048

Eickhoff, M., & Wieneke, R. (2018). Understanding topic models in context: A mixed-methods approach to the meaningful analysis of large document collections. *Proceedings of the 51st Hawaii International Conference on System Sciences*. https://pdfs.semanticscholar.org/9663/20028a68a5dd3d044f2bf1b40239aa2fcf58.pdf

Felípez-Abad, C., & Castro-Alonso, V. (2024). Trastorno del Espectro Autista en Educación Infantil: Realidades del profesorado e incidencia de la musicoterapia en el planteamiento escolar. *European Public & Social Innovation Review, 9*, 1–19. https://doi.org/10.31637/epsir-2024-475

Ferguson, L. E., & Lunn Brownlee, J. (2018). An Investigation of Preservice Teachers' Beliefs about the Certainty of Teaching Knowledge. *Australian Journal of Teacher Education, 43*(1). https://doi.org/10.14221/ajte.2018v43n1.6

Gisbert Caudeli V. G., Navarro Lalanda S. & Vela González M. (2024). Alumnado con NEAE en el aula de música. Experiencia y formación del profesorado en inclusión educativa: Experience and teacher training in educational inclusion. *Revista Electrónica Complutense de Investigación en Educación Musical - RECIEM*, *21*, 97-118. https://doi.org/10.5209/reciem.85719

Hassanein, E.E.A., Alshaboul, Y.M., & Ibrahim, S. (2021). The impact of teacher preparation on preservice teachers' attitudes toward inclusive education in Qatar. *Heliyon, 7*(9). https://doi.org/10.1016/j.heliyon.2021.e07925

Jiang, N., Li, H., Ju, S.-Y., Kong, L.-K., & Li, J. (2025). Pre-service teachers' empathy and attitudes toward inclusive education: The chain mediating role of teaching motivation and inclusive education efficacy. *PLoS One, 20*(4), 1-18. https://doi.org/10.1371/journal.pone.0321066

Kunz, A., Luder, R., & Kassis, W. (2019). Beliefs and attitudes toward inclusion of student teachers and their contact with people with disabilities. *European Journal of Special Needs Education, 34*(1), 92–107. https://doi.org/10.1080/08856257.2018.1474682

Lee, L., & Ho, H. J. (2017). Exploring young children's communication development through the Soundbeam trigger modes in the 'Holistic Music Educational Approach for Young Children' programme. *British Journal of Music Education, 34*(1), 41–55. https://doi.org/10.1017/S0265051716000326

Leonard, J., Barnes-Johnson, J., Dantley, S.J., & Kimber, C. (2010). Teaching Science Inquiry in Urban Contexts: The Role of Elementary Preservice Teachers' Beliefs. *Urban Rev, 43*, 124–150. https://doi.org/10.1007/s11256-010-0173-7

Martínez-Hernández, G., & Herrada, R. I. (2023). La estimulación musical como herramienta educativa para el desarrollo integral del alumnado con Trastorno del Espectro Autista en el ámbito escolar. *Revista Electrónica Complutense de Investigación en Educación Musical, 20*, 201-214. https://dx.doi.org/10.5209/reciem.81700

Metsala, J. L., & Harkins, M. J. (2019). An Examination of Preservice Teachers' Self-Efficacy and Beliefs About Inclusive Education. *Teacher Education and Special Education*, *43*(2), 178-192. https://doi.org/10.1177/0888406419873060

Ministerio de Educación, Formación Profesional y Deportes. (2024). Enseñanzas no universitarias. Alumnado. https://www.educacionfpydeportes.gob.es/servicios-al-ciudadano/estadisticas/no-universitaria/alumnado.html

Ministerio de Ciencia, Innovación y Universidades. (2025). *Estadística de estudiantes universitarios. Principales resultados. Curso 2024–2025*. Gobierno de España.

Muntaner-Guasp, J. J., Mut-Amengual, B., & Pinyà-Medina, C. (2021). Formación inicial en inclusión en los grados de maestro en Educación Primaria. *Revista Latinoamericana de Inclusión Educativa, 15*(2), 55–74. https://doi.org/10.14201/scero2021524927

Nzabonimpa, J. P. (2018). Quantitizing and qualitizing (im-)possibilities in mixed methods research. *Methodological Innovations, 11*(2). https://doi.org/10.1177/2059799118789021

Pérez Castejón, D., & Vigo Arrazola, M. B. (2024). Conceptualización de la educación inclusiva en la formación inicial del profesorado especialista: pensamiento hegemónico de la educación especial. *Revista de Investigación en Educación, 2024, 22*(2), 161-178. https://doi.org/10.35869/reined.v22i2.5376

Pinilla Arbex, J., & Villasana Terradillos, M. (2025). De infantil a secundaria: panorama de la educación inclusiva. *Revista De Educación, 1*(409), 226–242. https://doi.org/10.4438/1988-592X-RE-2025-409-697

Popping, R. (2015). Analyzing open-ended questions by means of text analysis procedures. *Bulletin de Méthodologie Sociologique, 128*(1), 23–39. https://doi.org/10.1177/075910631559738

Rizzo, A. L., & Pellegrini, M. (2018). L'efficacia della musica a scuola: Una rassegna delle evidenze. *Italian Journal of Special Education for Inclusion, 6*(1), 21–36.

