STUDIA UBB MUSICA, LXX, 2, 2025 (p. 139 – 162)
(RECOMMENDED CITATION)
DOI: 10.24193/subbmusica.2025.2.07

INTEGRATING MUSIC ITEMS IN GIFTED SCREENING TEST: VALIDATION STRATEGIES IN MALAYSIA

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SUMMARY. This study investigates the integration of music-related components into a gifted screening test to enhance the identification of artistic and music giftedness. Focusing on Malaysia's educational context, the research develops and evaluates music items embedded in a standardized test, targeting students' cognitive and creative abilities. A mixed-method design was employed, incorporating quantitative data from 414 students and qualitative insights from expert interviews and observations. Rasch model analysis revealed that the music items, particularly melody awareness and music interval recognition, effectively differentiated students based on ability. The study concludes that integrating music into gifted screening tests provides a more inclusive approach, recognizing diverse talents, and supporting a holistic evaluation of giftedness beyond conventional academic metrics.

Keywords: music education; music assessment; gifted and talented; gifted test; music item

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Introduction

Gifted children refer to those who demonstrate exceptional abilities or potential in one or more domains, such as intellectual, creative, academic, or artistic fields, which necessitate specialized educational support to foster their development.[6] [7] Giftedness should not be narrowly defined by high IQ alone but rather recognized as a dynamic construct that encompasses creativity, task commitment, and domain-specific talents. Lasekan et al. (2025) state that giftedness should be regarded as a developmental process, in which inherent potential during childhood evolves into achievement in adulthood through the provision of appropriate chances and support.[8] Since the inception of structured programs in 2009, gifted education in Malaysia has advanced considerably. These programs were created to provide gifted children with accelerated instruction and personalised training according to their unique learning requirements. These programs have established an environment conducive to the flourishing of gifted children, with their career trajectories closely monitored to ensure optimal development. Nevertheless, significant gaps remain in the process of identifying gifted children. Most of the current screening methods predominantly assess STEM-related abilities, hence may excluding students proficient in creative arts such as music, fine arts, and literary arts. This narrow focus on specific domains complicates the identification of giftedness and may marginalise youngsters with diverse talents, particularly in the creative arts.

Standardised assessments may not adequately reflect the strengths of all children, particularly those excelling in creative disciplines such as music, visual arts, and literature.[9] [10] Consequently, achieving high scores on these assessments does not necessarily indicate proficiency in other critical domains. This shows the necessity for a more comprehensive and receptive

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[6] Coleman, L. J., and Cross, T. L. *Being Gifted in School: An Introduction to Development, Guidance, and Teaching. 2nd ed., Routledge,* 2021. *https://doi.org/10.4324/9781003233213*

[7] Worrell, F. C., Subotnik, R. F., Olszewski-Kubilius, P., and Dixson, D. D. *"Gifted Students." Annual Review of Psychology, vol. 70,* 2019. Pp, 551–576. *https://doi.org/10.1146/annurev-psych-010418-102846*

[8] Lasekan, O. A., Godoy Pena, M. T., and Méndez Alarcón, C. M. *"Sustainable and Inclusive Model for Gifted Education." International Research Journal of Multidisciplinary Scope,* vol. 6, no. 1, 2025, pp. 1046-1064. *https://doi.org/10.47857/irjms.2025.v06i01.01930*

[9] Okyere, A. A., Adom, D., Kquofi, S., Sampene, A. A. B., and Buami, E. K. *"Integration of Universal Design for Learning in Creative Arts Education: Perspectives from Basic Schools in Suame Municipality, Ashanti Region, Ghana." Studies in Learning and Teaching,* vol. 5, no. 3, 2024, pp. 665-687. *https://doi.org/10.46627/silet.v5i3.530*

[10] *Bareiß, L., Platz, F., and Wirzberger, M. "Implicit Assumptions of (Prospective) Music School Teachers about Musically Gifted Students." Social Psychology of Education,* vol. 27, no. 3, 2024, pp. 1009-1041. *https://doi.org/10.1007/s11218-023-09833-8*

approach to identifying exceptional individuals, one that encompasses innovation and talent across several domains. This study seeks to address this deficiency by integrating music-related components into a gifted screening test and evaluating their effectiveness in recognising creative and artistic giftedness. The objectives of this study are to (1) develop and include music-related items into the gifted screening test and (2) evaluate their suitability as components of a comprehensive system for identifying gifted individuals.

Literature Review

Recent developments in incorporating music-based evaluations into gifted screening examinations aim to improve the precision and inclusivity of identifying gifted children. Previous research found the importance of musical intelligence in giftedness assessments, with a study in Bosnia and Herzegovina revealing a strong correlation among teacher, peer, and self-evaluations of musical intelligence, thus validating its role as an indicator of giftedness. [11]

A study investigating bilateral giftedness in music indicates that music-based assessments can stimulate both musical-mathematical and musical-linguistic capabilities, forecasting the emergence of talents and behaviours in gifted children. [12] A 54-item screening instrument was created in Brazil to identify musical aptitude, with initial findings indicating consistent scores across assessments, hence affirming its efficacy in detecting musically gifted individuals.[13] The incorporation of many informants (teachers, classmates, and parents) in conjunction with self-assessments improves the reliability and validity of the identification process, mitigating biases and enhancing accuracy.[14] [15] Mandelman et al. (2013) and Siu (2010) employed psychometric instruments, specifically the Aurora Battery and the Gifted Rating Scales-Preschool/Kindergarten Form (GRS-P), which exhibit robust psychometric

