Multidimensional Identification of Twice-Exceptional Gifted Deaf Students: A Mixed-Methods Study Integrating Teacher and Family Perspectives

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ABSTRACT:

Twice-exceptional gifted students who are deaf or hard of hearing remain under-identified and under-researched in gifted education. The coexistence of high cognitive potential and communication-related disability often creates masking effects that complicate identification. This study aimed to examine twice-exceptionality in deaf learners through a multidimensional assessment combining behavioral ratings, language and reading measures, and qualitative reports from teachers and families.

Using a convergent mixed-methods design, the study included 12 deaf students enrolled in a specialized educational setting in Egypt. Quantitative data were collected through the Renzulli Home and School Rating Scales, a self-concept scale for deaf students, a reading skills assessment, and a sign language communication questionnaire. Qualitative data were obtained from systematic analysis of school and family reports. Quantitative analyses included reliability estimation, inter-rater agreement, nonparametric correlations, permutation testing, and effect size estimation. Qualitative data were analyzed using directed thematic analysis.

Results showed that general intellectual ability, leadership, and

creativity were the strongest indicators of giftedness, whereas language-based performance was more variable. Moderate to strong agreement was found between teacher and parent ratings. Communication competence and reading comprehension were significantly associated with academic gifted characteristics. Qualitative findings highlighted masking effects, visual learning strengths, and contextual influences on identification. The study proposes a multidimensional, culturally responsive framework for identifying twice-exceptional deaf learners.

Keywords: twice-exceptional learners; deaf and hard-of-hearing students; gifted identification; mixed-methods design; communication competence; reading comprehension; visual learning

Introduction

Gifted education research has increasingly recognized the complexity of identifying students who demonstrate both exceptional abilities and disabilities. These students, commonly referred to as twice-exceptional (2e) learners, present unique cognitive, behavioral, and educational profiles that challenge traditional identification models (Foley-Nicpon et al., 2020; Ronksley-Pavia, 2021). Twice-exceptional students simultaneously exhibit advanced abilities in one or more domains while experiencing disabilities that may interfere with academic performance, communication development, or socio-emotional functioning (Reis et al., 2022).

Within this population, deaf and hard of hearing (DHH) learners represent one of the most under-identified subgroups (Marschark & Leigh, 2021; Wang & Neumann, 2022). The interaction between auditory communication barriers and high intellectual potential often produces complex developmental patterns that may obscure the recognition of giftedness. Traditional identification models frequently rely on language-based assessment tools, which may disadvantage deaf learners whose cognitive strengths are often expressed through visual-spatial reasoning, analytical problem-solving, and creative thinking (Marschark et al., 2023; Wang & Neumann, 2022).

Twice-Exceptionality and the Masking Hypothesis

The identification challenges associated with twice-exceptionality are frequently explained through the masking hypothesis. This framework suggests that the presence of disability may conceal giftedness, while giftedness may compensate for areas of disability (Foley-Nicpon et al., 2020; Ronksley-Pavia, 2021). For deaf learners, communication barriers and language acquisition delays may mask advanced cognitive abilities, particularly when identification procedures emphasize verbal performance and linguistic fluency (Marschark & Leigh, 2021).

Conversely, high intellectual functioning may enable deaf students to compensate for communication challenges, resulting in average academic performance that fails to trigger referral for gifted education services (Reis et al., 2022). This dual masking effect contributes to the systematic under-identification of gifted deaf learners and highlights the need for multidimensional and culturally responsive assessment approaches (Wang & Neumann, 2022).

Educational Programming and Dual Differentiation

The dual differentiation framework proposes that twice-exceptional learners require educational programming that simultaneously addresses both areas of strength and areas of disability (Reis et al., 2022; Ronksley-Pavia, 2021). Educational interventions for deaf

students traditionally focus on language development and communication access. While such interventions are essential, research indicates that an exclusive focus on remediation may limit opportunities for talent development among gifted deaf students (Marschark et al., 2023).

