

The level of autonomy among students enrolled in the gifted program in the Al-Ahsa region: An evaluative study

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Abstract

This study evaluates the efficacy of the Gifted Care Program implemented in public schools within the Al-Ahsa region of Saudi Arabia, with a dual focus on assessing its success in achieving predefined objectives and examining its impact on fostering independence among enrolled students. Utilizing a single-group experimental design (pre-test/post-test), the research involved a sample of 90 gifted students across four program levels, spanning grades six (primary) to nine (intermediate). The independent variable was the structured gifted program, while the dependent variable measured students' level of independence through a validated psychometric scale. Statistical analysis employed the non-parametric Wilcoxon signed-rank test, supplemented by effect size calculations, to account for potential non-normal data distribution and quantify the magnitude of observed changes. Results demonstrated statistically significant improvements in students' independence scores following program participation (p < 0.05) with a calculated effect size approximating 1.0—indicative of a robust practical impact according to conventional interpretive frameworks. These findings underscore the program's success in cultivating an educational environment tailored to gifted learners' cognitive and emotional needs, thereby enhancing critical thinking, creative problem-solving, and academic performance. The study further highlights the program's alignment with broader educational goals of nurturing autonomy and self-directed learning competencies among gifted populations. The outcomes advocate for sustained investment in specialized gifted programs, emphasizing their capacity to address unique student needs while contributing to national human capital development. Recommendations include longitudinal studies to assess long-term impacts and curricular refinements to optimize scalability and inclusivity. This research advances empirical understanding of gifted education in Saudi Arabia, offering actionable insights for policymakers and educators committed to fostering excellence in specialized learning frameworks.

Keywords: Affective learning outcomes, Autonomy, Evaluation, Gifted programs, Gifted.

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1. Introduction

The Kingdom of Saudi Arabia has demonstrated a sustained institutional commitment to advancing gifted education, as enshrined in its *Talent, Creativity, and Innovation Support Strategy and Plan*. This prioritization was further solidified during the 2008 Arab Education Ministers Conference in Riyadh, which culminated in the ratification of the *Arab Strategy for Talent and Creativity*. Central to these efforts are Ministry of Education-sponsored initiatives such as summer enrichment programs, which aim to address the multidimensional needs—cognitive, affective, and social—of gifted learners through tailored pedagogical interventions [1].

Despite substantial investments, critical questions persist among policymakers regarding the empirical efficacy of these programs and their longitudinal impact on participant development. While the Ministry employs routine quality assurance mechanisms via supervisory audits, extant evaluations remain narrowly focused on procedural compliance rather than holistic outcome assessment. This aligns with broader critiques of gifted education frameworks, wherein program evaluations frequently neglect rigorous methodologies such as quasi-experimental designs or longitudinal mixed-methods approaches Purcell and Eckert [2] and Avery and VanTassel-Baska [3]. Callahan [4] cautions that such oversight risks obscuring critical evidence of programmatic success or failure, as administrative priorities often favor incremental improvements over systematic impact analysis.

Within this context, fostering *autonomy* emerges as a pedagogically foundational objective. Conceptualized as the capacity for self-regulated learning, independent decision-making, and intrinsic motivation [5] autonomy is posited to catalyze the actualization of gifted potential. Effective programs operationalize autonomy through curricula emphasizing student-led inquiry, metacognitive reflection, and mastery of executive functioning skills such as goal articulation and temporal self-management [6]. These pedagogical strategies not only enhance domain-specific expertise but also cultivate psychosocial resilience, enabling gifted individuals to navigate tensions between academic rigor and socioemotional equilibrium [7].

The interdependence of autonomy and talent development underscores the imperative for evaluative frameworks that transcend conventional metrics of service delivery. Future research must integrate psychometrically robust measures of autonomy—spanning cognitive, affective, and behavioral domains—to elucidate its role in mediating program outcomes. Such an approach would align Saudi Arabia's gifted education initiatives with global best practices while addressing extant gaps in evidence-based policy formulation.

