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Design and Validation of a Differentiated Curriculum Model for Gifted Students Based on Multiple Intelligences

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A B S T R A C T

The objective of this study was to design and empirically validate a comprehensive differentiated curriculum model for gifted students grounded in the theory of Multiple Intelligences within the educational context of Tehran. This study employed a mixed-methods sequential exploratory design. In the qualitative phase, semi-structured interviews were conducted with twenty experts in gifted education, curriculum studies, and educational psychology to identify the core components of the proposed model. The resulting framework was operationalized into a researcher-developed questionnaire and administered to a sample of 350 gifted students selected through multi-stage cluster sampling from specialized schools in Tehran. Content validity was established through expert review, and construct validity was examined using confirmatory factor analysis. Structural equation modeling was conducted using AMOS to evaluate the relationships among model components and assess overall model fit. The measurement model demonstrated strong psychometric properties with satisfactory convergent and discriminant validity. Structural equation modeling revealed that alignment with Multiple Intelligences significantly predicted all dimensions of differentiated curriculum implementation, including content differentiation ($\beta = 0.62$, $p < 0.001$), process differentiation ($\beta = 0.71$, $p < 0.001$), product/performance differentiation ($\beta = 0.58$, $p < 0.001$), learning environment differentiation ($\beta = 0.49$, $p < 0.001$), and flexible assessment ($\beta = 0.76$, $p < 0.001$). The structural model exhibited good fit to the data ($\chi^2/df = 2.31$, CFI = 0.95, TLI = 0.94, RMSEA = 0.061, SRMR = 0.044). The validated model provides a theoretically grounded and empirically supported framework for designing differentiated curricula that effectively respond to the diverse intellectual profiles of gifted learners and offers practical guidance for curriculum reform in gifted education.

Keywords: *Gifted education, differentiated curriculum, multiple intelligences, curriculum validation, structural equation modeling, talent development*

1. Introduction

Gifted education has increasingly become a central concern of contemporary educational systems as nations strive to cultivate intellectual capital capable of addressing complex social, technological, and economic challenges. Gifted learners demonstrate advanced cognitive abilities, heightened sensitivity, creativity, and distinctive learning needs that often remain insufficiently addressed within conventional curricula (Jawabreh et al., 2022; Shaunessy-Dedrick & Lazarou, 2020). Traditional one-size-fits-all instructional approaches frequently fail to provide adequate challenge, engagement, and emotional support for gifted students, leading to underachievement, disengagement, or psychosocial difficulties despite their high potential (Fahri et al., 2019; Mofield & Chakraborti-Ghosh, 2010). Consequently, the design of specialized curricular models that acknowledge both cognitive diversity and socio-emotional complexity has become a fundamental priority in gifted education research and practice.

Among the most influential developments in this field is the shift toward differentiated curriculum design. Differentiation emphasizes flexible adaptation of content, learning processes, products, assessment methods, and learning environments according to individual learner profiles (GÖKsu & Gelişli, 2023; VanTassel-Baska & Baska, 2021). Research consistently demonstrates that well-designed differentiated curricula enhance academic achievement, motivation, creativity, and self-regulation among gifted learners (Little et al., 2007; Swanson et al., 2020). Yet, effective differentiation requires coherent theoretical grounding and systematic instructional planning rather than isolated classroom strategies. Without a comprehensive curriculum framework, differentiation efforts often remain fragmented and inconsistent across educational contexts (GÖKsu & Gelişli, 2023; VanTassel-Baska & Wood, 2023).

A growing body of scholarship supports the integration of Multiple Intelligences theory as a powerful conceptual foundation for curriculum differentiation. Gardner's framework recognizes diverse intellectual capacities—including linguistic, logical-mathematical, spatial, musical, bodily-kinesthetic, interpersonal, intrapersonal, and naturalistic intelligences—thereby expanding the definition of giftedness beyond narrow academic metrics (Vidergor, 2021). Applying this multidimensional view enables educators to design learning experiences that align with each learner's unique cognitive profile and strengths. Studies in various educational systems have demonstrated that MI-based instruction increases learner engagement, depth of understanding, creative performance, and emotional well-being, particularly among gifted populations (Fahri et al., 2019; Mohd et al., 2022; Rayeji et al., 2020).

