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Circle Singing as an Inclusive Interdisciplinary Practice: Assessing Musical and Linguistic Development Through Innovative Research Tools

Il canto in cerchio come pratica interdisciplinare inclusiva: valutazione dello sviluppo musicale e linguistico attraverso strumenti di ricerca innovativi

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Abstract
This study presents *Circle Singing* as an educational, inclusive, interdisciplinary practice capable of enhancing both musical perception and English pronunciation through embodied, multisensory and cooperative learning. Aligned with evidence-based pedagogy and with international frameworks for inclusive and lifelong education (Booth & Ainscow, 2014; UNESCO, 2022), Circle Singing integrates musical improvisation, linguistic inquiry, and an inclusive collective dimension to support all learners, particularly those with special educational needs. Circle Singing offers a multimodal environment in which rhythmic–melodic patterns, integrated with English lyrics selected for their phonetic features, foster phonological awareness, prosodic sensitivity, and improved pronunciation. To assess its pedagogical impact, a quasi-experimental design will involve 200 university students at Roma Tre University, comparing an experimental group participating in a 10-hour Circle Singing laboratory with a control group. Two digital tools—the Mini-PROMS and SpeechAce—will measure musical perception (melody, tuning, tempo, accent) and phonetic accuracy (vowel and consonant production) through pre- and post-testing. By situating English pronunciation within a dynamic, choral, and emotionally engaging experience, Circle Singing promotes inclusive participation and supports the development of linguistic, musical, and socio-emotional competences. The study aims to model a replicable framework that may serve as a signature pedagogy for integrating language learning and music within inclusive educational contexts.

Keywords: Circle Singing, inclusive education, english pronunciation, music perception, interdisciplinary didactic.

Riassunto
Questo studio presenta il Circle Singing come una pratica educativa, inclusiva e interdisciplinare capace di innalzare i livelli sia di percezione musicale sia di pronuncia in lingua inglese attraverso un apprendimento incarnato, multisensoriale e cooperativo. In linea con la pedagogia evidence-based e con i principali framework internazionali per l'educazione inclusiva e permanente (Booth & Ainscow, 2014; UNESCO, 2022), il Circle Singing integra improvvisazione musicale, indagine linguistica e una dimensione collettiva inclusiva per sostenere tutti gli studenti, in particolare quelli con bisogni educativi speciali. Il Circle Singing offre un ambiente multimodale in cui pattern ritmico-melodici, integrati con testi in lingua inglese selezionati per le loro caratteristiche fonetiche, favoriscono la consapevolezza fonologica e la sensibilità prosodica, contribuendo al miglioramento della pronuncia. Per valutarne l'impatto pedagogico, un disegno quasi-sperimentale coinvolgerà 200 studenti universitari di Roma Tre, confrontando un gruppo sperimentale che partecipa a un laboratorio di Circle Singing di 10 ore con un gruppo di controllo. Due strumenti digitali—il Mini-PROMS e SpeechAce—misureranno la percezione musicale (melodia, intonazione, tempo, accento) e l'accuratezza fonetica (produzione di vocali e consonanti) attraverso test pre e post. Collocando la pronuncia inglese all'interno di un'esperienza dinamica, corale e coinvolgente, il Circle Singing promuove la partecipazione inclusiva e sostiene lo sviluppo di competenze linguistiche, musicali e socio-emotive. Lo studio mira a delineare un modello replicabile che possa configurarsi come una signature pedagogy per l'integrazione tra apprendimento linguistico e musica in contesti educativi inclusivi.

Parole chiave: Circle Singing, didattica inclusiva, pronuncia inglese, percezione musicale, didattica interdisciplinare.

Credit author statement
The paper is the result of a joint contribution by both authors. Sections 2, 4, 5, 6 and 7 were written by Giuseppe Pantano; sections 1, 3 and 8 were written by Amalia Lavinia Rizzo, who also supervised the overall draft.

1. Introduction

Inclusive education is deeply intertwined with society, of which it is both a reflection and an expression (Pourtois & Desmet, 2006), and it bears the critical responsibility of negotiating tensions between contradictions, challenges, and processes of transformation (Slavich & Zimbardo, 2012; Rose & Myers, 2024). The educational context must therefore take into account the postmodern condition (Bauman, 2000), characterised by the logic of the temporary contract (Lyotard, 1984), the pervasive influence of social media on cognition and behaviour (The Lancet, 2014), the fragmentation of attention and identity (Wang, 2022), and the emerging challenges posed by an AI-driven society (Selwyn, 2022). These conditions underscore the urgency of designing pedagogical approaches that are both innovative and inclusive (Booth, Ainscow, 2014). Within this framework, it is important to acknowledge that although *signature pedagogies* have been established in education as well as across professional and disciplinary domains, habitual practices risk turning into *sources of rigidity and perseveration* (Shulman, 2005)—a challenge particularly relevant for students with special educational needs. While methodological approaches cannot, on the one hand, be prescribed as rigid or standardised (Biesta, 2007), on the other, it is crucial to reflect on best practices, understood as the decision-making processes through which teachers address the diverse needs of all learners (Hattie, 2009; Villa & Thousand, 2021). Rather than fixed routines, best practices are evolving agreements grounded in evidence-based practice (EvBP), systematically integrated into curriculum design and sustained by continuous monitoring and reflection, with the ultimate goal of progressively enhancing teaching and learning environments (Rizzo, 2024).