1.1. Fostering Autonomy in Gifted Programs: A Critical Focus

Developing Autonomy among students in gifted programs is vital, as it empowers them to manage their personal orientations and enhances their intellectual capabilities in advanced ways. This, in turn, strengthens their self-reliance and equips them to face future challenges effectively. The following points highlight the significance of prioritizing Autonomy in gifted education [8-11]:

- Enhancing Self-Regulation and Autonomy: Cultivating Autonomy enables gifted students to make decisions and organize their learning processes autonomously. Programs like Advanced Talent in Science and Mathematics foster this skill by teaching students to analyze ideas and independently work on scientific projects, bolstering their confidence in their abilities.
- Stimulating Creativity and Innovation: Independent learners are more likely to innovate. Enrichment programs such as Talent Skill Development create an environment that encourages students to develop and refine their ideas with minimal intervention, promoting critical and creative thinking.
- Preparation for Academic and Professional Futures: Autonomy equips gifted students with the flexibility and adaptability needed to navigate future academic and professional challenges successfully. These skills enhance their resilience in dynamic environments.
- Fostering Social and Psychological Responsibility:

Autonomy contributes to building a balanced personality capable of bearing responsibility, facilitating better adaptation to peers, and supporting personal and social success. Research indicates that social skills linked to Autonomy improve students' leadership abilities and their capacity to interact effectively with others.

The balance between cognitive, emotional, and social learning outcomes is pivotal in the design of gifted programs [12]. The interplay between these factors is central to the concept of talent, as most contemporary talent models emphasize that talent emerges from the interaction of cognitive, emotional, and social elements [5, 10, 11, 13-16].

Within this integrative framework of cognitive, emotional, and social aspects, the current research aims to highlight key outcomes that gifted programs should consider when designing and implementing their initiatives. These outcomes significantly impact the holistic development of gifted students. Accordingly, this study seeks to evaluate the gifted care program in public schools in the Al-Ahsa region to assess its success in achieving its intended objectives. The central research question driving this investigation is: *What is the effect of the gifted program on the level of Autonomy among gifted students participating in it in the Al-Ahsa region?*

1.2. Importance of the Study

Program evaluation is an organized process designed to generate information critical for making informed judgments about a program, documenting its necessity, and assessing its impact on participants. Sustained support from decision-makers for gifted programs requires evidence of the cognitive, emotional, and social outcomes these programs achieve. Providing such evidence demonstrates the positive and valuable effects of these programs on students' personalities and thinking styles.

This evaluation project is significant as it provides decision-makers and other stakeholders with essential insights into the outcomes of gifted programs. Autonomy is an especially important emotional outcome not only for gifted programs but also for education in general [17]. Despite its importance, this variable has not received adequate attention in Arab educational research, particularly in the field of gifted education. This study, therefore, addresses a critical gap in the literature, focusing on the role of gifted programs in fostering Autonomy among students.

1.3. Previous Studies

Autonomy constitutes a critical dimension in the developmental trajectory of gifted students, serving as a catalyst for self-regulated learning strategies and advanced analytical reasoning—attributes intrinsic to gifted cognition. A robust body of empirical research underscores the imperative of autonomy-supportive pedagogies in cultivating environments conducive to intellectual flourishing and exceptional academic performance. Snikkers-Mommer, et al. [18] posit that gifted learners exhibit heightened sensitivity to autonomy-enriched settings compared to neurotypical peers, with such environments correlating strongly with sustained cognitive engagement and mastery of complex subject matter. This aligns with findings by Baccassino and Pinnelli [19] who demonstrate that curricular frameworks emphasizing student agency foster significant gains in creative problem-solving capacities, thereby challenging conventional didactic models that prioritize instructor-led instruction over learner-centered approaches.

The nexus between autonomy and intellectual development extends beyond traditional classrooms. Calabrese and Capraro [20] analysis of STEM enrichment programs reveals that non-traditional learning contexts—such as project-based camps—amplify leadership competencies and metacognitive decision-making through collaborative peer dynamics. Such environments, characterized by iterative experimentation and peer-mediated feedback, engender self-reliance and systemic critical inquiry. Importantly, the benefits of autonomy transcend academic domains. Cheng, et al. [21] identify a bidirectional relationship between emotional self-regulation and independence, wherein gifted students' capacity to modulate affective states enhances perceived control over learning processes, thereby reinforcing self-efficacy. This psychodynamic interplay underscores the necessity of integrating socioemotional scaffolding within autonomy-oriented curricula.

