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Reflections on the Development of Music-Education Learners' Aesthetic Literacy in the Context of AI Technology

Lijuan Zhou

Chengdu University of Arts and Vocational Education, Chengdu 611433, Sichuan, China

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Abstract: Generative AI, large-scale audio models, algorithm-driven music recommendation, and other technologies have permeated the whole process of public music reception, creation, and appreciation. For learners receiving music-related education, aesthetic practices are no longer confined to classroom-based scenarios; instead, much of their aesthetic engagement unfolds within online media environments aided by AI tools. Moving beyond classroom-centered research perspectives, this paper centers on learners' autonomous music-aesthetic practices. It sorts out the dual-faceted impacts brought by AI intervention in aesthetic activities, clarifies the intrinsic dimensions of music aesthetic literacy, and draws on surveys of learner groups to identify practical challenges including algorithm-induced information cocoons, aesthetic alienation in AI-generated musical works, and ambiguous aesthetic judgment criteria [1]. It further explores feasible approaches for learners to build independent music-aesthetic literacy amid AI-enabled environments. This study offers theoretical references for music-education learners to shape their aesthetic capabilities in digital-intelligent settings, and provides insights for advancing music aesthetic education in non-instructional contexts.

Keywords: AI technology; Music learners; Music aesthetic literacy; Algorithm-driven aesthetics; Generative AI

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1. Introduction

Iterations in digital media have transformed the modes of music production, dissemination, and reception. The growing availability of AI-powered musical tools enables learners to generate melodies, produce accompaniments, retouch audio clips, and convert musical styles without relying on offline classes. Music streaming platforms also continuously deliver musical content according to users' listening histories. Consequently, many music-education learners accumulate substantial aesthetic experiences within AI-mediated media ecosystems, rather than through formal coursework alone.

Existing studies tend to prioritize pedagogical reforms inside school music classrooms and treat AI merely as classroom-assisting instruments. Less attention has been directed toward learners' self-directed

aesthetic practices outside instructional settings. In reality, the formation of aesthetic literacy largely stems from individuals' spontaneous listening, appreciation, and creative attempts after formal learning sessions. While AI expands learners' access to diverse musical works, algorithmic regulation and homogenized algorithm-generated outputs may subtly reshape and even distort personal aesthetic tastes. Understanding both opportunities and bottlenecks for aesthetic growth in AI-infused environments carries practical significance for interpreting how contemporary music learners develop their aesthetic competence.

2. Connotation and composition of music-education learners' aesthetic literacy under AI contexts

Music aesthetic literacy represents a comprehensive psychological quality cultivated through long-term musical practice, which differs distinctly from performance-oriented skills such as instrumental playing or vocal singing [2]. It comprises four interrelated dimensions: aesthetic perceptual competence, aesthetic empathetic experience, critical aesthetic judgment, and aesthetic imagination together with creative practice capacity.

2.1. Aesthetic perceptual competence

Aesthetic perception constitutes the foundation for developing aesthetic literacy. It refers to learners' capacity to identify and capture formal musical elements, including timbre, rhythm, harmony, genre, and stylistic traits, serving as the prerequisite for in-depth aesthetic engagement. The prevalence of highly-simulated AI-synthesized timbres in contemporary musical output raises new requirements for learners' perceptual discrimination.

2.2. Aesthetic empathetic experience

Aesthetic empathy denotes the comprehension of emotional undertones, historical backgrounds, and cultural connotations embedded within musical texts. It emphasizes spiritual communication between learners and musical works and embodies the humanistic nature of aesthetic activities. Music is more than sequenced notes; it functions as a carrier for specific social and cultural contexts. Empathetic experience allows learners to move beyond superficial auditory pleasure and achieve spiritual understanding.

2.3. Critical aesthetic judgment

Critical aesthetic judgment gains particular importance within AI-dominated environments. Learners ought to differentiate works produced by artificial intelligence from human-authored compositions, avoid being influenced by online streaming metrics, form personalized aesthetic yardsticks, and exercise discretion over algorithm-curated content. Without critical awareness, learners' aesthetic inclinations can readily be manipulated by platform algorithms and online public opinions.