However, despite strong theoretical justification, practical implementation of MI-aligned differentiated curricula remains uneven. Many schools struggle to translate the principles of MI theory into systematic curriculum structures that operate across grade levels and subject areas (GÖKsu & Gelişli, 2023; Shaunessy-Dedrick & Lazarou, 2020). Existing models frequently focus on classroom-level techniques rather than institution-wide curriculum architecture. This limitation underscores the need for validated curriculum models that integrate differentiation and MI theory into coherent instructional systems.

One of the most comprehensive contributions to gifted curriculum design is the Integrated Curriculum Model (ICM), which emphasizes advanced content, high-level process, and interdisciplinary conceptual connections (Swanson et al., 2020; VanTassel-Baska & Wood, 2023). The ICM has demonstrated strong effectiveness in enhancing academic outcomes and higher-order thinking among gifted learners (Little et al., 2007; VanTassel-Baska & Baska, 2021). Nevertheless, while the ICM incorporates differentiation principles, it does not explicitly operationalize MI theory as a central organizing construct. Recent curriculum scholarship therefore calls for expanded models that fuse the structural rigor of the ICM with the learner-centered depth of MI-based differentiation (GÖKsu & Gelişli, 2023; Vidergor, 2021).

The evolving landscape of education further intensifies this need. Rapid technological transformation, artificial intelligence, and data-driven instructional systems are reshaping curricular priorities worldwide. Scholars argue that gifted education must evolve beyond traditional enrichment toward dynamic curricula that foster adaptability, creative problem-solving, and interdisciplinary competence (Hong, 2018; Q. Wang, 2024; Zhu, 2024). AI-enhanced instructional environments, in particular, create unprecedented opportunities for personalization, adaptive assessment, and individualized learning trajectories that align naturally with MI-based differentiation (Huapaya et al., 2025; James & Maldonado-Molina, 2025; Zhang, 2024). Contemporary curriculum frameworks increasingly emphasize the integration of AI literacy and computational thinking as core competencies, even at the K-12 level (James & Maldonado-Molina, 2025; Mahmoud et al., 2025).

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Within this global context, gifted education must respond not only to cognitive diversity but also to the emotional, motivational, and psychosocial needs of learners. Affective curriculum components have been shown to play a crucial role in supporting the socio-emotional development of gifted students, mitigating perfectionism, anxiety, and social isolation (Chng, 2014; Mofield & Chakraborti-Ghosh, 2010). Emotional intelligence, self-awareness, resilience, and interpersonal skills are now recognized as essential outcomes of high-quality gifted education alongside academic excellence (Fahri et al., 2019; Shaunessy-Dedrick & Lazarou, 2020). Differentiated curriculum models must therefore integrate affective development and MI responsiveness into a unified instructional vision.

Empirical studies across diverse educational systems highlight the positive impact of specialized curriculum models for gifted learners. Research in Iran, Malaysia, and various international contexts demonstrates that curriculum designs grounded in differentiation, entrepreneurial thinking, psychosocial development, and MI alignment significantly enhance academic engagement, innovation, and life-skill development among gifted students (Fahri et al., 2019; Mohd et al., 2022; Rayeji et al., 2020). At the same time, scholars emphasize that curriculum reform must be evidence-based and systematically validated to ensure reliability, scalability, and long-term effectiveness (Madani & Marr, 2019; VanTassel-Baska & Wood, 2023).

Despite these advances, important gaps remain. Existing studies often examine isolated dimensions of gifted curriculum—such as enrichment strategies, emotional support, or technological integration—without constructing holistic models that unify differentiation, MI theory, affective development, and modern instructional technologies into a coherent curriculum architecture (GÖKsu & Gelişli, 2023; Vidergor, 2021). Furthermore, limited empirical research has focused on the formal validation of comprehensive differentiated curriculum models specifically designed for gifted learners. Most available frameworks remain theoretical or descriptive, lacking rigorous psychometric evaluation and structural testing (Swanson et al., 2020; VanTassel-Baska & Baska, 2021).