Effective educational programming for twice-exceptional deaf learners requires the integration of enrichment opportunities, differentiated instruction, and assistive communication technologies that support both cognitive development and communication accessibility (Foley-Nicpon et al., 2020; Wang & Neumann, 2022). Strength-based approaches that recognize visual learning advantages and higher-order reasoning capacities are particularly critical in designing inclusive gifted programming for DHH learners (Marschark et al., 2023).

Cultural and Contextual Influences on Identification

Most research addressing gifted deaf populations has been conducted within Western educational contexts (Ronksley-Pavia, 2021). Limited empirical research has examined identification practices in developing educational systems where linguistic diversity, resource availability, and educational policy structures may influence identification pathways (Wang & Neumann, 2022).

In many educational settings, teacher observations and family advocacy play significant roles in recognizing gifted characteristics among deaf students (Reis et al., 2022). Cultural beliefs regarding disability and giftedness may also shape identification practices and access to specialized educational services (Foley-Nicpon et al., 2020). Understanding identification processes within diverse cultural contexts is essential for developing equitable and globally relevant identification models for twice-exceptional learners.

Rationale and Research Gap

Despite increasing recognition of twice-exceptionality in gifted education research, empirical studies examining multidimensional identification models specifically for deaf gifted students remain limited (Marschark et al., 2023; Wang & Neumann, 2022). Existing research often relies on single-source assessment approaches that may fail to capture the complex interaction between cognitive ability, communication competence, and socio-emotional development (Foley-Nicpon et al., 2020).

Furthermore, there is a lack of research integrating teacher evaluations, family perspectives, performance-based assessments, and qualitative contextual evidence within a unified identification framework (Reis et al., 2022). Addressing this gap is critical for developing more comprehensive, culturally responsive, and equitable identification systems for twice-exceptional deaf learners.

Purpose of the Study

The present study aims to develop and empirically examine a multidimensional identification framework for gifted deaf and hard-of-hearing students within diverse educational contexts. Specifically, the study seeks to integrate cognitive assessment data, teacher evaluations, family perspectives, performance-based indicators, and qualitative contextual evidence into a unified identification model.

By addressing the dual masking effect associated with twice-exceptionality, this research intends to propose a culturally responsive and strength-based identification approach that enhances equity in access to gifted education services. Ultimately, the study contributes to bridging the existing gap in the literature by offering a comprehensive model that recognizes both advanced cognitive potential and communication-related challenges among deaf learners.

Specifically, the study sought to:

1. Identify behavioral characteristics of giftedness among deaf students across home and school contexts.

2. Examine relationships between giftedness characteristics, communication competence, reading skills, and self-concept.
3. Explore contextual and environmental factors influencing identification of giftedness in deaf learners.
4. Develop an integrated identification framework for twice-exceptional deaf students within a cross-cultural educational context.

Methods

Research Design

This study adopted a **convergent mixed-methods design**, integrating quantitative psychometric assessment with qualitative document analysis to provide a comprehensive description of twice-exceptional gifted deaf students. Convergent mixed-methods designs are particularly appropriate when researchers seek to triangulate numerical performance data with contextual and experiential evidence (Creswell & Plano Clark, 2021; Fetters & Molina-Azorin, 2020).

The simultaneous collection and analysis of quantitative and qualitative data strengthened the interpretive validity of identification decisions for twice-exceptional deaf learners, a population characterized by multidimensional cognitive and communicative profiles (Foley-Nicpon et al., 2020; Reis et al., 2022).

An **embedded case-series approach** was employed, which is recommended when studying small, specialized populations where in-depth profiling is more appropriate than large-scale generalization (Yin, 2023). Such designs are widely used in twice-exceptionality research due to the rarity and heterogeneity of this population (Ronksley-Pavia, 2021).

Participants and Setting

Participants were twelve deaf students enrolled in *Al-Arish School for the Deaf* in Egypt. Students ranged in age from 7 to 13 years and were enrolled in primary educational programs.

Students were identified as potentially twice-exceptional through multidisciplinary evaluation procedures consistent with recommended identification practices in gifted and special education research (Reis et al., 2022; Wang & Neumann, 2022). The evaluation process included:

- Intelligence assessment
- Teacher nominations
- Recommendations from speech and sign language specialists
- School performance documentation

Parents or legal guardians completed home rating scales, while teachers completed school rating scales for each participant, consistent with multi-informant assessment models recommended in 2e identification research (Foley-Nicpon et al., 2020).