2.4. Aesthetic imagination and creative-practice competence

Aesthetic imagination and creative-practice competence stress the proper utilization of AI as an auxiliary creative medium. It aims to translate internal aesthetic conceptions into acoustic manifestations while safeguarding human subjectivity in musical expression. Creative-practice competence does not equate to complete song-writing or arrangement; it emphasizes externalizing learners' inner aesthetic visions.

These four dimensions interact and interpenetrate to sustain complete musical-aesthetic engagement. Perception lays the groundwork; empathy delivers spiritual experience; criticism enables rational examination; imagination and practice realize aesthetic output. None of these dimensions can be omitted.

3. Real-world landscape of learners' aesthetic practices intervened by AI technology

3.1. General features of learner exposure to AI-enabled musical tools

Surveys were conducted among participants with music-learning backgrounds, covering amateur music enthusiasts, informal social learners, and university students with prior musical training [3]. Investigations avoided pure classroom-learning scenarios and focused on how respondents voluntarily interacted with diverse AI-musical tools. See **Table 1**.

Table 1. Distribution of learner exposure to AI-related musical tools

Tool category	Proportion of user groups	Primary purposes of application
AI music generation tools (Suno, AIVA, etc.)	Partial respondent groups	Generate melodies, accompaniments, and acquire creative inspirations
AI voice synthesis & AI voice-conversion tools	Partial respondent groups	Timbre experimentation and adaptation of existing musical pieces
Algorithmic recommendation on music streaming platforms	Most respondent groups	Acquire musical resources for daily listening
AI-powered audio analysis and music-theory parsing tools	Minor respondent groups	Assist interpretation of musical excerpts
No exposure to any AI-musical tools	Minor respondent groups	Retrieve musical resources via self-sourced channels

Survey feedback indicates that algorithm-based music recommendation achieves the highest penetration rate and has become the dominant channel through which learners access musical materials. AI music-generation tools attract certain user groups, mostly for inspirational references and fragment-level experimentation. Only a small number of participants adopt AI-audio-analysis resources for close reading of musical works, while a tiny fraction never engage with AI-musical applications.

3.2. Positive Potentials of AI for the Advancement of Aesthetic Literacy

AI partially dismantles practical barriers to musical-resource acquisition. In previous eras, access to niche recordings, archival vintage audio, and region-specific folk music was constrained by geography and channel limitations. Supported by AI-driven audio restoration and intelligent retrieval, previously inaccessible musical materials become available and expand the horizon for aesthetic exploration.

From the perspective of creative expression, learners without advanced performing or arranging proficiency can convert vague inner musical visions into audible excerpts through textual prompts fed into AI systems. This substantially lowers the threshold for creative engagement and frees musical imagination from instrumental-skill restrictions.

Meanwhile, AI-enabled analytical tools can automatically unpack instrumentation, harmonic progression, and formal structures of pieces, facilitating learners' comprehension of musical formal features and offering new avenues for self-directed music study.

3.3. Prevailing dilemmas for aesthetic development in AI-mediated settings

Subjective replies collected from survey questionnaires reveal several commonly observed practical difficulties. See **Table 2**.

Table 2. Prevailing dilemmas reflected in learners' AI-mediated aesthetic Practices

Dilemma category	Feedback from participant groups	Concrete manifestations
Algorithm-formed cocoons and solidified musical taste	Relatively high feedback proportion	Exposed to homogeneous recommended content; lack active initiative to explore unfamiliar musical genres
Difficulty distinguishing AI-generated works from human creations and confused aesthetic evaluation	Relatively high feedback proportion	Cannot identify work origins merely via auditory perception; confuse technical polish with intrinsic artistic appeal
Excessive reliance on AI generation and weakened internal aesthetic conception	Noticeable proportion of feedback	Directly adopt AI outputs without completing preliminary individual conception

Recommendation algorithms prioritize musical content matching users' historical listening preferences. Over time, learners tend to stay within their aesthetic comfort zones and lose motivation to explore classical repertoires, folk music, and world music. Most AI-generated musical outputs reproduce stylistic patterns learned from massive training datasets. Though acoustically polished, they lack emotional depth originating from real-life human experiences. Quite a few participants equate acoustic technical perfection with genuine artistic value, blurring the boundary between technical execution and artistic appeal [4].