Recent advances in curriculum science and educational analytics now enable researchers to address this methodological limitation. Structural equation modeling, confirmatory factor analysis, and advanced measurement frameworks provide robust tools for validating complex curriculum constructs and examining causal relationships among instructional components (Madani & Marr, 2019; VanTassel-Baska & Wood, 2023). These techniques allow for the systematic testing of differentiated curriculum models grounded in MI theory and aligned with contemporary educational demands.

Moreover, the emergence of intelligent educational systems amplifies the relevance of MI-based differentiation. AI-driven instructional platforms can dynamically adapt learning pathways, assessment strategies, and instructional resources to individual learner profiles, making large-scale implementation of differentiated curricula increasingly feasible (Mahmoud et al., 2025; D. Wang, 2024; Zhang, 2024). This convergence of differentiation theory, MI research, and intelligent educational technologies creates a unique opportunity to develop and validate next-generation curriculum models for gifted learners.

In summary, while the literature strongly supports the theoretical value of differentiated instruction, MI alignment, affective curriculum, and advanced instructional technologies for gifted education, a comprehensive, empirically validated curriculum model integrating these dimensions remains largely absent. Addressing this gap is essential for advancing both theory and practice in gifted education and for equipping future generations of gifted learners with the competencies required for an increasingly complex world.

Accordingly, the aim of the present study is to design and validate a comprehensive differentiated curriculum model for gifted students grounded in Multiple Intelligences theory and empirically examine its structural effectiveness within the educational context of Tehran.

2. Methods and Materials

2.1. *Study Design and Participants*

The present study adopted a mixed-methods sequential exploratory design aimed at developing and validating a differentiated curriculum model for gifted students grounded in the theory of multiple intelligences. In the qualitative phase, the purpose was to identify the core components, dimensions, and instructional mechanisms of a differentiated curriculum responsive to the diverse intelligence profiles of gifted learners. In the quantitative phase, the proposed model was empirically tested and validated using structural equation modeling. The research population consisted of gifted students enrolled in public and private gifted education centers, their teachers, and curriculum specialists in the city of Tehran during the academic year. For the

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qualitative stage, participants included twenty experts in gifted education, curriculum studies, educational psychology, and educational management who were selected through purposive and snowball sampling. Data collection continued until theoretical saturation was achieved. For the quantitative stage, the statistical population included all gifted students in grades seven to nine in Tehran. Based on Cochran's formula and to ensure adequate statistical power for structural equation modeling, a sample of three hundred and fifty students was selected using multi-stage cluster random sampling from different educational districts of Tehran. The inclusion criteria were official identification as gifted by the Ministry of Education and active enrollment in specialized gifted programs, while exclusion criteria included learning disabilities or major psychological disorders reported in school records.

2.2. Measures

Data collection tools were developed in accordance with the qualitative findings and the theoretical framework of multiple intelligences. The primary instrument was a researcher-constructed Differentiated Curriculum Questionnaire consisting of eighty-two items across six main dimensions: instructional content differentiation, learning process differentiation, product and performance differentiation, learning environment differentiation, assessment flexibility, and alignment with multiple intelligences profiles. Each dimension contained several subcomponents derived from expert interviews, including cognitive challenge level, creativity facilitation, emotional and social development, learner autonomy, flexible grouping, and personalized assessment strategies. Responses were measured on a five-point Likert scale ranging from strongly disagree to strongly agree. To assess multiple intelligences profiles, Gardner's Multiple Intelligences Inventory was administered, adapted and validated for the Iranian context. Content validity of the researcher-constructed questionnaire was confirmed by a panel of ten experts using the content validity ratio and content validity index. Reliability was examined through a pilot study with forty students, yielding a Cronbach's alpha coefficient of 0.93 for the overall instrument and coefficients ranging from 0.81 to 0.90 for individual subscales, indicating strong internal consistency. Construct validity was further examined during the quantitative phase through confirmatory factor analysis.