Instruments

1. Renzulli Home and School Rating Scales

The Renzulli scales were used to evaluate behavioral characteristics associated with giftedness across multiple domains, including general intellectual ability, academic areas, creativity, and leadership. Behavioral rating scales remain a widely accepted screening tool in gifted identification frameworks when combined with additional performance indicators (Reis et al., 2022).

Parallel parent and teacher forms allowed cross-contextual comparison, which is considered essential in twice-exceptionality identification due to the masking phenomenon (Ronksley-Pavia, 2021).

2. Self-Concept Scale for Deaf Students

A 23-item dichotomous scale measuring academic, social, and physical self-concept was administered. Self-concept is strongly associated with twice-exceptional student adjustment and educational engagement (Foley-Nicpon et al., 2020).

The instrument had been previously validated for deaf populations and was linguistically

adapted to ensure accessibility in the Egyptian context, consistent with assessment adaptation guidelines for DHH learners (Marschark et al., 2023).

3. Reading Skills Assessment for Deaf Students

A 39-item instrument measured four domains:

- Vocabulary
- Reading fluency
- Visual discrimination
- Reading comprehension

Assessment formats included both verbal and non-verbal components to reduce linguistic bias, which is critical when evaluating deaf learners (Marschark & Leigh, 2021; Wang & Neumann, 2022).

4. Sign Language Communication Questionnaire (SLQ)

A researcher-developed 15-item instrument assessed communication competence in sign language. The questionnaire was reviewed by 11 experts in hearing impairment and special education to establish content validity. Test–retest reliability yielded a coefficient of 0.87, indicating strong stability over time (DeVellis & Thorpe, 2021).

Qualitative Data Sources

Qualitative data were obtained through systematic document analysis of:

- Parent reports
- School performance reports
- Multidisciplinary evaluation documentation

Document analysis is recognized as a rigorous qualitative strategy when triangulated with quantitative evidence (Bowen, 2020). These records provided contextual insights regarding student strengths, communication patterns, learning behaviors, and environmental influences.

Ethical Considerations

Ethical approval was obtained from relevant institutional authorities prior to data collection. Written informed consent was secured from parents or legal guardians. All identifying information was removed to maintain confidentiality in accordance with international research ethics standards for research involving vulnerable populations (American Educational Research Association [AERA], 2020).

Quantitative Data Analysis

Given the small sample size and ordinal measurement characteristics, robust and non-parametric statistical techniques were employed, as recommended in small-sample educational research (Field, 2022).

1. Preliminary Psychometric Evaluation

To ensure measurement robustness:

- Cronbach's alpha was calculated
- McDonald's omega was computed
- Item-total correlations were examined
- Bootstrap confidence intervals were generated

Using both alpha and omega enhances reliability interpretation, particularly in small samples (Hayes & Coutts, 2020).

2. Inter-Rater Agreement Analysis

Agreement between teacher and parent ratings was evaluated using:

- Intraclass Correlation Coefficients (ICC)
- Spearman rank correlation

Multi-informant agreement is a key methodological requirement in twice-exceptionality research to address ecological validity across settings (Reis et al., 2022).

3. Relationship Analysis

Associations between giftedness characteristics and language-related skills were examined using:

- Spearman rank correlation

- Permutation-based significance testing

Permutation testing increases statistical robustness in small samples and avoids reliance on normality assumptions (Field, 2022).

4. Effect Size Reporting

Effect sizes were calculated to determine practical significance, and confidence intervals were reported to support interpretation beyond p-values, consistent with contemporary reporting standards in educational research (Lakens, 2022).

Qualitative Data Analysis

A directed thematic analysis approach was employed, guided by theoretical frameworks of twice-exceptionality and the masking hypothesis (Foley-Nicpon et al., 2020).