[11] Milic, S., and Simeunovic, V. *"Concordance between Giftedness Assessments by Teachers, Parents, Peers and the Self-Assessment Using Multiple Intelligences."High Ability Studies,* vol. 33, no. 1, 2022. https://doi.org/10.1080/13598139.2020.1832445

[12] Kalinina, L. Y. *"Music in Pedagogical Diagnostics for Bilateral Giftedness of Preschoolers".* Musical Art and Education, vol. 12, no. 3, 2024, pp. 17–34. https://doi.org/10.31862/2309-1428-2024-12-3-17-34

[13] Koga, Fabiana Oliveira, Rosemeire de Araújo Rangni, and Rafael Pereira. "Musical Aptitude Screening: A Brazilian Experience under Construction." *Engineering Proceedings* 39.1 2023, 7. https://doi.org/10.3390/engproc2023039007

[14] Milic, S., and Simeunovic, V. *"Concordance between Giftedness Assessments by Teachers, Parents, Peers and the Self-Assessment Using Multiple Intelligences".* High Ability Studies, vol. 33, no. 1, 2022. https://doi.org/10.1080/13598139.2020.1832445

[15] Almeida, L. S., Araújo, A. M., Sainz-Gómez, M., and Prieto, M. D. *"Challenges in the Identification of Giftedness: Issues Related to Psychological Assessment."* Anales de Psicologia, vol. 32, no. 3, 2016, pp. 621-627. https://doi.org/10.6018/analesps.32.3.259311

features, hence facilitating a more thorough and precise identification of gifted children.[16] [17] Integrating musical intelligence into various frameworks improves how giftedness is identified by recognizing abilities beyond traditional cognitive tests. Recent advances in software development, supported by research on musical intelligence, aim to make this identification process more efficient and accessible.[18]

The convergence of music and giftedness has been examined, with an increasing array of data indicating that musical talents reflect greater cognitive capabilities. Ma et al. (2025) and Liu (2024) highlighted that regular musical training correlates with structural alterations in the brain, especially in regions governing fine motor skills and auditory-motor integration, thereby supporting the notion that musical proficiency fosters enduring cognitive and neurological development.[19] [20]

These findings corroborate the hypothesis that music represents a distinct domain where both inherent aptitude and acquired skills merge to augment various cognitive capacities. Research indicates that creativity, a facet of giftedness, is linked to musical involvement. Han et al. (2022) emphasised the significance of music emotion recognition (MER), a subdiscipline of music cognition that integrates cognitive psychology and natural language processing.[21] The research emphasised the interconnection between musical and linguistic abilities, reinforcing the need for incorporating music into gifted identification frameworks. Yokochi and Okada (2020) discovered that musical activities foster creative and divergent thinking skills, essential for giftedness, hence associating music with cognitive potential. [22]

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[16] Mandelman, S. D., Barbot, B., Tan, M., and Grigorenko, E. L. *"Addressing the 'Quiet Crisis': Gifted Identification with Aurora."* Educational & Child Psychology, vol. 30, no. 2, 2013. https://doi.org/10.53841/bpsecp.2013.30.2.101

[17] Siu, A. F. *"The Reliability and Validity of a Chinese-Translated Version of the Gifted Rating Scale-Preschool/Kindergarten Form."* Journal of Psychoeducational Assessment, vol. 28, no. 3, 2010, pp. 249-258. https://doi.org/10.1177/0734282909345832

[18] Milic, S., and Simeunovic, V. *"Concordance between Giftedness Assessments by Teachers, Parents, Peers and the Self-Assessment Using Multiple Intelligences".* High Ability Studies, vol. 33, no. 1, 2022. https://doi.org/10.1080/13598139.2020.1832445

[19] Ma, T., Sanchis, I. C., Santana, G. R., and Jiang, Y. *"Neuroplasticity Mechanisms in Early Childhood Piano Education: A Literature Review from the Perspective of Educational Neuroscience."* Journal of Sociology and Education, vol. 1, no. 1, 2025, pp. 167-175.

[20] Liu, A. *Neurons Behind Notes: An Interdisciplinary Exploration Bridging Psychology and Neuroscientific Insights for Music Learning, Performance, and Pedagogy.* University of Washington, 2024

[21] Han, D., Kong, Y., Han, J., and Wang, G. *"A Survey of Music Emotion Recognition."* Frontiers of Computer Science, vol. 16, no. 2, 2022, pp. 165–191. https://doi.org/10.1007/s11704-021-0569-4

[22] Yokochi, S., and Okada, T. *"The Process of Art-Making and Creative Expertise: An Analysis of Artists' Process Modification."* The Journal of Creative Behavior, vol. 55, no. 2, 2020, pp. 532–545. https://doi.org/10.1002/jocb.472

Despite the promising relationship between music and cognitive development, existing gifted identification systems often fail to recognize musical talent effectively. Current identification models heavily rely on standardized tests, which often prioritize STEM skills while overlooking creative domains such as music, visual arts, and language arts. This narrow focus results in the underrepresentation of students with exceptional abilities in the arts. As Akdemir et al. (2025) pointed out, standardized assessments do not adequately capture the talents of students excelling in creative fields, leading to a skewed identification process that fails to acknowledge the full spectrum of giftedness.[23] The lack of a comprehensive, inclusive identification model is a critical issue, especially for twice-exceptional gifted children with learning disabilities. These students, who may struggle with traditional assessments, are often overlooked due to their atypical performance patterns. Incorporating music into gifted identification could offer a more inclusive and equitable approach, addressing the diverse cognitive profiles of gifted students.[24] Integrating music-based tasks into identification tools could ensure that a broader range of cognitive and creative abilities is recognized, providing a more holistic view of giftedness.