Some learners treat raw AI outputs as their own creative outcomes and skip internal conception, revision, and polishing procedures. In the long run, opportunities to exercise aesthetic imagination and evaluative competence diminish, and human subjectivity within aesthetic activities becomes eroded.

4. Analysis of intrinsic contradictions for aesthetic-literacy development under AI circumstances

4.1. Contradiction between technical convenience and depth of aesthetic experience

AI can generate complete acoustic musical excerpts within seconds, propose harmonizations, produce accompaniment, and lower the entry barriers for composition, arranging, and performance practice. For learners, this convenience is genuinely enabling: ideas that once required years of notation and instrumentation training can now be auditioned immediately. Yet the growth of aesthetic literacy is not measured by the quantity of finished sonic products a learner can obtain; it depends on sufficient personal perception, reflection and iterative refinement. Aesthetic appreciation is far more than passively receiving completed auditory outputs. It constitutes a psychological process of continuous perception, association, comparison and introspection, in which the listener gradually constructs inner schemas of style, form, timbre and expression. When technical efficiency becomes the dominant value, learners are tempted to chase instant acoustic results, generate a draft, accept it, and move on, thereby skipping deep listening, repeated comparison, and internal conception. The very ease of production can therefore shorten the perceptual cycle that aesthetic growth requires. In pedagogical terms, the risk is that AI output replaces the "slow" stages of imagining, humming, revising, and re-hearing, which are precisely where auditory imagery and evaluative judgment are formed. The contradiction is thus structural rather than incidental: the tool accelerates the endpoint while the cultivation of taste

depends on the process. Blind pursuit of tool-generated outputs will squeeze the space for profound aesthetic experience, producing learners who can produce much but discern little [5].

4.2. Contradiction between algorithmic commercial-traffic logic and aesthetic pluralism

Algorithms deployed on commercial music-streaming platforms prioritize high-traffic musical content, because recommendation systems are optimized for engagement, retention and monetization rather than for artistic breadth. Artistic pluralism often takes secondary priority. When learners are continuously exposed to algorithm-filtered materials, online popularity may be mistaken for aesthetic criteria: play counts, trending tags, and short-video virality begin to function as implicit standards of "good music." Works possessing high artistic merit yet low circulation—experimental forms, minority traditions, historical repertoires, locally rooted genres—risk being overlooked simply because they are not amplified by the recommendation loop. Over time, personal aesthetic preferences can be subtly reshaped by commercial algorithms, producing a narrowing of taste that learners do not consciously choose. This is a contradiction between the pluralism that aesthetic education aspires to and the homogenizing pressure of platform logic. It also raises an epistemological problem: learners may confuse the statistical frequency of a style with its artistic value, and mistake familiarity for understanding. For teaching, the implication is that algorithmic exposure cannot substitute for deliberately curated listening lists, guided score analysis, and exposure to repertoires that lie outside the traffic mainstream. Without such intervention, the diversity that aesthetic literacy requires is eroded precisely at the moment when access appears most abundant.

4.3. Contradiction between AI generative logic and humanistic core of aesthetic appreciation

State-of-the-art generative AI systems do not possess genuine human emotional experiences. They merely reorganize existing musical patterns learned from training corpora, producing statistically plausible continuations rather than expressive intentions grounded in a life. The humanistic core of musical aesthetic literacy is rooted in lived experience, cultural memory, and emotional projection: a phrase moves us because it resonates with embodied history, with rituals, places, losses, and hopes that listeners and creators bring to sound. Prolonged immersion in AI-generated musical outputs may cause learners to conflate pattern-based reproduction with human-centered artistic creation, which distorts aesthetic evaluation yardsticks. Learners may begin to judge works by surface fluency and stylistic conformity—how convincingly a model reproduces a genre—rather than by expressive necessity, originality, or cultural situatedness. This risks a subtle redefinition of what counts as meaningful music. The contradiction is not that AI-generated music is worthless, but that its generative logic is categorically different from the humanistic logic of aesthetic appreciation, and learners need explicit guidance to distinguish the two. Pedagogically, this calls for comparative listening, discussion of authorship and intention, and reflective writing that asks not only "does it sound good?" but "what human experience does it articulate, and for whom?" Without such framing, technical fluency may quietly displace the humanistic criteria on which aesthetic literacy ultimately rests.