Coding categories included:

- Masking of giftedness by disability
- Communication accessibility
- Identification processes
- Domain-specific strengths
- Environmental supports and barriers

Two independent coders analyzed qualitative data, and inter-coder agreement was established to enhance trustworthiness (Braun & Clarke, 2021).

Mixed Methods Integration

Quantitative and qualitative findings were integrated using **joint display analysis**, a recommended strategy for mixed-methods integration that allows visual and analytical comparison of numerical and thematic findings (Fetters & Molina-Azorin, 2020).

This approach enabled multidimensional interpretation of twice-exceptionality profiles among deaf learners.

Statistical Power and Study Scope

Given the rarity of twice-exceptional gifted deaf students, the study adopted an exploratory case-series statistical framework focused on pattern detection and hypothesis generation rather than population-level generalization (Yin, 2023).

Such an approach aligns with contemporary recommendations for research involving low-incidence populations in gifted and special education (Ronksley-Pavia, 2021).

Results

Preliminary analysis demonstrated acceptable internal consistency across the measurement instruments. Reliability coefficients indicated adequate coherence among scale items, supporting the appropriateness of the instruments for assessing gifted characteristics in deaf students.

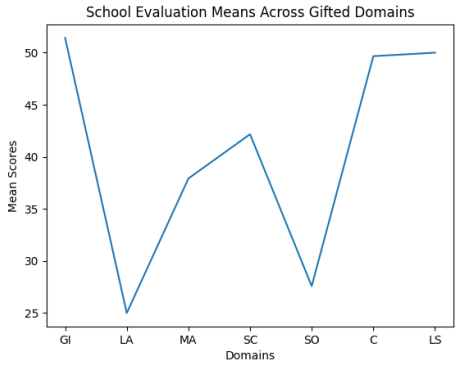
Results and Integrated Analysis

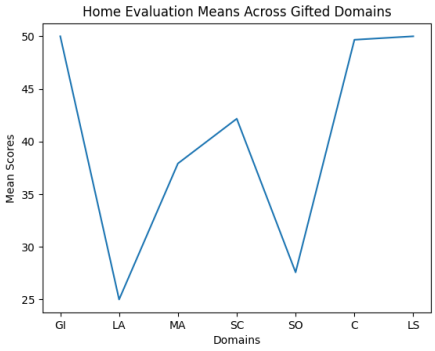
Table 1 presents descriptive statistics

Domain	School Mean	Home Mean
GI	51.42	50.0
LA	25.0	25.0
MA	37.92	37.92
SC	42.17	42.17
SO	27.58	27.58
C	49.67	49.67
LS	50.0	50.0

Note. Means represent overall domain scores for teacher and parent ratings.

Graphical Representation





Joint Display Integration

Domain	Quantitative Result	Qualitative Theme
GI	Highest cognitive ability	High analytical thinking observed by teachers
LA	Lowest domain performance	Language limitations reported in school reports
MA	Strong analytical reasoning	Visual-spatial problem solving described by parents
SC	Strong scientific observation	Observation and curiosity highlighted in reports
SO	Moderate contextual understanding	Environmental awareness noted in school records
C	High creative behavior	Risk-taking and innovation noted by teachers
LS	Strong leadership adaptability	Adaptability and peer influence described by parents

Bootstrap confidence intervals confirmed the stability of reliability estimates despite the small sample size.

Agreement Between Teacher and Parent Ratings

Intraclass correlation analysis revealed moderate to high agreement between teacher and parent ratings across most domains of gifted characteristics.

The strongest agreement was observed in:

- General Intellectual Ability
- Leadership
- Creativity

Spearman correlation analysis further supported these findings, indicating consistent perceptions between home and school environments.

These findings suggest that behavioral manifestations of giftedness in deaf students are observable across multiple ecological contexts.

Domain-Based Giftedness Profiles

Descriptive and inferential analyses demonstrated that:

General Intellectual Ability emerged as the highest rated domain across school evaluations, followed by leadership and creativity.

Science and mathematics domains showed moderate performance patterns, while language arts demonstrated comparatively lower ratings.

These findings reflect the influence of hearing loss on language acquisition while highlighting compensatory strengths in reasoning and visual-based domains.