Theories of giftedness that emphasize the diverse nature of talent offer strong support for incorporating music into gifted identification. Renzulli's Three-Ring Model conceptualizes giftedness as the interaction of above-average ability, creativity, and task commitment (Renzulli, 2021), aligns well with the role of music in fostering creativity and task commitment.[25]

Some music tasks such as improvisation and composition require both technical skills and emotional engagement, making them an ideal medium for assessing creative and cognitive potential. In addition, Gagné's Differentiated Model of Giftedness and Talent (DMGT) supports the view that music can contribute to both the natural development of giftedness and the systematic development of talent. It shows the importance of environmental and personal factors in nurturing talent, suggesting that music, with its dual emphasis on innate ability and learned skill, provides a robust platform for talent development across diverse domains. The growing body of research on the cognitive benefits of music and its connection to giftedness emphasizes the need for a more inclusive and comprehensive gifted identification process.

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[23] Akdemir-Beveridge, Z. G., Zaghi, A., and Syharat, C. *"Understanding and Evaluating Engineering Creativity: Development and Validation of the Engineering Creativity Assessment Tool (ECAT)."* arXiv preprint arXiv:2504.12481, 2025. https://doi.org/10.48550/arXiv.2504.12481.

[24] Ismail, M. J., Anuar, A. F., and Loo, F. C. *"From Physical to Virtual: A New Learning Norm in Music Education for Gifted Students."* International Review of Research in Open and Distributed Learning, vol. 23, no. 2, 2022, pp. 44–60. https://doi.org/10.19173/irrodl.v23i2.5615

[25] Renzulli, J. S. *"The Three-Ring Conception of Giftedness: A Developmental Model for Promoting Creative Productivity."* Reflections on Gifted Education, pp. 55-90, Routledge, 2021.

It is beneficial incorporating music into gifted screening tools enabling educators to capture a wider range of talents, particularly those in creative domains. This approach not only aligns with existing theories of giftedness but also ensures that diverse cognitive and creative abilities are recognized and nurtured. As the landscape of gifted education continues to evolve, integrating music-based assessments will likely prove critical in identifying and fostering the development of gifted students across multiple domains, including the arts.

Methodology

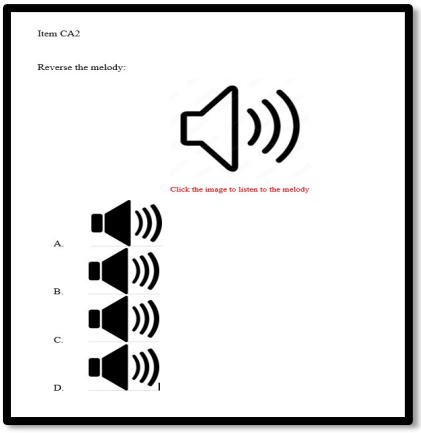
The study employed a mixed-method design, integrating both quantitative and qualitative approaches. The quantitative component involved administering a gifted test embedded with music-related items to assess participants' cognitive and creative abilities. The sample consisted of 414 participants, including 183 males and 233 females, selected from 38 schools across 13 states in urban and rural areas of Malaysia. Purposive sampling was used to select respondents from primary schools who scored between 85 to 100 marks (excellent) in the universal screening test with a focus on students who also demonstrate talents in arts and music. The qualitative component involved non-participant observation and in-depth interviews with 10 participants, including representatives from the Psychology and Counselling Division, schools, and gifted institutions. The combination of structured testing, observational data, and expert insights are intended to allow exploration of how music-based assessments contribute to identifying gifted students within the Malaysian education system.

Data Collection Gifted Test

A gifted test was administered over Malaysia (13 states) involving 414 children aged 11 years old. It took two months to finish the test in which we visited 38 schools all over Malaysia to find the eligible respondents to take the test. The data collection process involved administering a gifted test comprising two separate booklets: Booklet 1 and Booklet 2. The total test contained 100 questions, which are distributed across six domains which are intellectual (science and mathematics), creative, social studies, computational thinking, emotional quotient (EQ) and leadership. Two musical items were integrated in each booklet in which the questions were in aural forms. Respondents were asked to identify correct melody by listening to the main melody and at the second part of question respondents needed to listen to music interval and choose the best answers of reverse interval. Total music

items were 4 coded as CA4, CI3, CI4, and CA2. It means CA4 and CI4 tested the melody awareness while CI3 and CA2 tested the music interval. The test is administered using a computer-based approach in which students need to wear earphones or headphones to listen to the audio. Microsoft Excel is utilized as a platform for data entry and organization. Each respondent is provided with a digital version of Booklet 1 and Booklet 2, and they input their answers directly into the pre-designed Excel sheet as shown in Figure 1.

Fig 1



A Sample of Music Item in Gifted Test

Questions are primarily in multiple-choice format. Each respondent is provided with instructions on how to complete the test via Excel and submit their responses. They were provided with earphones and headphones to answer the music test. The data collection process including respondent completes both Booklet 1 and Booklet 2, inputting their answers into the Excel file. Researchers approached respondents who facing technological issues in listening to the audio files or if there were format conflicting. After completion, the Excel files were returned to the researchers. Finally, the researchers ensure that the data collection process was consistent across all respondents to minimize variability due to the mode of administration. Upon receiving the Excel files from respondents, the data was verified to ensure that all required fields were completed, and no errors occurred during the data entry process. Any discrepancies were followed up with the respective respondents for clarification or correction. Once the data is collected and verified, they were prepared for analysis using the Rasch model, a psychometric model that allows for scaling responses across the different domains. The data from the Excel sheets was imported into statistical software for performing Rasch analysis across the six domains.