2. English Learning as a Key Competence for Lifelong Learning

In addition to the socio-cultural context and the need to ground inclusive teaching in evidence-based practice (EvBP), the lifelong learning perspective (UNESCO, 2022) underscores the role of education in addressing today's near-limitless access to multimedia and multilingual content by fostering the development of students' linguistic competences. Such competences are essential not only for disciplinary development but also for enabling learners to navigate and critically interpret the digital environments to which they are increasingly exposed (Darvin, 2017; Leander & Burriss, 2020). At the European and international level, this approach finds support in key documents such as the European Commission's *Communication on Promoting Language Learning and Linguistic Diversity* (2004), which advocates for "providing support to learners in acquiring different languages useful for their working and personal life and for cross-border communication and mobility," and for "training teachers so that they can teach their subjects in at least one other foreign language" while "promoting an inclusive approach to linguistic diversity." Notably, the acquisition of English is identified as a key-competence that underpins the right of all learners—including those with special educational needs (SEN)—to participate fully in inclusive and lifelong learning opportunities (European Commission, 2018). These processes are also connected to the formative value of the Common European Framework of Reference for Languages (CEFR), developed by the Council of Europe (2001), which provides a comprehensive model for language learning, teaching, and assessment grounded in principles of equity, inclusion, and lifelong education. From a pedagogical perspective, the CEFR frames language not only as knowledge but as a dynamic integration of skills, strategies, and personal dispositions, thereby fostering communicative and intercultural competence. Within this model, learners are conceived as active agents in their own learning, mobilising linguistic resources not for the simple transmission of information but for the negotiation of meaning and intention. Intercultural competence, in this sense, emerges from encounters between individuals of different languages and cultures, requiring mediation to create a *third space* of shared understanding without erasing individual identities (Mariani, 2004). A dynamic integration of skills—in which all learners are conceived as active agents of their own learning while simultaneously developing intercultural competences—is further supported by interdisciplinary methodologies such as Content and Language Integrated Learning (CLIL), which explicitly promote the development of linguistic, cognitive, and disciplinary competences.

3. CLIL as an interdisciplinary resource for English learning

The interdisciplinary dimension—particularly when it involves the acquisition of a second language in an inclusive perspective—is strongly endorsed by both the Italian and European normative frameworks, which explicitly recognise the pedagogical value of CLIL (DPR 15/03/2010; MIUR, 2013). The Italian normative framework, in fact, promotes the adoption of inclusive, laboratory-based teaching methodologies that enhance diversity and guarantee equal learning opportunities, positioning the school as a space for the construction of educational cultures and shared learning (DPR 15/03/2010; D.Lgs. 66/2017; MIUR, 2012). Such a pedagogical model encourages the integration of English language with other disciplinary areas, responding to the needs of a globalised world and to the growing demand for linguistic competence as a transversal skill. Likewise, the UNESCO Policy Guidelines on Inclusion in Education (2009) encourage the use of flexible strategies and innovative teaching, such as laboratory approaches, to foster inclusion. In addition, it is relevant to underpin the importance of artistic and interdisciplinary education underscored in the *Seoul Agenda: Goals for the Development of Arts Education* (2010), which highlights the role of the arts in promoting creativity, cultural awareness, and inclusive learning environments. Within this framework, the integration of music and CLIL emerges as a valuable pedagogical strategy for stimulating imagination, emotion, and disciplinary engagement. Such an approach aligns with broader educational priorities—including sustainability, as outlined in *Agenda 2030* and the *GreenComp* framework, and digital competence development, as promoted in *DigComp 2.2* (European Commission, 2022)—all of which emphasise the need for innovative and inclusive pathways to lifelong learning. While these interdisciplinary approaches underscore the potential of integrating language and content learning, challenges related to pronunciation remain a persistent issue in English language education. Despite its centrality to communicative competence, pronunciation often receives limited attention in pedagogical practice. For teachers, clear and accurate pronunciation is fundamental to their professional identity and to their capacity to model linguistic proficiency; for learners, it is a decisive factor in intelligibility, communicative confidence, and full participation in academic and social exchanges. Mastering pronunciation in a foreign language, however, is a complex process. Learners' phonological awareness is deeply influenced by their mother tongue, and when the first language features a transparent orthography, decoding strategies are often transferred that prove inadequate for more opaque languages such as English (Costenaro, Daloiso, & Favaro, 2014). Research in both general and special education demonstrates that multisensory and embodied strategies significantly enhance second-language acquisition by activating multiple perceptual channels and deepening learners' awareness of sound–letter correspondences (Reid, 2009; Schneider & Crombie, 2003). Consequently, interdisciplinary, game-based, performative, and collaborative approaches position pronunciation within embodied learning experiences that are both engaging and motivating (Nijakowska, 2010).