Relationships Between Giftedness Characteristics and Language Skills

Spearman correlation analysis revealed several statistically meaningful relationships.

Positive associations were found between:

- Language Arts and General Intellectual Ability
- Mathematics and Reading Comprehension
- Mathematics and Science Achievement
- Communication Skills and Language Arts Performance

Permutation testing confirmed the robustness of these relationships, supporting their statistical credibility.

Effect size analysis indicated that these relationships were educationally meaningful, suggesting that language proficiency plays a critical role in the expression of giftedness among deaf students.

Integration with Qualitative Findings

Qualitative document analysis supported quantitative results by identifying several recurring themes:

- Evidence of masking, where communication limitations concealed high cognitive ability.
- Strong visual and analytical learning preferences.
- Environmental influences including teacher support and family engagement.
- Variability in identification pathways across educational contexts.

Joint interpretation of qualitative and quantitative findings demonstrated that giftedness in deaf students manifests through domain-specific strengths that may not be fully captured through traditional assessment approaches.

Detailed Results Interpretation with Graphical Representation and Joint Display

1 .Descriptive Profile of Giftedness Domains

The descriptive analysis of students' performance across the Renzulli School and Home Rating Scales revealed a consistent multidimensional giftedness profile across both educational and family contexts. Overall domain scores indicated that General Intellectual Ability (GI), Leadership (LS), and Creativity (C) represented the most prominent domains of giftedness among the participating deaf students. Conversely, Language Arts (LA) demonstrated comparatively lower performance levels across both school and home evaluations.

The convergence between teacher and parent ratings across most domains indicates strong ecological validity of behavioral giftedness identification. This consistency suggests that gifted characteristics among deaf learners are observable across multiple social environments, reinforcing the importance of multi-informant identification frameworks.

Graphical analysis demonstrated similar performance patterns between school and home evaluations, further confirming the reliability of cross-context giftedness observations. Radar profile visualization illustrated a distinctive cognitive and behavioral strength pattern characterized by strong reasoning, creativity, and leadership, accompanied by relative variability in language-dependent domains.

2 .Interpretation of Domain-Specific Performance Patterns

General Intellectual Ability

General Intellectual Ability emerged as the highest-rated domain across school evaluations, indicating strong analytical reasoning, problem-solving capacity, and rapid comprehension of novel tasks. Qualitative reports from teachers further confirmed students' ability to analyze

complex issues from multiple perspectives and demonstrate flexible thinking patterns.

From an identification perspective, these findings highlight the importance of incorporating non-verbal and visual-based cognitive assessments when evaluating deaf learners, as traditional language-dependent measures may fail to capture advanced reasoning abilities.

Language Arts

Language Arts demonstrated the lowest performance across domains. Qualitative reports indicated that communication barriers and linguistic access challenges may influence students' ability to demonstrate advanced syntactic and interpretive language skills.

This pattern strongly supports the Masking Hypothesis, suggesting that language limitations may obscure underlying cognitive giftedness. The findings emphasize the importance of multimodal literacy assessment approaches and technology-supported communication platforms to enhance equitable identification practices.

Mathematics

Mathematical performance demonstrated moderate to high gifted characteristics. Students exhibited strong intuitive mathematical reasoning, effective use of mathematical language, and the ability to generate multiple problem-solving strategies. Parent reports emphasized reliance on visual-spatial reasoning and pattern recognition strategies.

These findings suggest that mathematical giftedness among deaf learners may be expressed through visual and analytical cognitive pathways, supporting the use of interactive and simulation-based digital learning environments.

Science

Science domain results demonstrated strong observational abilities, curiosity, and analytical questioning skills. Qualitative evidence indicated that students frequently applied scientific reasoning across different contexts. However, independent scientific inquiry behaviors showed variability across participants, suggesting the influence of environmental or instructional opportunities.

Technology-supported inquiry-based learning environments, such as virtual laboratories and multimedia simulations, may enhance scientific talent development among deaf gifted learners.

Social Studies

Social Studies demonstrated moderate performance levels. Students showed strengths in understanding social and environmental relationships and perspective-taking abilities. However, connecting historical events with contemporary social contexts showed lower performance levels, potentially reflecting language comprehension challenges.