In-Depth Interview

The interview was conducted with 10 participants who had more than 10 years' experience as teachers, counsellors and officers in the ministry of education involved in gifted education. The interviews were designed as written responses, allowing participants time to reflect and articulate their views in depth. According to Powney and Watts (2018), interviewing is more than a technique in which it is a structured, conversational encounter that requires thoughtful planning, contextual sensitivity, and openness to the perspectives of others.[26] Participants were given time to get ready for responses, fostering a space for consideration and preparation for the interview. The interview questions explored the suitability of music as creative components infused in the gifted test, the importance of integrating music items in the test, and how the integration of musical questions could support a more holistic evaluation of students' potential. Participants were encouraged to respond freely and reflectively, ensuring a diverse range of insights on the value of creativity in gifted education and assessment. The demographic details of participants are shown in Table 1.

Table 1

Participant	Gender	Teaching Experience	Position
P1	Male	26-30 years	Academic teacher with gifted teaching experience
P2	Female	16-20 years	Academic teacher with gifted teaching experience
P3	Male	16-20 years	Academic teacher with gifted teaching experience
P4	Male	11-15 years	Counselor
P5	Male	16-20 years	Academic Teacher without gifted teaching experience
P6	Female	11-15 years	Counselor
P7	Female	26-30 years	Ministry of Education Officer
P8	Female	26-30 years	Ministry of Education Officer
P9	Female	16-20 years	Counselor
P10	Male	11-15 years	Academic teacher with gifted teaching experience

Profile of Participants

[26] Powney, J., and Watts, M. *Interviewing in Educational Research.* Routledge Revivals, 2018.

Observation

The observation aimed to record students' behaviour and engagement during the gifted test, especially the music section. It was conducted in a computer lab over two-hour sessions with four observers who used a non-participant approach to avoid disrupting the test while noting students' reactions, pacing, and interaction with the materials. Papatheodorou and Luff (2011) emphasized ethical awareness, contextual sensitivity, and the use of unobtrusive methods in conducting observation.[27] Observers assisted at the beginning by clarifying instructions, then circulated the room while documenting behaviours such as signs of engagement, confusion, or fatigue, as well as variations in time taken to complete tasks. As O'Leary (2020) suggests, observation is not merely descriptive but interpretive; thus, observers reflected on the observed behaviours in relation to the complexity of the test items and the individual differences in response.[28]

Results

The suitability of four music items that were infused into the gifted test was analysed using Rasch model analysis. Table 2 shows Rasch model analysis across different ability levels for four music items namely as CA4, CI3, CI4, and CA2.

Table 2

Item	Ability Group	Mean Ability	P.SD	S.E. Mean	Infit MNSQ	Outfit MNSQ	PTMA Corr.
CA4	Lowest	-1.04	0.34	0.24	0.7	0.7	0.06
CA4	Low	-0.83	0.41	0.06	0.9	0.9	-0.08
CA4	Medium	-0.77	0.45	0.05	1	1	-0.05
CA4	High	-0.76	0.49	0.05	1.1	1.1	-0.05
CA4	Highest	-0.62	0.51	0.05	1	1.1	0.15
CI3	Lowest	-0.97	0.48	0.21	0.9	0.8	-0.06
CI3	Low	-0.83	0.49	0.05	1	1	-0.12
CI3	Medium	-0.75	0.48	0.04	1	1	0.04
CI3	High	-0.67	0.43	0.05	1.1	1.1	0.06
CI3	Highest	-0.6	0.57	0.05	1.1	1.1	0.14
CI4	Lowest	-1.24	0.21	0.21	0.6	0.6	-0.06

[27] Papatheodorou, T., and Luff, P*. Child Observation for Learning and Research*. Pearson Education, 2011.

[28] O'Leary, M. *Classroom Observation: A Guide to the Effective Observation of Teaching and Learning.* 2nd ed., Routledge, 2020.

Item	Ability Group	Mean Ability	P.SD	S.E. Mean	Infit MNSQ	Outfit MNSQ	PTMA Corr.
CI4	Low	-1.1	0.39	0.08	0.7	0.7	-0.12
CI4	Medium	-0.84	0.45	0.05	0.9	1	0.04
CI4	High	-0.69	0.5	0.04	1.1	1.1	0.04
CI4	Highest	-0.56	0.51	0.04	1	1	0.23
CA2	Lowest	-1.38	0.28	0.14	0.5	0.5	-0.15
CA2	Low	-0.86	0.44	0.05	0.9	0.9	-0.14
CA2	Medium	-0.82	0.45	0.06	1	1	0.08
CA2	High	-0.76	0.44	0.04	1	1	-0.04
CA2	Highest	-0.56	0.55	0.05	1	1	-0.25