4. Enhancing English Pronunciation through Musical Perception

Musical perception and linguistic development share cognitive resources, particularly in accessing phonological representations (Kraus et al., 2014). Music, by engaging a distributed network of brain structures, supports the activation of a wide range of functions, from sound encoding to higher-order cognitive operations, and induces both functional and structural changes within the auditory and sensorimotor systems, as demonstrated by the OPERA theory (Patel, 2012). Moreover, studies on music and language have shown that improvements in musical perception processes can transfer to speech perception and reading abilities (Rizzo, 2021). Music enhances the adaptive plasticity of the neural networks involved in language processing, sharing cognitive resources such as attention and memory (Herholz & Zatorre, 2012). Researches by Overy (2003) reported that participation in a 15-week program of progressively challenging musical games focused on rhythm and timing skills led to significant improvements in phonological processing and spelling. From an auditory perspective, sound is analysed through three fundamental parameters—pitch, timbre, and timing—each with direct linguistic correlates. Pitch determines how high or low a sound is perceived, playing a central role in musical and linguistic prosody. Timbre allows us to distinguish one syllable from another—for example, in differentiating "most" from "must." Timing is also

critical for the differentiation of minimal pairs such as "post" and "cost," where the distinction lies in the *Voice Onset Time* (VOT)—the interval between the release of a plosive consonant and the onset of vocal fold vibration. Voiceless consonants such as /p/, /t/, and /k/ are characterised by a longer VOT, due to a delay before vocal fold vibration begins, while voiced consonants like /b/, /d/, and /g/ have a shorter VOT, with immediate onset of voicing. The ability to accurately perceive these subtle temporal cues is essential for phonetical comprehension and accuracy both in speaking and listening (Zuk, Ozernov-Palchik, Kim, Lakshminarayanan, Gabrieli & Gaab, 2013). Based on these premises, musical activities operationalise the principles of interdisciplinary pedagogy by activating overlapping neural mechanisms shared by music and language processing. Within this framework, it becomes crucial to identify and implement methodological strategies—such as Circle Singing—that introduce into the educational context a model of multimodal learning, intrinsically interdisciplinary in nature, and aimed at fostering integral, multidimensional, and non-linear artistic thinking (Kolyadenko & Skorokhodov, 2003). Traces of such an interdisciplinary paradigm can be found in the work of Émile Jaques-Dalcroze and Carl Orff, who theorised and experimented with multimodal approaches to music education based on bodily movement, improvisation, and active participation.

5. Circle Singing as an inclusive educational strategy for English pronunciation

Circle Singing has been widely disseminated thanks to the work of American singer and composer Bobby McFerrin. Not yet systematically described within academic literature, Circle Singing values difference as a resource, intentionally directing the educational focus toward the plurality of individuals and learning pathways. The participants, arranged in a circle around an expert guide, collaboratively construct harmonic, melodic and rhythmic structures in real time. Within this context, the expert assumes the role of conductor of the ludo-animative laboratory (Rizzo, 2021)—a mediating function that acquires further clarity when considered through the etymological lens of the term itself. In Latin, the root *per-* appears in *ex-perior* ("to experience"), from which the word *expert* is derived; whereas in Ancient Greek, the same Indo-European root *per-* evolves semantically from the idea of "passing through" or "going beyond" to that of "transferring to others," as in the verb πέρνημι (*pérnēmi*), meaning "to sell" (Rendich, 2009). Thus, the guiding qualities necessary to the educators conducting the circle song lie not so much in their professional role outside the circle, but in the experiential knowledge cultivated within it, and in their capacity to share and activate that knowledge by effectively motivating and engaging the participants through a non-hierarchical, horizontal approach. As the orienting figure in the vocal circle, their role is to guide and inspire, transforming the musical experience into a participatory and motivating educational process. In fact, the teacher-animator plays a crucial role in inclusive settings: they welcome and valorise differences, shaping a learning environment grounded in active participation and shared responsibility (Rizzo, 2021). This practice offers a circular vision of existence, in which the dimension of finite matter is contrasted with that of matter in transformation: from being to becoming, a shared space where error does not exist. Furthermore, the reiterative structure of the circle song reinforce the *emotive* or *expressive* function of language (Jakobson, 1960), deepening learners' affective engagement with the material. This contribution reinterprets Circle Singing as an educational methodology integrated with English learning, employing words, sounds, and literary characters drawn from the Anglophone world and embedded within a CLIL-based didactic framework. Through this approach, English language may become the object of *embodied cognition* and *knowledge*, offering learners a situated and contextualised experience that supports both the cognitive, practical and affective dimensions of learning in inclusive contexts (Gallagher, 2005; Booth & Ainscow, 2014; Araya, 2017). In fact, Circle Singing not only results in a cohesive, immersive, and enjoyable musical performance but also offers a space to explore emotions and sharing learning pathways. Students guided by the expert reflect on the keywords belonging to the lyrical excerpts, while the educator defines a harmonic, melodic and rhythmic framework integrated with the selected literature, thereby transforming the circle song into a device for the interdisciplinary learning.