Empirical evidence further delineates autonomy's role in holistic development. Gubbels and Runhaar [22] contend that structured independence initiatives—such as self-paced learning modules and time management protocols—equip gifted learners with transferable competencies to reconcile academic rigor with personal aspirations. In the Saudi context, Al-Jughaiman, et al. [23] document marked improvements in creative ideation and academic achievement among participants in specialized gifted programs, validating the cross-cultural relevance of autonomy-driven pedagogies. Collectively, these studies illuminate independence not merely as a skill but as a foundational pillar of gifted education, enabling learners to actualize latent potential and navigate multifaceted academic-social ecosystems.

The corpus of research converges on autonomy's dual function as both an educational objective and a developmental mechanism. By fostering self-determination, institutions empower gifted students to transcend rote academic proficiency, cultivating instead adaptive expertise and innovative thinking. To optimize outcomes, educators must reimagine curricula through the lens of autonomy—integrating flexible learning pathways, metacognitive reflection exercises, and collaborative problem-solving tasks. Future research should explore longitudinal impacts of autonomy-focused interventions on post-academic success, as well as culturally contextualized adaptations to address regional educational paradigms.

2. Theoretical Framework

Modern interactive models of talent conceptualize giftedness as a multidimensional construct encompassing both cognitive and affective mental factors [5, 10, 13-15, 24]. These models also highlight the significant role of social and environmental factors in nurturing talent within domains valued by society.

Many researchers in the field of gifted education view cognitive and affective aspects as inherently interconnected and interactive. The manner in which an individual cognitively approaches a task is influenced by, and simultaneously influences, their affective dimensions [25]. This dynamic interaction underscores the importance of emotional factors in talent development. As Tannenbuam [26] suggests, cognitive factors pertain to the mental powers and processes required to generate ideas, while non-cognitive factors include social and emotional characteristics that either facilitate or hinder the full realization of an individual's potential. Talent development, therefore, requires the integration of cognitive and non-cognitive factors, as ability alone is insufficient to ensure achievement. This interplay highlights the necessity of designing gifted programs that integrate cognitive and emotional aspects effectively.

Developing Autonomy among gifted students is a core objective of summer talent programs [1] and a fundamental goal of general and higher education [17]. The importance of Autonomy, particularly during adolescence, has been emphasized in numerous studies Ryan [27]; Baltes and Silverberg [28]; Collins and Repinski [29]; Koestner and Losier [30]; Silverberg and Gondoli [31] and AlAli and Saleh [32]. According to Hughes [17] Autonomy can be categorized into two types: logical Autonomy, which focuses on the development of logical thinking, and personal Autonomy, which centers on self-awareness and emotional maturity.

Allen [33] defines personal Autonomy as an aspect of emotional maturity encompassing self-reliance, the ability and desire to self-regulate, and the capacity to bear personal responsibility without reliance on others. Researchers such as Fenner King Abdulaziz and His Companions Foundation for Giftedness and Creativity [1]; Hughes [17] and Mele [34] refer to this concept as "self-governance," which includes traits like self-confidence and self-efficacy. Chickering and Reisser [35] in their theory of Autonomy, propose that personal Autonomy consists of three dimensions: emotional Autonomy, functional Autonomy, and Autonomy from others. Emotional Autonomy develops through freedom from parental control, peer interactions, and ultimately personal decision-making. Functional Autonomy refers to self-direction and the ability to undertake meaningful personal endeavors.

Noom [36] after reviewing related literature, identified three dimensions of Autonomy: Orientation Autonomy (awareness of personal goals), Emotional Autonomy (confidence in one's uniqueness), and functional Autonomy (strategies for self-organization and control). These dimensions were later confirmed through empirical research [37].