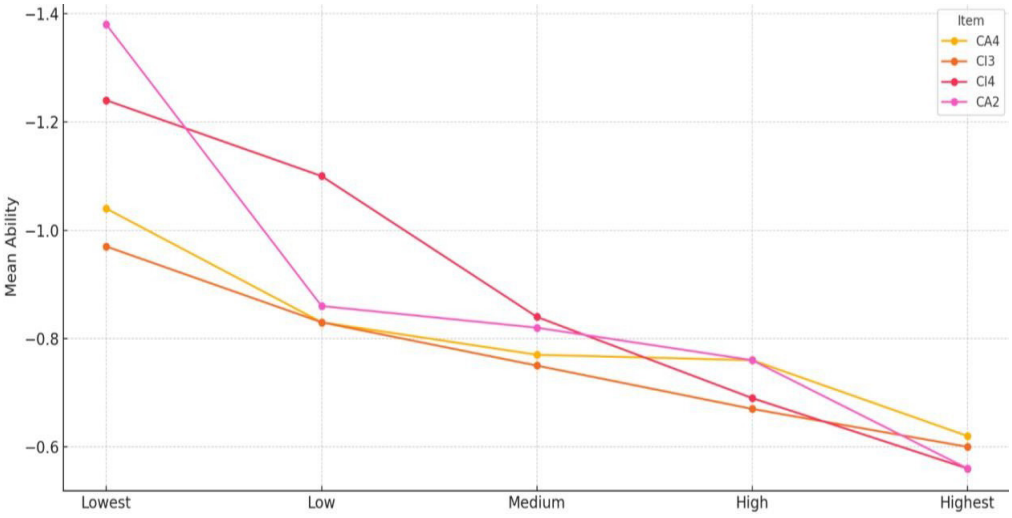
Rasch Analysis Results

According to Table 2, music item CA2 is the most suitable for a gifted test, while CA4 is the least suitable. CA2 shows the best spread of ability differentiation, and its fit statistics are consistently good, indicating its high quality. The Mean Ability values show how well an item can differentiate between different skill levels. CA2 has the widest range of mean ability values, from -1.38 (Lowest) to -0.56 (Highest). This indicates it effectively measures a broad spectrum of musical aptitude. The significant gap between the Lowest and Highest groups confirms its utility in identifying top-tier talent. CI4 also shows a strong range, from -1.24 to -0.56, making it a good second choice. In contrast, CA4 and CI3 have the narrowest ranges (from -1.04 to -0.62 and -0.97 to -0.60, respectively). This suggests they are less effective at differentiating between test takers, especially those with high ability.

The Infit and Outfit MNSQ values should ideally be close to 1.0, with an acceptable range of 0.5 to 1.5. All four items have excellent fit statistics. Most of their values are very close to 1.0, and none fall outside the acceptable 0.5-1.5 range. This suggests that test-takers' responses were predictable and did not show unusual or random patterns. The lowest values are for CA2 and CI4 in the lowest ability groups (around 0.5-0.6). While still acceptable, this may indicate that for the least skilled test takers, these items were so difficult that their answers were less random than what the model would predict, possibly due to guessing. The PTMA Correlation shows the relationship between a test taker's score on a specific item and their overall ability. A positive value is good. CA4 and CA2 have negative PTMA correlations for low-ability groups, which is a concern. For example, CA2's PTMA for the "Lowest" group is -0.15. This suggests that for this specific group, the item is not functioning as intended. The PTMA values for all items generally become positive for medium to highest ability groups, showing that the items become more effective at differentiating at higher skill levels. CA2 is the "Goldilocks"

Item: It's difficult enough to challenge the most gifted test takers, but not so hard as to be random for the lowest ability groups. Its ability to differentiate across the full spectrum of talent makes it the most valuable item for a gifted test. CI4 is a great compliment. Given its strong differentiation and fit, CI4 would be an excellent item to pair with CA2. The combination of these two items would provide a robust measure of giftedness. The "Lowest" ability group is an outlier. The data shows a notable disconnect in the "Lowest" ability group for all items, as evidenced by the high standard error, lower fit statistics, and negative correlations. This could be due to a smaller sample size, random guessing, or a fundamental lack of skill in this group, making the item's performance less stable. Because they do not effectively distinguish between different ability levels, CA4 (testing melody awareness) and CI3 (testing music interval) are less efficient for a test specifically designed to identify gifted individuals. However, it doesn't test melody awareness and music interval are improper for this test as the other items showed a potential of testing these skills. The Rasch analysis results is shown in Figure 2.

Fig. 2



Rasch Analysis of Mean Ability by Ability Group

Thematic analysis was used to analyse data from the interview and observation data collection. Interview data was transcript and coded into themes as shown in Table 3.

Table 3

Participant	Verbatim	Coding	Theme
P1	"Music can form students who are more skilled, innovative, creative, and dynamic."	Skill formation, innovation, creativity, dynamic growth	Holistic Assessment of Giftedness
	"Creativity items can measure the ability of students' intelligence to be more holistic and dynamic. They become underachievers if potentials are not uncovered."	Measuring holistic intelligence	
P2	"Music element suitable in gifted test as it measures intelligence holistically, beyond STEM."	Broadening intelligence measurement	
P2	"Evaluates creativity side of gifted individuals, including music and visual art."	Creativity, multi-domain intelligence	Multi-Domain Talent
P3	"Identifies all traits of a gifted student."	Comprehensive gifted traits	Holistic Assessment of Giftedness
	"Integrating creativity through music promotes a holistic assessment of intelligence."	Holistic intelligence	
	"Reflects Malaysia's diverse culture, aligns with multiple intelligences theory."	Cultural relevance, multiple intelligences	Cultural & Theoretical Relevance
	"Broadens concept of giftedness to include diverse talents."	Broader concept of giftedness	Giftedness Definition
P4	Creativity elements from music cultural recognize diverse talents, relevance, and engagement."	Diverse talents, cultural relevance, engagement	Cultural Relevance & Engagement
	"Finds multi-talented gifted students Measures creativity level."	Multi-talent identification	Skill Development
P5	"Music helps students explore themselves more and become more creative… Needs to be included as an item."	Self-exploration, creativity	Creative & Artistic