6. The Current Study

Within this framework the research pursues the following objectives:

1. To design and model a laboratory that actively supports the participation of students with special educational needs (SEN), fostering inclusion through embodied, collaborative, and creative practices.
2. To evaluate the effectiveness of Circle Singing in promoting English language acquisition, with specific attention to pronunciation accuracy and phonological awareness.
3. To assess the impact of Circle Singing on musical competences and perception skills, including pitch, rhythm, accent and melody discrimination.
4. To develop a replicable, workshop-based model that can be adopted by future teachers in both primary and secondary education, grounded in interdisciplinary and evidence-based pedagogy.

The study adopts a quasi-experimental design. The sample involves 200 university students, divided into an experimental group and a control group. Participants will be recruited on a voluntary basis from students enrolled in the courses *Didattica inclusiva*, *Pedagogia e didattica speciale per l'inclusione*, and *Musica e inclusione scolastica*, offered within the Departments of Educational Sciences and DAMS (Dance, Art, Music and Performance) at Roma Tre University. The research will proceed through the following phases:

– Design phase: development of the Circle Singing laboratory, including the selection of musical material and English texts (March–September 2025).
– Baseline assessment: pre-tests administered to both experimental and control groups (1–15 October 2025).
– Implementation: delivery of the Circle Singing laboratory to the experimental group (15 October–15 December 2025, 10h).
– Post-assessment and qualitative inquiry: administration of post-tests and organisation of a focus group with selected participants from the experimental group (15–30 December 2025).
– Data analysis: integration of qualitative and quantitative findings (January–March 2026).

The evaluation strategy combines quantitative and qualitative methods in order to triangulate data and ensure reliability. Quantitative instruments will include pre- and post-questionnaires for self-assessment of linguistic and musical competences, as well as two validated digital tools: the Profile of Music Perception Skills (PROMS) and SpeechAce. These tools are designed to assess pitch, rhythm, timbre, and melody perception, and evaluate vowel and consonant accuracy in English pronunciation, as detailed in the following sections. Qualitative data will be collected through a focus group, conducted with a voluntary sample of participants from the experimental group, to explore perceptions, experiences, and attitudes towards the Circle Singing laboratory. The study has received favourable approval from the Ethics Committee of Roma Tre University, ensuring compliance with ethical standards for research involving human participants.

6.1 Technical and musical aspects of the Circle Singing laboratory

The following section details the methodological framework and procedural steps of the Circle Singing laboratory. The process is articulated through successive phases that combine musical improvisation, linguistic awareness, and group interaction. Each phase has been designed to foster the integration of auditory, motor, and cognitive processes while maintaining flexibility for real-time adaptation during the sessions.

1. Preparatory Phase (Fig.1): participants are arranged in a circle and grouped according to similar vocal registers in order to ensure homogeneity of timbre and balance across the ensemble. The expert, positioned within the circle, introduces the chosen mode or scale using a musical instrument (e.g., piano, guitar). Following this introduction, participants are guided to sing the degrees of the scale—first using numerical labels, then moving to non-lexical syllables—in order to progressively internalise and stabilise the tonal or modal framework. The expert employs a system of pre-agreed gestures to signal entries, dynamics, group exchanges, activations and deactivations, and the final closure of the performance.