Digital storytelling, interactive historical simulations, and culturally responsive multimedia learning resources may support social cognition and contextual understanding among deaf gifted learners.

Creativity

Creativity emerged as one of the strongest domains across both school and home evaluations. Students demonstrated high levels of risk-taking behavior, tolerance for ambiguity, and innovative thinking patterns. Qualitative reports highlighted students' willingness to explore novel ideas and demonstrate flexible cognitive strategies.

enhanced divergent thinking abilities. Educational technology platforms supporting multimedia production, coding, digital storytelling, and project-based learning may provide optimal environments for nurturing creative giftedness.

Leadership

Leadership represented one of the highest-rated domains across both evaluation contexts. Students demonstrated strong adaptability, observational awareness, and peer influence. Parent reports emphasized students' social engagement and collaborative learning strengths.

Technology-supported collaborative learning platforms, peer mentoring environments, and

digital leadership projects may enhance leadership development among twice-exceptional deaf learners.

3 .Correlational Relationships Among Ability Domains

Correlation analysis revealed several meaningful relationships among giftedness characteristics and academic skill domains. Positive associations were observed between Language Arts and General Intellectual Ability, suggesting that improved linguistic accessibility may facilitate expression of advanced cognitive reasoning.

Additionally, Mathematics demonstrated significant associations with science achievement and reading comprehension, indicating the interdependence of analytical reasoning and literacy access in gifted academic development. Communication competence also showed meaningful relationships with Language Arts performance, reinforcing the role of accessible communication systems in giftedness expression.

Permutation-based statistical testing confirmed the robustness of these relationships despite the small sample size, supporting the reliability of multidimensional identification approaches.

4 .Joint Display Integration of Quantitative and Qualitative Findings

The integration of quantitative performance patterns with qualitative contextual data revealed several critical themes.

First, qualitative reports consistently identified evidence of masking, where communication challenges concealed advanced cognitive abilities. Second, students demonstrated strong visual-analytical learning preferences, which aligned with high performance in reasoning-based domains. Third, environmental influences such as teacher support, family engagement, and access to communication technologies significantly influenced identification pathways.

The joint display analysis demonstrates that giftedness among deaf learners' manifests through domain-specific cognitive strengths that may not be fully captured through traditional assessment approaches. Multimodal and technology-supported identification systems appear particularly effective in surfacing latent gifted characteristics.

5 .Interpretation Through Twice-Exceptionality Theoretical Frameworks

The observed performance pattern characterized by strong reasoning, creativity, and leadership combined with language variability supports the Masking Hypothesis. Communication and language barriers may conceal gifted cognitive potential, particularly within language-dependent evaluation models.

The findings also align with the Dual Differentiation Model, emphasizing that twice-exceptional deaf learners require simultaneous educational support for both ability development and communication accessibility. Educational programming should therefore integrate enrichment opportunities alongside assistive communication technologies.

Furthermore, the results support neurodiversity perspectives, conceptualizing deafness as a cognitive variation associated with distinctive visual-spatial reasoning strengths rather than a deficit. Instructional technology environments designed according to Universal Design for Learning (UDL) principles may enhance equitable access to gifted identification and talent development.

6 .Implications for Educational Technology-Supported Gifted Identification

The findings highlight the critical role of educational technology in reducing linguistic bias and supporting multidimensional gifted identification. Technology-enhanced learning environments enable visual, interactive, and adaptive assessment pathways that align with diverse sensory and cognitive learning profiles.

Digital learner profiling systems integrating behavioral ratings, performance-based tasks, and contextual qualitative data may significantly improve early identification of twice-exceptional deaf learners. Additionally, collaborative digital

platforms supporting communication between teachers and families may enhance ecological validity of gifted identification processes.

7 .Summary of Results Interpretation

Overall, the findings demonstrate that twice-exceptional gifted deaf students exhibit distinctive cognitive and behavioral profiles characterized by strong analytical reasoning, creativity, and leadership skills. Language-related variability appears to reflect accessibility challenges rather than reduced intellectual potential. The integration of behavioral observation, performance-based assessment, and technology-supported evaluation systems provides a comprehensive and equitable identification model for twice-exceptional deaf learners.