Participant	Verbatim	Coding	Theme
P6	"A creativity item can gauge a candidate's interest in arts."	Interest measurement	Inclusion & Creative Support
	"Supports individuals with exceptional creative abilities in a more inclusive approach."	Inclusion, creativity support	
	"Makes testing experience more engaging and enjoyable."	Engagement, enjoyment	Engaging
P7	"Music elements are important to value students."	Valuing individual abilities	Value Individual Talents
	"Reengineer product, easy to evaluate them."	Assessment design, simplicity	Focused Assessment
P8	"Music involves skills like singing, playing instruments, supporting mental growth."	Skill diversity, mental growth	Holistic Skill Development
	"Boosts creativity in gifted students and helps them express ideas."	Creativity boost, artistic expression	Creative & Artistic
	"Important for cognitive development."	Cognitive support	Cognitive
	"Allows expression of emotions, language, and culture, giving a well-rounded experience."	Emotional, linguistic, cultural expression	Emotional & Cultural Expression
P9	"Music is a field that can nurture giftedness and enables a holistic perspective."	Giftedness nurturing, holistic perspective	Holistic Giftedness Development
	"Music items allow candidates to connect rationale with divergent solutions creatively."	Rationale, divergent thinking, creativity	Problem-Solving & Divergent Thinking
	"Triggers creativity and rationale domains."	Creativity and rationale	
P10	"Music items let candidates think creatively, test artistic abilities, and make the test holistic."	Creative thinking, artistic ability, holistic test	Creative & Artistic

Interview Results

Table 3 shows that participants agreed on the importance of including music in the Malaysian Gifted Screening test to provide a fuller picture of the student's competences. Participants stressed that music promotes creativity, self-expression and the development of artistic and cognitive skills which are often overlooked in conventional assessments. They found that music helps to identify talents that go beyond academic achievements, such as emotional sensitivity, cultural awareness and different perspectives. Several respondents also noted that music reflects Malaysia's cultural diversity and supports a wider interpretation of the concept of intelligence.

Fig. 3

Observation During the Implementation of Gifted Test

Observation data was collected and coded into themes as shown in Table 4. Observation was conducted.

Table 4

Participant	Verbatim	Coding	Theme
P1	"Music can form students who are more skilled, innovative, creative, and dynamic."	Skill formation, innovation, creativity, dynamic growth	Holistic Assessment of Giftedness
	"Creativity items can measure the ability of students' intelligence to be more holistic and dynamic. They become underachievers if potential is not uncovered."	Measuring holistic intelligence	
P2	"Music element suitable in gifted test as it measures intelligence holistically, beyond STEM."	Broadening intelligence measurement	Holistic Assessment of Giftedness
	"Evaluates creativity side of gifted individuals, including music and visual art."	Creativity, multi-domain intelligence	Multi-Domain Talent

Participant	Verbatim	Coding	Theme
P3	"Identifies all traits of a gifted student."	Comprehensive gifted traits	Holistic Assessment of Giftedness
	"Integrating creativity through music promotes a holistic assessment of intelligence."	Holistic intelligence	
	"Reflects Malaysia's diverse culture, aligns with multiple intelligences theory."	Cultural relevance, multiple intelligences	Cultural & Theoretical Relevance
	"Broadens concept of giftedness to include diverse talents."	Broader concept of giftedness	Giftedness Definition
P4	Creativity elements from music cultural recognize diverse talents, relevance, and engagement."	Diverse talents, cultural relevance, engagement	Cultural Relevance & Engagement
	"Finds multi-talented gifted students Measures creativity level."	Multi-talent identification	Skill Development
P5	"Music helps students explore themselves more and become more creative…Needs to be included as an item."	Self-exploration, creativity	Creative & Artistic
	"A creativity item can gauge a candidate's interest in arts."	Interest measurement	
P6	"Supports individuals with exceptional creative abilities in a more inclusive approach."	Inclusion, creativity support	Inclusion & Creative Support
	"Makes testing experience more engaging and enjoyable."	Engagement, enjoyment	Engaging
P7	"Music elements are important to value students."	Valuing individual abilities	Value Individual Talents
	"Reengineer product, easy to evaluate them."	Assessment design, simplicity	Focused Assessment
P8	"Music involves skills like singing, playing instruments, supporting mental growth."	Skill diversity, mental growth	Holistic Skill Development
	"Boosts creativity in gifted students and helps them express ideas."	Creativity boost, artistic expression	Creative & Artistic
	"Important for cognitive development."	Cognitive support	Cognitive

Participant	Verbatim	Coding	Theme
P8	"Allows expression of emotions, language, and culture, giving a well-rounded experience."	Emotional, linguistic, cultural expression	Emotional & Cultural Expression
	"Music is a field that can nurture giftedness and enables a holistic perspective."	Giftedness nurturing, holistic perspective	Holistic Giftedness Development
P9	"Music items allow candidates to connect rationale with divergent solutions creatively."	Rationale, divergent, thinking, creativity	Problem-Solving & Divergent Thinking
	"Triggers creativity and rationale domains."	Creativity and rationale	Creative & Artistic
P10	"Music items let candidates think creatively, test artistic abilities, and make the test holistic."	Creative thinking, artistic ability, holistic test	

Observation Results

Table 4 indicated participants' insights into students' experiences during the implementation of the Malaysian Gifted Screening Test. The testing environment was orderly and conducive to concentration, with students generally maintaining focus and discipline. Teachers played an important role in guiding students, though some students required repeated clarification, especially for music-related items. Many students showed interest and engagement during the creative and music sections, although a number experienced difficulty with unfamiliar music concepts and technical aspects of the computer-based format. Challenges such as software issues, navigation errors, and time constraints were observed, leading to frustration for some students. Despite these obstacles, signs of critical thinking and reflective behaviour emerged, particularly during problem-solving tasks. The varied responses suggest that while the music component sparked interest, technical and instructional limitations need to be addressed to ensure a smoother and more equitable testing experience.