2. Layering of patterns: once the tonal framework has been established, the facilitator introduces an initial rhythmic–melodic ostinato combined with carefully selected English lyrics chosen for their phonetic specificity. Once the ensemble repeats and consolidates this pattern, additional subgroups are gradually engaged, each assigned complementary rhythmic or melodic material. One subgroup may sustain the original ostinato transposed to a different pitch, while another introduces a contrasting motif. Through this process, a polyphonic texture progressively emerges, allowing participants to practise distinct vowel qualities and phonetic sounds in parallel, while remaining anchored within a coherent and stable musical framework.
3. Improvisational Variation within a Structured Frame: although improvisation plays a role, it is systematically guided by the expert, who modulates complexity according to the participants' responsiveness and engagement. The dynamics of the group may be expanded towards a climax or diminished towards pianissimo, with participants experiencing crescendi, decrescendi, and group alternations. Counter-rhythms and polyphonic interlocking are progressively introduced to consolidate rhythmic synchronisation and attentional flexibility.
4. Closure: once the polyphonic texture is fully developed, the expert leads the deactivation phase by silencing one subgroup at a time or, alternatively, the entire ensemble simultaneously. This process relies on the previously established gestural code, ensuring clarity, collective coordination, and replicability of the activity.
5. Metacognitive process: in the final phase of the laboratory, the expert selects one of the circle songs performed and guides participants through a process of recall and structured reflection. Learners are invited to reconstruct the various layers of the performance—identifying rhythmic patterns, tonal or modal frameworks, metric values, and overall structural organisation. Depending on their prior knowledge and prerequisites, participants may also engage in simple transcription activities, thereby linking the practical experience to foundational aspects of music theory. This reflective process extends to the linguistic dimension as well: participants examine the English words employed in the circle song, exploring both their phonetic features and their orthographic representation. In this way, the transition from phoneme to grapheme is enacted, reinforcing the integration of auditory, cognitive, and linguistic skills. The activity not only enhances metacognitive awareness but also stimulates mnestic processes, supporting long-term retention and the consolidation of both musical and linguistic competences within a coherent learning framework.

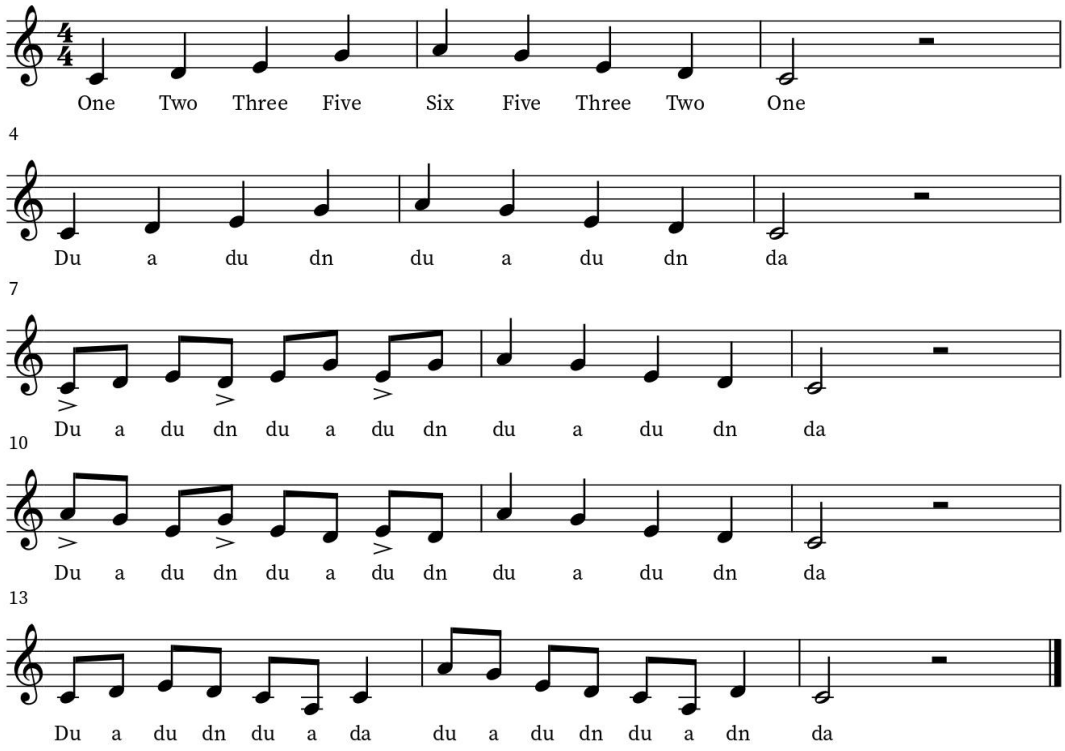

Fig.1 - Example of preparatory work

In Fig. 2, the circle song is based on a major pentatonic scale and employs the minimal pair *seek* (long vowel /i /) and *sick* (short vowel / /), directly quoting George and Ira Gershwin's *Someone to Watch Over Me* as source material for the lyrics. Two groups sustain a harmonic–isorhythmic contour on the degrees of the pentatonic scale, while another group responds with a small phrase containing the word *sick* in a syncopated rhythmic pattern during the rests. The expert may swap the groups throughout the session, giving participants the opportunity to experience the different layers of the song.

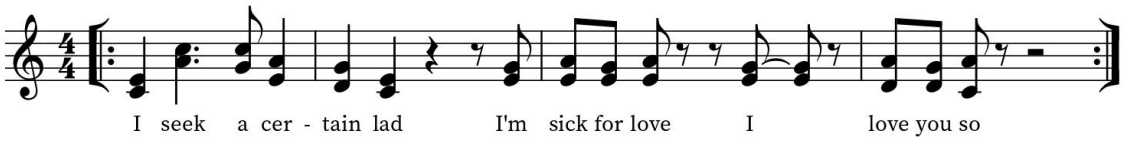

Fig. 2 - Example of a Circle Song based on the Major Pentatonic

In Fig. 3, the circle song is built on the minor scale and draws inspiration from Desdemona's *a cappella* performance of the "Willow Song" in Act IV, Scene 3 of Shakespeare's *Othello*. Here, the lyrics emphasise English phonetic features less familiar to Italian speakers, such as the diphthong in *willow* (/oʊ/ – /əʊ/) and the aspirated *h* in *her* and *hands*. This arrangement is conceived for four voices, including a bass register performed by male participants.