2.3. Data Analysis

Data analysis was conducted in two major stages. In the qualitative phase, interview transcripts were analyzed using thematic analysis following the procedures of open coding, axial coding, and selective coding. This process resulted in the extraction of core themes and relationships that formed the conceptual foundation of the differentiated curriculum model. In the quantitative phase, descriptive statistics were first computed to examine data distribution, missing values, and normality assumptions. Confirmatory factor analysis was then performed using AMOS software to validate the measurement model. Model fit was assessed using multiple indices, including chi-square to degrees of freedom ratio, CFI, TLI, RMSEA, and SRMR. Subsequently, structural equation modeling was employed to test the causal relationships among the components of the proposed curriculum model and to evaluate its overall validity. Convergent validity was examined using average variance extracted and composite reliability, while discriminant validity was assessed through the Fornell–Larcker criterion. The final validated model provided empirical support for the effectiveness of differentiated curriculum design based on multiple intelligences in addressing the diverse learning needs of gifted students in Tehran.

3. Findings and Results

Data from 350 gifted students in Tehran were analyzed to evaluate the psychometric adequacy of the Differentiated Curriculum Questionnaire and to validate the proposed differentiated curriculum model grounded in Multiple Intelligences. Prior to inferential modeling, the dataset was screened for missing values and distributional assumptions. Missing values were minimal and handled using expectation–maximization at the item level. Skewness and kurtosis statistics indicated acceptable univariate normality for all study variables, supporting the use of maximum likelihood estimation in the confirmatory factor analysis and structural equation modeling stages.

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Table 1

Descriptive statistics and internal consistency for the study constructs (N = 350)

Construct	Items (n)	Min	Max	Mean	SD	Skewness	Kurtosis	Cronbach's α
Content Differentiation	14	1.43	4.93	3.86	0.58	-0.41	-0.12	0.89
Process Differentiation	16	1.38	4.88	3.92	0.56	-0.48	0.06	0.91
Product/Performance Differentiation	12	1.25	4.92	3.78	0.60	-0.33	-0.21	0.88
Learning Environment Differentiation	12	1.33	4.83	3.74	0.61	-0.29	-0.27	0.86
Flexible Assessment	14	1.29	4.89	3.81	0.59	-0.36	-0.18	0.90
Multiple-Intelligences Alignment	14	1.36	4.96	3.95	0.55	-0.52	0.14	0.92
Overall Differentiated Curriculum (Total Score)	82	1.41	4.88	3.84	0.49	-0.45	-0.08	0.93

As shown in Table 1, mean scores across all constructs were above the scale midpoint, indicating that participants generally perceived the curriculum practices as moderately to highly differentiated and aligned with multiple intelligences. Dispersion values were moderate, suggesting sufficient variability for modeling. Skewness and kurtosis values were within commonly accepted thresholds for SEM applications, supporting approximate normality. Internal consistency was strong across all constructs, with Cronbach's alpha coefficients ranging from 0.86 to 0.92, and 0.93 for the total questionnaire score, indicating that the instrument reliably captures the intended dimensions.

Table 2

Confirmatory factor analysis results: standardized loadings, composite reliability, and convergent validity (N = 350)

Latent construct	Indicator (subcomponent)	Standardized loading (λ)	SE	CR	AVE
Content Differentiation	Cognitive challenge calibration	0.79	0.04	0.90	0.68
	Tiered content resources	0.83	0.04		
	Enrichment/extension content	0.86	0.03		
	Concept-based integration	0.80	0.04		
Process Differentiation	Flexible grouping	0.81	0.04	0.91	0.72
	Strategy variety	0.86	0.03		
	Autonomy-supportive learning	0.87	0.03		
	Scaffolding and pacing	0.83	0.04		
Product/Performance Differentiation	Choice of performance formats	0.80	0.04	0.89	0.67
	Creativity-oriented outputs	0.84	0.03		
	Authentic performance tasks	0.82	0.04		
	Criteria transparency	0.78	0.04		
Learning Environment Differentiation	Psychological safety	0.77	0.04	0.88	0.64
	Resource-rich setting	0.81	0.04		
	Collaboration norms	0.80	0.04		
	Classroom management flexibility	0.82	0.04		
Flexible Assessment	Formative feedback	0.85	0.03	0.92	0.74
	Multiple assessment modes	0.86	0.03		
	Assessment timing flexibility	0.83	0.04		
	Growth-oriented criteria	0.87	0.03		
Multiple-Intelligences Alignment	MI-informed task design	0.88	0.03	0.93	0.77
	MI-based learning options	0.89	0.03		
	MI-responsive grouping and roles	0.86	0.03		
	MI-consistent assessment options	0.87	0.03		