Discussion

The integration of musical components in the gifted screening test provides opportunities for merging musical aptitude with conventional assessments of giftedness. The findings indicated that students encountered challenges in completing the computer-based test due to restricted access

to digital resources and a lack of experience with software interfaces. These problems highlight a more problem of technological disparity, especially in remote or underfunded institutions where kids may possess limited exposure to digital learning environments. Future incarnations of the test could adopt mobile-friendly or web-based formats, enhancing accessibility beyond desktop platforms. Furthermore, integrating fundamental digital training into current disciplines like computer class may better equip students for technology-enhanced evaluations. Integrating musical elements into the gifted screening test creates new avenues for investigating the potential synergy between musical aptitude and conventional indicators of giftedness. This study revealed that certain students encountered difficulties with the computer-based test due to insufficient access to digital tools and unfamiliarity with software interfaces, underscoring a broader issue of technological inequity in rural or under-resourced schools, where numerous students may lack experience in a digital learning environment.

The Rasch analysis revealed that two items, CA4 (assessing melody awareness) and CI3 (evaluating music intervals), exhibited lower efficiency compared to the other test items. These findings suggest that while the concepts of melody awareness and music interval testing are valuable, the specific content used in items CA4 and CI3 may need further revision to enhance their effectiveness. This recommendation is supported by the performance of similar items, CI4 and CA2, which assess the same musical domains of melody awareness and interval recognition. These items demonstrated better efficacy, indicating that the underlying constructs are appropriate for inclusion in the screening test. Therefore, it is plausible that with adjustments to the content of items CA4 and CI3 particularly focusing on the keys associated with melody and intervals, the revised items could show improved potential for accurately assessing the intended musical skills. Such revisions may enhance the overall validity and reliability of the gifted screening test, ensuring it better captures the musical abilities of the participants as recommended by Heil (2024). [29]

Observations indicated that students demonstrated better comfort with items that utilized visual or theoretical elements rather than aural playback. This shows that individuals with minimal training in aural skills perform well in tasks associated with visual or notation-based music. The findings correspond with the Multiple Intelligences Theory (Gardner, 1983), which asserts that individuals have varied cognitive abilities, including musical intelligence, yet may not cultivate all facets of that intelligence

[29] Heil, S.*"Universal Screening for Gifted Education in the Arts."* National Association for Gifted Children, 2024. https://www.nagc.org/news/universal-screening-for-gifted-education-in-the-arts

uniformly.[30] Students can show an awareness of music in both visual and theoretical aspects; however, they might face challenges in processing aural information without formal training. This highlights the importance of developing music evaluation tools that integrate diverse modalities through which students engage with and respond to musical information. The study suggests converting aural items into written or visual forms, allowing students to imagine the sounds, relate them to their experiences, and select the most appropriate answer based on their reasoning skills. Written items appear to be more practical than aural ones, as they simplify testing procedures, particularly in rural areas where access to audio resources may be limited.

Enhancing music assessment is essential for the precise identification of cognitive abilities and creative traits in gifted students. The existing testing framework, although effective in assessing general musical awareness, may inadequately evaluate students with specific or technical musical skills, including improvisation, harmonic analysis, or rhythmic precision. Research indicates that musical aptitude is evident in melodic identification, harmonic assessment, rhythmic accuracy, and improvisation. Future iterations of the test may integrate sophisticated technical elements, including intricate rhythmic exercises, sight-reading challenges, and improvisational prompts, to differentiate students with authentic musical aptitude from those possessing merely a fundamental grasp of music theory. The integration of musical components in gifted evaluations broadens the criteria for recognising giftedness beyond conventional cognitive measures.

Evaluations focused on music would measure musical intelligence in connection with creativity, problem-solving, and divergent thinking characteristics often overlooked in traditional gifted assessment methods. The integration of music in evaluations illustrates a thorough method for identifying giftedness, affirming the arts and humanities as valid domains of exceptional talent in conjunction with traditional STEM assessments. The findings demonstrate an increasing consensus in gifted education that intellectual ability alone is insufficient for defining giftedness, highlighting the importance of incorporating creative and artistic intelligence.

The preparedness of students and their understanding of music education significantly influenced performance outcomes; numerous students encountered unfamiliar musical terminology and concepts, resulting in an inequitable scenario for those without formal training in notation or rhythm. This concern aligns with the findings of Farias et al. (2023), which advocate for assessment tools that account for cognitive variability and diverse

[30] Gardner, H. *Frames of Mind: The Theory of Multiple Intelligences*. Basic Books, 1983.

learning experiences.[31] The implementation of pre-assessment sessions is recommended to ensure participants are familiar with fundamental musical concepts prior to the evaluation. Incorporating pre-assessment sessions into the evaluation process is recommended to familiarize participants with essential musical concepts before the actual assessment, thereby improving fairness. The findings demonstrate that some individuals, despite lacking formal music training, displayed an inherent comprehension of musical concepts. This observation is noteworthy, as it implies that cognitive attributes like pattern identification, auditory memory, and inherent musicality may develop autonomously from conventional education, corroborating findings from Cetinkaya (2023) regarding creativity and intelligence in gifted individuals.[32] These findings highlight the necessity of providing ongoing musical training opportunities to children with inherent musical skill, facilitating the cultivation and enhancement of their abilities throughout time.