Autonomy is a central objective in most gifted education programs [38-40]. The *Autonomous Learner Model* by Betts [38] and Betts and Kercher [39] is a comprehensive program specifically designed to develop independent learners and has been widely implemented in schools and districts across the United States and Canada. This model has significantly influenced gifted education, helping students take ownership of their learning while fostering positive self-concepts, enhancing social skills, and expanding knowledge across academic fields.

The Autonomous Learner Model comprises five main components: guidance, personal development, enrichment activities, research circles, and in-depth study:

- Guidance: Introduces students, teachers, and parents to the principles of gifted education and the model's components, helping students understand the program's benefits.
- Personal Development: Focuses on cultivating skills, attitudes, and concepts that encourage self-directed learning and sustained Autonomy.
- Enrichment Activities: Allows students to explore specific topics of interest, leading to investigative and researchbased outcomes.
- Research Circles: Engages students in collaborative research projects, culminating in individual presentations to peers.
- In-Depth Study: Enables students to pursue individual or small-group projects of interest, involving decisions on learning goals, required resources, final outputs, and evaluation methods. This component represents the pinnacle of independent learning.

Autonomy in orientation, emotions, and behavior is a critical factor in shaping individuals capable of self-regulation, life planning, and goal formulation. By fostering Autonomy, gifted programs equip students to develop a mature vision for their future, preparing them to navigate academic, personal, and professional challenges with confidence and resilience.

2.1. Research Hypothesis

There is a statistically significant effect of the gifted program on developing the level of Autonomy among gifted students participating in it in the Al-Ahsa region. In other words, there is a statistically significant difference in the rank-related statistical parameters between the pre-test and post-test in favor of the post-test.

3. Methodology

This study employed a quasi-experimental one-group pre-test/post-test design. The gifted programs in the Al-Ahsa region served as the independent variable, while the level of Autonomy among gifted students constituted the dependent variable.

3.1. Participants

The study sample comprised 90 gifted students enrolled in the gifted care program at a center in the Al-Ahsa region. All participants voluntarily took part in both the pre-test and post-test evaluations.

3.2. Instrument

3.2.1. Autonomy Scale

The current study utilized the *Autonomy Scale* [37] a self-report questionnaire comprising 15 items that assess an individual's capacity for self-regulation in personal life. The scale consists of three sub-dimensions:

- 1. Orientation Autonomy: Reflecting the individual's awareness of personal goals through opportunities and desires.
- 2. Emotional Autonomy: Reflecting the individual's confidence in their uniqueness and self-reliance.
- 3. Functional Autonomy: Reflecting the individual's understanding of strategies for self-organization and control.

Each sub-dimension includes five items. Participants respond using a Likert scale with five options: *Applies completely* (5 points), *Applies* (4 points), *Somewhat applies* (3 points), *Does not apply* (2 points), and *Does not apply at all* (1 point).

The scale was translated and refined after being reviewed by a panel of experts. It was administered to a pilot sample of 50 students enrolled in a gifted care program in the Madinah region. These participants were distributed across the program levels as follows: 15 in level one, 12 in level two, 15 in level three, 5 in level four, and 3 in level five.

3.3. Psychometric Properties

• Reliability:

Cronbach's alpha coefficients were calculated for the overall score and for each sub-dimension. The reliability coefficients for each sub-dimension, with and without the removal of individual items, are shown in Table 1.

Orientation autonomy		Emotional	autonomy	Functional autonomy		
Item	Alpha coefficient	Item	Alpha coefficient	Item	Alpha coefficient	
1	0.753	6	0.517	11	0.581	
2	0.731	7	0.515	12	0.545	
3	0.814	8	0.599	13	0.559	
4	0.725	9	0.590	14	0.519	
5	0.708	10	0.494	15	0.557	
Total	0.789	Total	0.600	Total	0.608	

 Table 1.

 Cronbach's alpha coefficients for the autonomy scale.

• Validity:

The validity of each item was calculated by correlating its score with the total score of its respective subdimension, excluding the item itself. All correlations were statistically significant, except for item 3, which was both unreliable and invalid (Table 2).

Table 2.

Correlations between item scores and sub-dimension scores (Excluding the Item).