Table 2 indicates that all indicators loaded strongly on their intended latent constructs, with standardized loadings ranging from 0.77 to 0.89. Composite reliability values were consistently high (0.88–0.93), confirming construct reliability beyond Cronbach's alpha. Average variance extracted values exceeded the recommended 0.50 benchmark for all constructs (0.64–0.77), supporting convergent validity and indicating that each latent factor explains a substantial share of variance in its indicators.

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Table 3

Discriminant validity evidence using the Fornell–Larcker criterion (N = 350)

Construct	1	2	3	4	5	6
1. Content Differentiation	0.82					
2. Process Differentiation	0.63	0.85				
3. Product/Performance Differentiation	0.58	0.66	0.82			
4. Learning Environment Differentiation	0.55	0.60	0.57	0.80		
5. Flexible Assessment	0.61	0.69	0.64	0.59	0.86	
6. MI Alignment	0.67	0.71	0.62	0.56	0.73	0.88

In Table 3, the diagonal values (bold) represent the square root of AVE for each construct. In all cases, the square root of AVE was larger than the corresponding inter-construct correlations, providing evidence of discriminant validity. The correlation pattern also suggests that MI alignment is closely associated with process differentiation and flexible assessment, which is conceptually consistent with the logic of designing instruction and evaluation options aligned with diverse intelligence profiles.

Table 4

Structural model results: standardized path coefficients, explained variance, and model fit indices (N = 350)

Structural path	Standardized β	SE	CR (z)	p
MI Alignment → Content Differentiation	0.62	0.06	10.33	<0.001
MI Alignment → Process Differentiation	0.71	0.05	13.74	<0.001
MI Alignment → Product/Performance Differentiation	0.58	0.06	9.78	<0.001
MI Alignment → Learning Environment Differentiation	0.49	0.07	7.18	<0.001
MI Alignment → Flexible Assessment	0.76	0.05	15.21	<0.001
Endogenous construct	R^2			
Content Differentiation	0.38			
Process Differentiation	0.50			
Product/Performance Differentiation	0.34			
Learning Environment Differentiation	0.24			
Model fit index	Value			
χ^2/df	2.31			
CFI	0.95			
TLI	0.94			
RMSEA	0.061			

SRMR 0.044

Table 4 shows that MI alignment significantly and positively predicted all differentiated curriculum dimensions. The strongest effects were observed for flexible assessment (β = 0.76) and process differentiation (β = 0.71), indicating that alignment with multiple intelligences is particularly influential when teachers provide varied learning pathways and flexible assessment options. Explained variance values were substantial for flexible assessment (R^2 = 0.58) and process differentiation (R^2 = 0.50), and moderate for content and product differentiation, suggesting that MI-based alignment accounts for a meaningful proportion of variability in differentiated curriculum implementation as perceived by gifted students. Fit indices supported an acceptable-to-good overall model fit, with χ^2/df below 3, CFI and TLI near or above 0.94, and RMSEA and SRMR below 0.08 and 0.05 respectively, indicating that the proposed model is empirically consistent with the observed data.