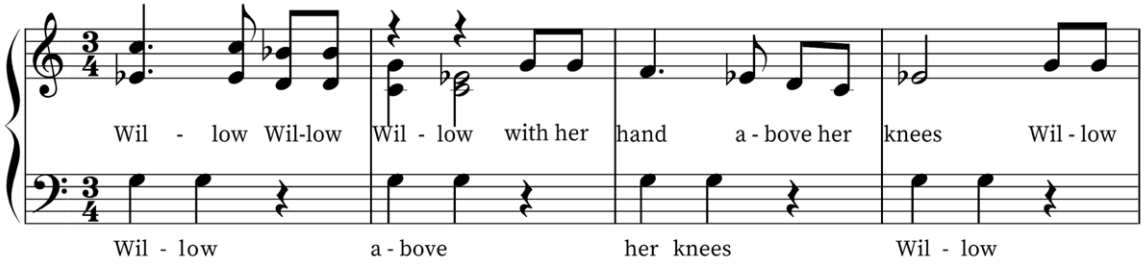

Fig. 3 - Example of a Circle Song based on the Minor Scale

The improvisational nature of Circle Singing enables the expert to adapt the musical and linguistic materials dynamically during performance, arranging patterns in ways that are both pedagogically effective and responsive to participants' engagement. Within this broader framework, and in alignment with the epistemology of evidence-based education, which calls upon educators and researchers to determine *what works in what circumstances*, it becomes essential to identify and employ reliable, up-to-date assessment instruments capable of measuring the parallel development of musical and linguistic competences.

7. The PROMS Test: Assessing Music Perception Skills

As previously stated, neuroscience—thanks to the advent of advanced neuroimaging techniques—has long investigated the ways in which music may influence the development of cognitive abilities. The parameters most frequently measured have focused on language acquisition (Overy, 2003), brain plasticity, memory, and motor coordination (Rizzo & Spadolini, 2024). However, very few standardised tools have been consistently selected and applied to assess musical skills in a comprehensive and systematic manner. Musicality has often been considered an exclusive trait of professional musicians; however, it is in fact a specific form of intelligence (Gardner, 1983) that resides in every individual and can be cultivated through appropriate pedagogical interventions. Interestingly, the concept of *musical sleepers*—individuals with latent, untrained musical potential—has been described by Law and Zentner (2012) as a category of learners whose capacities remain undeveloped but present. To evaluate such potential, it is essential to adopt a measuring device that considers the multimodal and multifaceted nature of music, both in its practical expressions and in the complexity of its cognitive processing. This involves identifying key perceptual categories such as

tempo, pitch, rhythm, timbre, and melody perception, as well as their possible combinations. Accordingly, any tool employed to assess musical skills must be designed to accommodate these diverse dimensions of musical understanding, while also being appropriate to the attention spans and socio-cultural contexts of contemporary learners. Another relevant factor to consider in evaluating the measuring devices is the quality of the audio samples employed that must not be compromised by ageing technological supports, such as cassette tapes or compact discs, which risk degrading over time and introducing unwanted variables. For these reasons, this study adopts an online, self-administered device compatible with the BYOD (Bring Your Own Device) approach, with a duration of about 15 minutes. The measuring tool selected for this contribution is the *Profile of Music Perception Skills* (PROMS), a test specifically designed by Law and Zentner (2012) to meet several key criteria such as: being suitable for both musicians and non-musicians, ensuring inclusivity across varying levels of musical training; assessing a broader range of perceptual components than previous standardised tools, thereby capturing the multifaceted nature of musical perception; offering a detailed account of the way it evaluates each perceptual component allowing for a nuanced understanding of musical sensitivity and, finally conform to contemporary scientific standards of quality and reliability, thereby ensuring the validity of data it generates. Additionally, in order to minimise the natural variability of knowledge associated with specific musical genres, the auditory samples have been designed as *proto-stimuli*. The creators' vision was to design stylistically neutral musical elements—basic and abstract in form—guided by the principle that the ability to discriminate simple units, such as single phonemes, is among the most sensitive predictors of linguistic proficiency (Kirby, Parrila, & Pfeiffer, 2003). This approach aims to reduce analytical bias stemming from participants' habitual exposure with particular musical genres. The PROMS test is easily and freely consulted online (https://musemap.org/resources/proms) and has been differentiated in: Micro-PROMS (10 min.); Mini-PROMS (15 min.); PROMS-S (35 min.); Modular-PROMS (flexible); Full-PROMS (60 min.). The rich variety of PROMS subtests stems from the recognition that researchers assessing musical skills must rely on techniques that are not only precise and valid but also time-efficient. Building on this foundation, two brief online measures of musical ability—the PROMS-S and the Mini-PROMS—were later developed and validated. The brief PROMS device has proven that: "Criterion validity with a composite index of musical accomplishment ranged from r = 0.46 to r = 0.61 in the current studies, which is consistent with the size of correlations of the full-length PROMS and the Brief-PROMS to similar criterion variables" (Zentner & Strauss, 2017, pp.42). Considering the actual educational context and the use of this test within this study, it has been established to investigate, select and administrate the Mini-PROMS test. The test unfolds through a sequence of musical perception tasks, each built around a tripartite auditory structure: a first *reference excerpt*, followed by its repetition, and subsequently by a *comparison excerpt*. The standard stimulus is presented twice, allowing the listener to encode and stabilise the auditory memory trace during a brief 1.5-second interval. After this initial reinforcement, a subsequent 2.5-second pause introduces the comparison stimulus, inviting participants to engage in the act of discrimination. Participants are instructed to assess whether the comparison is identical to or different from the reference. This format is designed to engage short-term auditory memory and fine-grained perceptual discrimination across various musical dimensions. Participants must indicate their response by choosing among five graded options:

– Definitely Same or Definitely Different: selected when participants are confident in their judgement, each correct answer in this category is awarded 1 point;
– Probably Same or Probably Different: used when participants have a degree of intuition but lacks full certainty, correct responses in this category receive 0.5 points;
– I Don't Know, allows participants to abstain from guessing when no confident or intuitive judgement can be made, this option is not scored.

Before beginning the actual trials, participants are provided with example stimuli corresponding to the various music parameters under evaluation, such as melody, tuning/timbre, rhythm/accent, and tempo. At the end of the test the PROMS elaborate a printable chart in which the results are detailed by each category: Melody, Tuning, Tempo and Accent. The PROMS battery allow users to gather information about specific skills rather then a general level of musicianship. This element has been crucial in selecting this tool because "any link between musical ability and a nonmusical ability–be it language processing, working

memory, or vocal emotion recognition–can be understood in more detail than is currently possible. Isolating the specific musical components that underlie the relationship between musical ability and other abilities or disorders is not only important for understanding the latter, but it may also play a role in devising effective treatment plans". (Law and Zentner, 2012, pp.12).

8. SpeechAce: An Engaging Learning Tool Reinterpreted as an Assessment Instrument

It is worth remarking how education is increasingly called upon reinventing itself in response to the radical changes brought about by the pervasive use of digital technologies among younger generations—often referred to as *Screenagers* (Rushkoff, 2006). Immersed in a media-saturated environment, many students exhibit signs of disengagement and cognitive fragmentation, likely caused by overstimulation and fractured attention (The Lancet, 2024). Within this complex socio-cultural context, didactic practices must evolve, promoting a beneficial and educational use of technological and AI-based tools. At the same time, it is essential to acknowledge the growing need for future educators to develop linguistic competences that enable them to support their students in acquiring foreign languages—skills that are not only valuable for personal and professional development, but also fundamental to navigating and making sense of the digital environments to which both young people and adults are increasingly exposed. In this context, the contemporary society, marked by near-limitless access to multimedia and multilingual content, is actively reshaping the concept of internationalisation, thus requiring the adoption of innovative, integrated approaches to language education. As a consequence, many studies support the use of ASR based programs (Automatic Speech Recognition-based programs) in educational settings. These programs use AI technologies to convert speech into text or measurable data, and are specifically designed to assess and analyse spoken language. Considering the importance of phonetic aspects in the comprehension and use of a language, this contribution has focused on identifying a BYOD-compatible, online, and self-administered measuring tool specifically designed to assess spoken production and phonetic accuracy. Among the various ASR-based tools, the vocal recognition API (Application Programming Interface) SpeechAce has proven to meet the criteria established by this research, offering a user-friendly interface and detailed analytical feedback suited to evaluating the phonetical accuracy of speakers in real-time. One of the key advantages of SpeechAce over other platforms—such as Praat, Rosetta Stone, or Duolingo—is the detailed feedback it offers to users (Nguyen, Tran, Vo, 2025). In particular, the platform supports a wide range of speaking tasks, from monosyllabic words to complex sentences, evaluating the user's phonetic production and identifying specific phonemes that were misarticulated, accompanied by their corresponding phonetic alphabet transcription and achieved score. SpeechAce also includes more sophisticated AI-driven assessment modes categorised by domain (e.g., professional, educational, leisure), offering pronunciation diagnostics, passage-level fluency assessments, and even estimated IELTS and PTE speaking scores (Moxon, 2021). Phonological accuracy, in fact, represents a long-standing area of inquiry in English language pedagogy and has been shown to significantly affect overall speaking fluency. The way learners produce and perceive their own pronunciation influences not only the clarity of the message (Fraser, 2000), but also their intelligibility, comprehension, and—critically—their confidence when speaking in public contexts (Derwing & Rossiter, 2002). A study published in the *CALL-EJ Computer-Assisted Language Learning Electronic Journal* (Vol. 26, No. 3, 2025) explores the state of pronunciation instruction in Vietnam, with particular focus on a private university in Ho Chi Minh City. The article underpins the persistent challenges encountered in English language acquisition, particularly in the domain of pronunciation, which remains marginalised within a broader pedagogical framework that privileges receptive skills such as reading and listening. Within this context, the research investigates the transformative potential of ASR-based technologies—particularly SpeechAce—as innovative tools to acquire speaking competences. The study sheds light on how digital tools can foster learning autonomy, improve phonetic awareness, and promote engagement in second language acquisition. To obtain relevant outcomes the study employed both control and experimental groups to ensure data reliability, combining quantitative and qualitative methodologies to achieve scientifically grounded results and reflect on learner experience and attitudes. As results, the majority of students found SpeechAce user-friendly and considered it helpful in improving their pronunciation, particularly in recognising and correcting phonemic errors such as final consonant sounds. The final open-