Traditional assessments frequently overlook critical elements such as cognitive reasoning and analytical skills. In contrast, music-focused evaluation tools can identify attributes like creativity, originality, and curiosity, which are areas where many children excel. Integrating a musical element into assessments of giftedness may enhance the identification of gifted children who have been missed by tests that exclusively measure cognitive or analytical skills. This method aligns with theories of artistic talent that highlight the complex nature of giftedness, encompassing cognitive, emotional, and artistic dimensions. Music is connected to culture, ethnomusicology, and history, fostering a profound comprehension and appreciation of heritage through interdisciplinary investigation. Engagement with diverse musical traditions significantly enhances students' understanding of their cultural heritage and broadens their global perspective. [33] Future iterations of the test may integrate elements of soundscape analysis, ethnomusicology, and historical musicology.

This study also illustrates that music-based assessments can reveal cognitive and creative abilities that conventional academic evaluations may overlook, thus advancing the field. It is found that music-based assessments can uncover creative and cognitive abilities that traditional academic tests

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[31] Farias, E. S., Nakano, T. C., and Wechsler, S. M. *"Identification by Teachers of Intellectual Gifted Students: Construction of an Instrument and Evidence of Content Validity."* Ciencias Psicológicas, vol. 17, no. 1, 2023, e-2581. https://doi.org/10.22235/cp.v17i1.2581

[32] Cetinkaya, C. *"The Relationship between Intelligence and Creativity within the Threshold Theory among Gifted and Bright Students in Turkey."* SAGE Open, vol. 13, no. 4, 2023, pp. 1–10, https://doi.org/10.1177/21582440231206612

[33] Miendlarzewska, E. A., and Trost, W. J. *"How Musical Training Affects Cognitive Development: Rhythm, Reward and Other Modulating Variables."* Frontiers in Neuroscience, vol. 14, 2014, 1037. https://doi.org/10.3389/fnins.2020.01037

may fail to identify. The results show that music functions as both an academic field and a means of assessing gifted potential, merging cognitive science, the humanities, and talent identification. Gardner (1983) posits that musical intelligence is associated with emotional sensitivity, abstract reasoning, and pattern recognition, suggesting capabilities that extend beyond mere musical performance and encompass a wider range of cognitive functions.[34] The capacity of certain students to identify melodic and rhythmic patterns without formal instruction indicates an inherent cognitive process that supports the organic growth of musical intelligence in specific individuals. This supports the claim that the gifted screening test should continue to explore non-traditional assessment methods, particularly those that challenge traditional notions of intelligence and talent.

The integration of musical components into the assessment broadens the scope of gifted evaluation, allowing for a more thorough identification of exceptional learners. Traditional testing methods often fail to recognise other important types of intelligence, including artistic ability. [34]The integration of music into the assessment model incorporates elements related to musical and creative intelligence, consistent with Gardner's theory of multiple intelligence (1983), which recognizes these domains as legitimate facets of human potential, thus adhering to international standards in gifted identification. Addressing challenges associated with technological access and digital literacy may involve schools adopting web-based assessment platforms, improving technology-focused subjects such as computer class by incorporating digital music tools, utilizing visual aids, interactive design, and scaffolding techniques to enhance student engagement, and broadening the curriculum through interdisciplinary approaches that include soundscape studies, ethnomusicology, and music psychology. Incorporating soundscape studies, ethnomusicology, and music psychology enhances the interdisciplinary nature of the content, promoting cognitive and creative engagement in accordance with Beghetto and Kaufman's (2014) framework for fostering creativity in educational settings.[35]

Conclusion

This study presents a new method for identifying gifted children through the integration of musical items into the gifted screening test. The inclusion of music-oriented questions, extending beyond conventional assessments focused on logical reasoning and academic achievement, facilitated the identification

[34] Gardner, H. *Frames of Mind: The Theory of Multiple Intelligences.* Basic Books, 1983.
[35] Beghetto, R. A., and Kaufman, J. C. *"Classroom Contexts for Creativity."* Educational Psychology Review, vol. 26, no. 4, 2014, pp. 665-687. https://doi.org/10.1080/13598139.2014.905247

of students possessing creative thinking, musical sensitivity, and artistic expression skills might be neglected in traditional evaluations. The findings indicated that musicals could be good items in forming a comprehensive screening test in identifying gifted individuals including those who may not excel in STEM fields. Interviews and observations data validated the suitability of music in broadening the criteria for identifying gifted individuals. On the other hand, challenges including restricted music exposure, technological limitations, and differing levels of digital proficiency highlighted the necessity for improved item design, preparation of procedures, and accessible assessment platforms.

Integrating music into the evaluation process for gifted pupils corresponds with a more comprehensive method of identifying exceptional learners. This is achieved by acknowledging that there exists a spectrum of potential in our students, whereby talent identification tools are essential not just in assessing information acquisition but also in recognizing creative thinking, emotional intelligence, and cultural awareness. Music-based assessments can enhance this paradigm by equipping educators to evaluate musical aptitude more precisely and by integrating music into talent-identification strategies, necessitating further research to ascertain how these methods support the long-term development of gifted learners.

Acknowledgment

Authors acknowledge the Ministry of Higher Education (MOHE) for funding under the Fundamental Research Grant Scheme – Early Career (FRGS-EC) (FRGS-EC/1/2024/SSI07/UITM/02/6) and Universiti Teknologi MARA UiTM (600-RMC/FRGS-EC 5/3 (010/2024)). The authors would like to thank the collaborator, which is *Kementerian Pendidikan* Malaysia especially Azizi, Suhaimi, Aisyah, Izzati, and Maheran. The AI particularly ChatGPT and Quillboat were used to proofread and improve the language. There is no conflict of interest as a result of this study.

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