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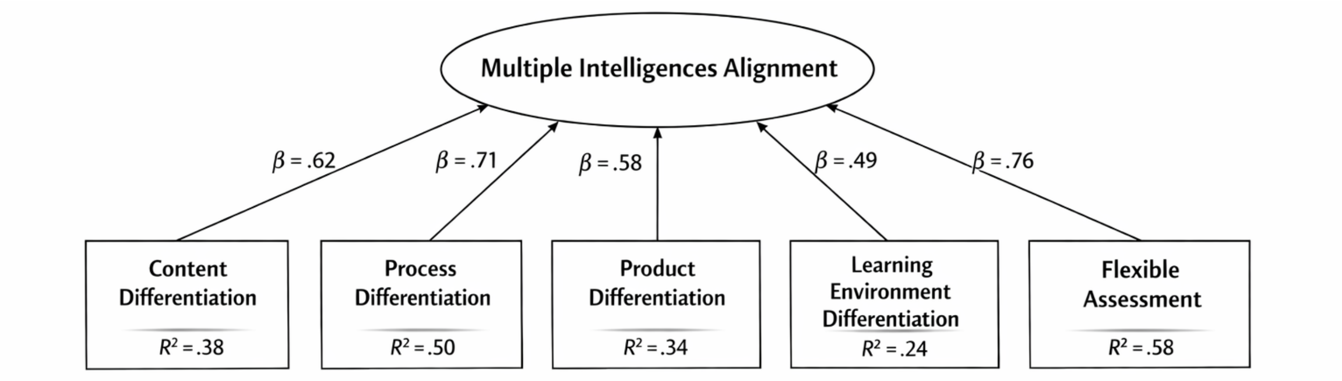
Figure 1

Final validated differentiated curriculum model for gifted students based on multiple intelligences



4. Discussion

The present study sought to design and empirically validate a differentiated curriculum model for gifted students grounded in Multiple Intelligences theory, and the findings provide strong support for the conceptual coherence and practical viability of the proposed framework. The measurement model demonstrated robust psychometric properties, with high internal consistency, satisfactory convergent and discriminant validity, and acceptable overall model fit. More importantly, the structural model confirmed that alignment with multiple intelligences functions as a central organizing construct that significantly predicts all major dimensions of curriculum differentiation, including content, process, product, learning environment, and flexible assessment. These results offer compelling empirical evidence that MI-based alignment is not merely a pedagogical philosophy but a powerful structural driver of effective curriculum design for gifted learners.

The strongest structural effects were observed in the relationships between MI alignment and flexible assessment (β = 0.76) as well as process differentiation (β = 0.71), indicating that when instructional systems recognize diverse intelligence profiles, they most strongly influence how learning is structured and how student performance is evaluated. This finding is highly consistent with differentiation theory, which posits that responsiveness to learner variability must be embedded primarily within instructional processes and assessment systems (GÖKsu & Gelişli, 2023; VanTassel-Baska & Wood, 2023). Process differentiation reflects instructional pacing, learning pathways, strategy diversity, and autonomy-supportive practices, all of which are directly activated when educators acknowledge multiple modes of intelligence and learning expression. The strong effect on flexible assessment likewise reflects the central importance of offering multiple avenues for students to demonstrate understanding, a principle repeatedly emphasized in gifted education literature (Shaunessy-Dedrick & Lazarou, 2020; Swanson et al., 2020).

The substantial explained variance in flexible assessment (R^2 = 0.58) and process differentiation (R^2 = 0.50) further confirms that MI alignment is not an auxiliary factor but a core mechanism driving differentiated curriculum implementation. These results resonate with findings reported by VanTassel-Baska and Wood, who argued that meaningful differentiation must operate systemically across instructional design and assessment rather than through isolated enrichment activities (VanTassel-Baska & Baska, 2021). Similarly, Swanson et al. demonstrated that integrated curriculum models yield the strongest outcomes when instructional processes and assessments are coherently aligned with learner characteristics (Swanson et al., 2020). The present findings extend this literature by demonstrating that MI alignment provides a theoretically grounded and empirically validated pathway for achieving such coherence.