4.4. Implications for aesthetic education

Taken together, these three contradictions are not reasons to reject AI, but reasons to design instruction around them. Convenience must be paired with structured slowness—listening journals, revision logs, comparative auditions. Algorithmic exposure must be paired with curated breadth—repertoire outside the

traffic loop, score-based analysis, cultural context. Generative fluency must be paired with humanistic interrogation—authorship, intention, lived experience and cultural memory. The task of aesthetic education under AI circumstances is therefore not to compete with the tool's efficiency, but to protect and cultivate the perceptual, evaluative and humanistic capacities that the tool cannot supply.

5. Pathways for cultivating learners' aesthetic literacy in AI-technology contexts

AI itself represents merely a technical instrument. Neither total negation nor unregulated adoption is reasonable. The core objective lies in consolidating learners' subjective aesthetic agency, so that technologies serve aesthetic advancement rather than dictating aesthetic preferences.

5.1. Breaking algorithm-induced information cocoons and building autonomous music-listening regimes

Learners ought to avoid total dependence on platform-generated recommendations. Self-planned listening schedules should be established to intentionally engage with musical works of diverse eras, geographic origins, and genres. Traditional folk music, classical compositions and world music should be incorporated into regular listening repertoires to counteract aesthetic solidification brought by algorithmic curation. It is advisable to diversify information sources, including curated playlists, musical literature, and online music archives, to expand the boundaries of aesthetic cognition.

5.2. Fostering critical aesthetic awareness towards AI-generated musical works

Learners need to understand the underlying generative logic of AI music and form evaluative thinking that differentiates acoustic technical quality from intrinsic artistic value. AI-produced musical segments should be primarily regarded as inspirational source materials instead of mature artistic pieces. Comparative listening practices are encouraged: select thematically aligned AI-generated excerpts and human-created counterparts for paired appreciation, and perceive gaps in emotional expression and cultural implications. Comparative listening exercises help sharpen learners' aesthetic discrimination capabilities.

5.3. Clarifying human-AI creation boundaries and safeguarding human subjectivity in creative practice

When adopting AI tools for musical creative practice, learners shall finalize personal aesthetic conception and emotional-expression orientation prior to invoking AI resources. Artificial intelligence can be deployed for acoustic realization and material revision, while learners should refrain from delegating the full creative workflow to algorithms. AI functions as a provider of source materials and inspirations. The emotional core and aesthetic orientation intended for musical works must derive from individual human deliberation to preserve human subjectivity in musical creation.

5.4. Accumulating cultural knowledge reservoirs and consolidating foundations for aesthetic empathy

Musical aesthetic empathy is built upon adequate cultural understanding. Whether appreciating human-authored or AI-produced works, learners are supposed to proactively explore relevant historical backgrounds and regional cultural connotations. Analysis should go beyond superficial traits such as melody and

instrumentation. Interpreting musical texts within corresponding cultural contexts lays solid groundwork for in-depth aesthetic empathy.

6. Conclusion

AI technologies are comprehensively reshaping aesthetic-practice scenarios for contemporary music-education learners. While these technologies broaden resource accessibility and lower creative-participation thresholds, challenges such as algorithm-driven information cocoons, homogenized AI-generated outputs, and diminished human aesthetic subjectivity have simultaneously emerged. The core of music aesthetic literacy resides within human beings, manifested through perception, empathy, critical judgment, and imaginative thinking. Technologies can transform carriers for aesthetic activities yet can never replace authentic inner aesthetic experience and independent human reflection.

In the digital-intelligent era, learners need to properly position the relationship between human agents and AI instruments. They should take advantage of technical conveniences while maintaining critical vigilance, proactively overcoming algorithm-originated aesthetic limitations and defending human subjectivity throughout aesthetic engagement. Only when technical instruments are subordinated to individual aesthetic volition can learners gradually cultivate diversified, independent, and humanistic-oriented music-aesthetic literacy. This contributes not only to individuals' musical experiences but also delivers practical references for promoting public music aesthetic education in non-classroom contexts.

Disclosure statement

The author declares no conflict of interest.

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