Rojo-Ramos, J., Ferrera-Granados, C., Fernández-Guerrero, M., Polero, P., Manzano-Redondo, F., & García-Gordillo, M. Á. (2021). A descriptive study on the training and attitude of future teachers towards educational inclusion. *Sustainability, 13*(21), 11807. https://doi.org/10.3390/su132111807

Salvador, K. (2010). Who isn't a special learner? A survey of how music teacher education programs prepare future educators to work with exceptional populations. *Journal of Music Teacher Education, 20*(1), 27–38. https://doi.org/10.1177/1057083710362462

Salvador, K., & Pasiali, V. (2017). Intersections between music education and music therapy: Education reform, arts education, exceptionality, and policy at the local level. *Arts Education Policy Review, 118*(4), 234–242. https://doi.org/10.1080/10632913.2016.1190459

Sánchez-Serrano, J. M., Alba-Pastor, C., & Zubillaga del Río, A. (2021). La formación para la educación inclusiva en los títulos de maestro en Educación Primaria de las universidades españolas. *Aula Abierta, 50*(2), 489–498. https://doi.org/10.4438/1988-592X-RE-2021-393-496

United Nations. (2006). *Convention on the Rights of Persons with Disabilities* [Convention]. https://www.un.org/development/desa/disabilities/convention-on-the-rights-of-persons-with-disabilities.html

United Nations. (2015). *Transforming our world: The 2030 agenda for sustainable development.* https://sdgs.un.org/2030agenda

Wong, M. W., & Chik, M. P. (2022). Teaching students with special educational needs in inclusive music classrooms: Experiences of music teachers in Hong Kong primary schools. *International Journal of Music Education, 40*(1), 69–84. https://doi.org/10.1177/02557614211048293

Woodcock, S., Gibbs, K., Hitches, E., & Regan, C. (2023). Investigating Teachers' Beliefs in Inclusive Education and Their Levels of Teacher Self-Efficacy: Are Teachers Constrained in Their Capacity to Implement Inclusive Teaching Practices? *Education Sciences, 13*(3), 280. https://doi.org/10.3390/educsci13030280

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Conflict of interest

There is no conflict of interest between the authors and reviewers.

Contribution of authors

Vicente Castro-Alonso contributed 50% to the research. He was responsible for the methodology section, the statistical analysis, and the overall supervision of the study. Aroa Rodríguez Labora contributed the remaining 50%, designing the instrument and conducting the data collection and literature review.

Appendix A

Percentage-point differences by variable and category

Category	Δ p.p. SNE (Yes – No)	Δ p.p. SSP (Yes - No)	Δ p.p. acad. year (3rd/4th – 1st/2nd)	Δ p.p. gender (Female – Male)
Institutional limitations	+15.7	+16.2	+18.2	+5.0
Theoretical and practical limitations in teacher training	+7.8	+2.7	0.1	-12.0
Sociocultural limitations	-2.9	-6.5	-7.1	-1.2
Consequences	-7.0	-1.6	-0.8	+5.3
Positive impact of music	+11.69	+18.2	+17.7	+18.5

Appendix B

Complete Results of the Bivariate Analyses

Outcome (categ.)	Predictor	χ^2 / Fisher	OR (CI95%)	p
Institutional limitations	SNE (Yes vs No)	χ^2=4.40	1.9 (1.0-3.6)	0.036
	SSP (Yes vs No)	χ^2=5.75	2.0 (1.1-3.5)	0.016
	Academic Year (3rd–4th vs 1st–2nd)	χ^2=7.36	2.2 (1.2-3.9)	0.007
	Gender (Male vs Female)	χ^2=0.16	0.9 (0.4-1.7)	0.697
Theoretical and practical limitations in teacher training	SNE (Yes vs No)	χ^2=1.02	1.4 (0.7-2.5)	0.312
	SSP (Yes vs No)	χ^2=0.15	1.1 (0.6-1.9)	0.704
	Academic Year (3rd–4th vs 1st–2nd)	χ^2=0.00	1.0 (0.6-1.7)	0.989
	Gender (Male vs Female)	χ^2=2.13	1.6 (0.8-3.1)	0.145
Sociocultural limitations	SNE (Yes vs No)	Fisher	0.6 (0.2-2.3)	0.570
	SSP (Yes vs No)	Fisher	0.3 (0.9-1.2)	0.110
	Academic Year (3rd–4th vs 1st–2nd)	Fisher	0.3 (0.8-1.1)	0.066
	Gender (Male vs Female)	Fisher	1.2 (0.4-3.8)	0.759
Consequences	SNE (Yes vs No)	χ^2=0.92	0.7 (0.4-1.4)	0.337
	SSP (Yes vs No)	χ^2=0.06	0.9 (0.5-1.7)	0.806
	Academic Year (3rd–4th vs 1st–2nd)	χ^2=0.02	1.0 (0.5-1.7)	0.902
	Gender (Male vs Female)	χ^2=0.47	0.8 (0.4-1.6)	0.494
Positive impact of music	SNE (Yes vs No)	χ^2=2.96	1.9 (0.9-3.8)	0.085
	SSP (Yes vs No)	χ^2=8.60	2.6 (1.4-5.0)	0.003

	Academic Year (3rd–4th vs 1st–2nd)	χ^2=7.64	2.4 (1.3-4.5)	0.006
	Gender (Male vs Female)	χ^2=5.89	0.4 (0.2-0.9)	0.015