The significant effects of MI alignment on content differentiation (β = 0.62) and product/performance differentiation (β = 0.58) indicate that when instruction is grounded in multiple intelligences, curriculum content becomes more flexible, conceptually rich, and cognitively challenging, while student outputs become more creative, authentic, and personalized. This aligns closely with the findings of Little et al., who reported that curriculum effectiveness for gifted learners increases when content is advanced, conceptually structured, and offers opportunities

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for high-level inquiry (Little et al., 2007). Moreover, Vidergor's multidimensional instructional conception emphasizes that gifted curricula must offer diverse cognitive entry points and expressive modalities to fully activate learners' intellectual potential (Vidergor, 2021). The present model operationalizes this conception by embedding MI responsiveness directly into the structural fabric of curriculum design.

The comparatively lower but still substantial explained variance for learning environment differentiation ($R^2 = 0.24$) suggests that while MI alignment strongly shapes instructional and assessment practices, environmental factors are influenced by additional contextual variables such as institutional policies, classroom resources, and teacher beliefs. Nonetheless, the significant predictive effect of MI alignment ($\beta = 0.49$) on learning environment differentiation underscores the importance of designing psychologically safe, resource-rich, and collaboration-oriented classrooms that support diverse intellectual strengths. This finding is consistent with affective curriculum research demonstrating that emotionally supportive environments are essential for the healthy development of gifted learners (Chng, 2014; Mofield & Chakraborti-Ghosh, 2010). Fahri et al. likewise emphasized the integration of psychosocial and emotional intelligence components into gifted curricula to promote both academic success and emotional well-being (Fahri et al., 2019).

Beyond confirming the internal structure of the model, the overall fit indices provide strong support for the theoretical soundness of the proposed framework. The acceptable values of CFI, TLI, RMSEA, and SRMR demonstrate that the model captures the complex relationships among differentiated curriculum components in a statistically coherent manner. These results contribute to the growing body of curriculum research that calls for empirically validated models rather than purely conceptual frameworks (Madani & Marr, 2019; VanTassel-Baska & Wood, 2023). By employing advanced structural modeling techniques, the present study responds directly to this call and strengthens the evidence base for gifted curriculum development.

The broader educational significance of these findings becomes particularly evident when viewed in light of contemporary transformations in schooling. The increasing integration of artificial intelligence and intelligent instructional systems provides unprecedented opportunities for implementing MI-based differentiated curricula at scale. Recent research highlights how AI-driven learning environments enable dynamic personalization of content, instructional pathways, and assessment practices (Q. Wang, 2024; Zhang, 2024; Zhu, 2024). The strong association between MI alignment and flexible assessment in the present model suggests that such technologies could serve as powerful enablers of differentiated gifted education, facilitating continuous adaptation to learners' evolving intellectual profiles. This interpretation aligns with the emerging consensus that future-ready curricula must integrate human-centered differentiation with technological intelligence (Huapaya et al., 2025; James & Maldonado-Molina, 2025; Mahmoud et al., 2025).

The findings also reinforce the view that gifted education must extend beyond cognitive acceleration toward holistic development. Jawabreh et al. emphasized that gifted learners display complex developmental profiles that encompass emotional sensitivity, social awareness, and motivational needs alongside intellectual strengths (Jawabreh et al., 2022). The present model explicitly integrates these dimensions by embedding affective development, autonomy, creativity, and MI responsiveness within curriculum design. This integrated approach reflects the evolution of gifted education from narrow academic elitism toward inclusive talent development systems that cultivate diverse forms of excellence (Mohd et al., 2022; Rayeji et al., 2020; Waswas & Jwaifell, 2019).

In the Iranian educational context, the results are particularly significant. Previous studies conducted in Iran have called for systematic curriculum reform for gifted learners, emphasizing entrepreneurship, innovation, and psychosocial development (Elhamifar et al., 2019; Rayeji et al., 2020). The present study provides a validated structural model that offers a concrete roadmap for such reform, grounded in international theory and adapted to local educational realities. By demonstrating that MI alignment serves as a central driver of effective differentiation, the model offers policymakers and curriculum designers a scientifically grounded framework for strengthening gifted education nationwide.