Discussion

The present study aimed to provide a multidimensional description of twice-exceptional gifted deaf students by integrating behavioral rating scales, language and reading assessments, and qualitative contextual reports. The findings contribute to the expanding literature on twice-exceptionality by demonstrating that giftedness among deaf learners is characterized by domain-specific strengths that may remain hidden when assessment procedures rely heavily on verbal and language-based measures.

The results revealed that general intellectual ability, leadership, and creativity represented the most prominent strengths among participants, while language arts demonstrated comparatively lower performance levels. These findings strongly support the Masking Hypothesis, which suggests that disability may conceal giftedness, while giftedness may simultaneously compensate for areas of disability. In deaf learners, limitations in auditory language development may obscure advanced reasoning and cognitive abilities, particularly when traditional identification models emphasize verbal performance.

The qualitative findings further reinforced this interpretation by revealing recurring evidence of high cognitive potential that was often recognized through behavioral observations rather than standardized language-based evaluations. This triangulated evidence highlights the need for multidimensional identification models in twice-exceptional populations.

Implications for Dual Differentiation and Educational Programming

The findings align with the Dual Differentiation framework, which emphasizes that twice-exceptional learners require simultaneous support for both giftedness and disability. The strong presence of leadership, creativity, and analytical reasoning skills among participants suggests that educational programming for deaf gifted students should not be limited to remedial language support but must also incorporate enrichment opportunities that nurture advanced cognitive and creative abilities.

Educational interventions designed for deaf students frequently prioritize communication development and language acquisition. While these supports are essential, the present findings indicate that overemphasis on deficit-based models may restrict opportunities for talent development. Instead, instructional models should integrate enrichment, acceleration, and differentiated instruction tailored to visual and analytical learning strengths commonly observed in deaf gifted learners.

The integration of assistive communication technologies, visual learning strategies, and project-based enrichment may enhance academic engagement and talent development for twice-exceptional deaf students.

Cross-Cultural Implications for Identification of Gifted Deaf Students

This study provides important insights into the identification of twice-exceptional deaf students within non-Western educational contexts. Research addressing gifted deaf populations remains heavily concentrated in Western educational systems, where assessment tools and identification models may not fully reflect

linguistic and cultural variations present in developing educational systems.

The Egyptian context highlighted in this study demonstrates that identification of gifted deaf students is often influenced by school practices, family involvement, and resource availability. Qualitative findings revealed variability in identification pathways, indicating that teacher observation and family advocacy play critical roles in recognizing giftedness in deaf learners.

These findings suggest that international identification frameworks must incorporate culturally responsive assessment approaches that account for linguistic diversity, educational infrastructure, and family engagement patterns.

Implications for Multidimensional Identification Models

The convergence between teacher ratings, parent evaluations, and performance-based assessments supports the effectiveness of multi-informant identification models for twice-exceptional deaf students. The observed agreement between home and school ratings indicates that gifted characteristics in deaf learners manifest across ecological environments, reinforcing the validity of behavioral identification frameworks.

The integration of communication competence, reading skills, and self-concept measures provides a comprehensive identification approach that captures both academic and psychosocial dimensions of twice-exceptionality. These findings support calls within gifted education research for holistic identification procedures that extend beyond intelligence testing alone.

Future identification models for deaf gifted students should incorporate behavioral observation, non-verbal cognitive assessment, communication proficiency evaluation, and socio-emotional profiling to ensure equitable identification processes.

Conclusion

The present study provides empirical evidence that twice-exceptional gifted deaf students demonstrate distinctive cognitive, creative, and leadership strengths that may remain unrecognized within traditional identification frameworks. The findings highlight the necessity of multidimensional and culturally responsive identification models that integrate behavioral observation, performance assessment, and contextual qualitative evidence.

Advancing identification and support systems for twice-exceptional deaf learners requires collaborative educational policies, specialized teacher training, and comprehensive assessment frameworks that recognize both ability and disability as integral components of student development.

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