ended question—"Do you like learning pronunciation with SpeechAce? Why or why not?"—elicited unanimous positivity: 100% of respondents (n = 34) reported enjoying the experience. Of these, 76% stated that they would like to see SpeechAce integrated into all pronunciation lessons. SpeechAce, in fact, was perceived as interesting (68%), useful (82%), easy to use (74%), and highly effective in providing targeted, detailed feedback (88%). Ultimately, the study confirms the crucial role SpeechAce can play in enhancing not only learners' pronunciation skills but also their motivation, autonomy, and engagement with the learning process. Another relevant study, conducted on the pronunciation accuracy of first-year English major students at Walailak University in Thailand, indicated that SpeechAce had a statistically significant positive impact on students' pronunciation scores across testing (Moxon, 2021). Even though previous experiences have primarily employed SpeechAce as a learning tool, this contribution intends to use it as an AI-powered instrument for the analysis and assessment of participants' phonetic accuracy. Specifically, the study will focus on the use of the "Intermediate Sentences" section, which consist of four structured lessons, each culminating in a score ranging from 1 to 100. After each session, participants will collect their individual scores and submit them anonymously to the facilitators, using an alphanumeric code assigned at the beginning of the testing phase. Following the completion of the Circle Singing laboratory, an analogous post-test will be administered. The speaking exercises will be carried out by students through a BYOD approach and will be self-administered, while expert facilitators will conduct the class and thoroughly explain each step in advance. The scores will be recorded and subsequently compared with those obtained after the Circle Singing laboratory to determine whether any measurable improvement has occurred. As in the case of the PROMS test, SpeechAce's capacity to isolate and evaluate specific phonetic parameters enables a more refined analysis of the data, allowing the study to investigate which particular phonetic features—vowel articulation, consonantal accuracy, or both—have shown the greatest development through the vocal and rhythmic practices of Circle Singing.

9. Expected Results and Perspectives

This research has presented the Circle Singing laboratory together with the assessment tools that will be employed in the upcoming study at Roma Tre University, with the aim of establishing Circle Singing as a best practice through an evidence-based approach to educational research. Further analyses of the collected data and reflective accounts of the experience will follow, with the objective of offering education professionals not only a concrete pedagogical practice but also a pedagogical strategies suited to group-based and inclusive learning contexts. It is expected that the comparison between pre- and post-tests administered through PROMS and SpeechAce will reveal measurable improvements in both musical perception and phonetic accuracy. These anticipated outcomes are linked to the iterative nature of articulatory practice inherent in Circle Singing, as well as to the recruitment of overlapping neural networks involved in the processing of both music and language. Just as Legal Education has adopted the semicircular classroom as a physical layout to support a dialogue-based approach recognised as its signature pedagogy (Shulman, 2005), this contribution—and those that will follow—seeks to explore how a circular, interdisciplinary, and multimodal framework could emerge as a signature pedagogy for the integrated teaching of second languages and music within authentically inclusive environments, while simultaneously fostering states of flow (Sawyer, 2012) during the learning process. Within this perspective, the present contribution considers Circle Singing as a promising model for inclusive educational practice. By layering rhythmic and melodic patterns with English lyrics, students engage with pronunciation not as mechanical repetition but as a dynamic, choral experience that integrates music, movement, and language. This interdisciplinary practice enhances phonological awareness, prosodic sensitivity, and communicative intent, situating pronunciation within a framework of collective creativity and inclusion, while closely aligning with the CLIL principles of integrating language and content learning.

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