Overall, the findings suggest that a differentiated curriculum grounded in Multiple Intelligences theory is not only pedagogically desirable but structurally necessary for optimizing the development of gifted learners. The model advances existing scholarship by unifying differentiation theory, MI research, affective curriculum principles, and contemporary instructional innovations into a coherent, empirically validated framework. In doing so, it provides a powerful tool for addressing the longstanding challenges of

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gifted education in an increasingly complex and rapidly evolving educational landscape.

Several limitations of the present study should be acknowledged. The sample was restricted to gifted students in Tehran, which may limit the generalizability of the findings to other regions or educational systems. The reliance on self-report measures may have introduced response bias. Additionally, the cross-sectional design prevents causal inference regarding long-term educational outcomes associated with the proposed curriculum model.

Future studies should examine the longitudinal impact of implementing the validated model on academic achievement, creativity, motivation, and psychosocial development. Comparative studies across different cultural and educational contexts would further strengthen external validity. Experimental intervention research is also needed to assess how systematic adoption of the model influences classroom practices and student outcomes over time.

Educational policymakers should integrate the validated model into national curriculum frameworks for gifted education. Teacher training programs should emphasize MI-based differentiation and flexible assessment design. Schools should invest in instructional technologies that support personalized learning pathways aligned with diverse intelligence profiles.

5. Conclusion

Taken together, the findings underscore the differential strengths of child-centered mindfulness training and drawing-based art therapy. Mindfulness appears to have a more pronounced impact on socially mediated behavioral problems, particularly aggression, whereas both interventions are similarly effective in improving maladaptive cognitive appraisal patterns. This distinction has important implications for intervention selection and tailoring. For children with hearing impairment who primarily exhibit externalizing social behaviors, mindfulness-based programs may offer particular benefits, whereas for those whose difficulties are more cognitively or emotionally internalized, either mindfulness or art therapy may be appropriate (Rahimi Pardenjani et al., 2021; Zaccari et al., 2022). The results also highlight the value of integrating experiential, nonverbal, and awareness-based approaches when working with populations facing communication barriers.

Despite its contributions, the present study has several limitations that should be acknowledged. First, the sample size was relatively small, which may have limited statistical power and reduced the ability to detect subtle between-group differences, particularly in behavioral outcomes. Second, participants were recruited from a single geographic location, which may restrict the generalizability of the findings to other cultural or educational contexts. Third, reliance on questionnaire-based measures introduces the possibility of response bias, especially given the involvement of children with sensory impairments. Finally, although a follow-up assessment was included, the follow-up period was relatively short, limiting conclusions about the long-term stability of intervention effects.

Future studies should consider employing larger and more diverse samples to enhance generalizability and statistical robustness. Longitudinal designs with extended follow-up periods would be valuable in determining the durability of behavioral and cognitive changes over time. Researchers may also explore integrative intervention models that combine mindfulness, art therapy, and behavioral skills training to address multiple domains simultaneously. In addition, incorporating multi-informant assessments, such as parent and teacher reports or observational measures, could provide a more comprehensive evaluation of intervention outcomes. Finally, qualitative approaches may offer deeper insight into children's subjective experiences of mindfulness and art-based interventions.

From a practical perspective, the findings suggest that both child-centered mindfulness training and drawing-based art therapy can be effectively implemented as supportive interventions for children with hearing impairment, particularly to improve cognitive appraisal and emotional processing. Practitioners should consider mindfulness-based programs when addressing social aggression and impulsive interpersonal behaviors, while art therapy may be especially useful for facilitating emotional expression and self-understanding. Schools, rehabilitation centers, and counseling services can integrate these interventions into routine support programs, ensuring that activities are developmentally appropriate and adapted to children's communication needs. Combining experiential interventions with family and school collaboration may further enhance their effectiveness and sustainability.

Authors' Contributions

Authors equally contributed to this article.

Declaration

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In order to correct and improve the academic writing of our paper, we have used the language model ChatGPT.

Transparency Statement

Data are available for research purposes upon reasonable request to the corresponding author.

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Declaration of Interest

The authors report no conflict of interest.

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Ethics Considerations

The study protocol adhered to the principles outlined in the Helsinki Declaration, which provides guidelines for ethical research involving human participants.

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