Orientation autonomy		Emotional autonomy		Functional autonomy	
Item	Corr. coefficient	Item	Corr. coefficient	Item	Corr. coefficient
1	0.557**	6	0.515**	11	0.404**
2	0.653**	7	0.513**	12	0.479**
3	0.243**	8	0.455**	13	0.542**
4	0.639**	9	0.464**	14	0.532**
5	0.682**	10	0.543**	15	0.459**
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Note: ** Statistically significant ($p \le 0.05$).

After excluding item 3, the overall reliability of the scale and its sub-dimensions was re-evaluated using Guttman's reliability coefficient. Table 3 presents the results.

Table 3.

Correlations between sub-dimensions and total score of the autonomy scale.

Dimension	Correlation with total score	Guttman's reliability coefficient		
Orientation autonomy	0.878**	927.0		
Emotional autonomy	0.897**	579.0		
Functional autonomy	0.740**	647.0		

Note: ** Statistically significant ($p \le 0.05$).

3.4. Conclusion on Instrument Suitability

The psychometric properties of the *Autonomy Scale* meet the necessary criteria for validity and reliability, making it a suitable tool for assessing Autonomy among the gifted student sample.

4. Results

4.1. Research Hypothesis

There is a statistically significant effect of the gifted program on developing the level of active open-minded Autonomy among gifted students participating in it in Madinah, indicating a significant difference in the statistical rank parameters between the pre-test and post-test in favor of the post-test.

To test this hypothesis and examine the program's effect on Autonomy, representing one of the program's affective learning outcomes, the Wilcoxon Signed-Rank Test was applied, which is a statistical technique used to assess differences between groups without assuming a normal distribution of data. This test is characterized by its flexibility in dealing with data that may not follow a Gaussian distribution, making it an ideal choice for many studies, especially in the fields of social sciences and education. This test was used to analyze the scores of students on the *Autonomy Scale* during the pretest and post-test phases to determine whether the distribution of scores significantly differed. The three dimensions of the test (Orientation Autonomy, emotional Autonomy, and functional Autonomy) and the total score were analyzed separately. This study distinguishes itself from prior research through the application of the Wilcoxon test, a non-parametric statistical method that enables the analysis of data without the assumption of normal distribution, thereby enhancing the robustness and reliability of the findings. Unlike studies that rely on parametric tests or one-time measurements, this approach is particularly suited for examining differences in repeated measurements within the same group, offering a more nuanced understanding of the effects of interventions over time. Furthermore, the study is grounded in real-world data, ensuring that its findings are not only statistically sound but also practically relevant and applicable to educational contexts. This combination of methodological rigor and practical relevance advances the field by providing actionable insights that can inform and improve educational practices.

Table 4.

Effect	Effect	Statistical	Z value	Rank sum	Mean	Ν	Ranks	Dimension
strength	size	significance			ranks			
Very strong	0.964	0.0001	7.397	3371.00	46.18	73	Positive	Orientation
				115	11.50	10	Negative	autonomy
Very strong	0.967	0.0001	5.727	3066.50	45.77	67	Positive	Emotional
				305.50	29.62	17	Negative	autonomy
Very strong	0.965	0.0001	6.842	3179.50	46,08	69	Positive	Functional
				223.50	17.19	13	Negative	autonomy
Very strong	0.959	0.0001	7.643	3794.50	48.03	79	Positive	Total score
				121.50	13.50	9	Negative	

Wilcoxon test results for autonomy across pre-test and post-test

4.2. Findings

As shown in the Table 4, the differences between the pre-test and post-test across the dimensions of the *Autonomy Scale* (Orientation, emotional, and functional Autonomy) and the total score are statistically significant ($p \le 0.0001$) in favor of the post-test. This indicates that the gifted program had a positive impact on improving and increasing Autonomy levels. The effect size approaches one, reflecting a very strong effect according to the equation used.

These findings confirm the validity of the hypothesis, indicating that the program significantly influenced the development of Autonomy in all three dimensions—Orientation, emotional, and functional.

4.3. Supporting Evidence

The results align with numerous indirect studies aimed at evaluating gifted programs and their role in enhancing affective outcomes.

- 1. Delcourt, et al. [41]: This study examined cognitive and affective learning outcomes of gifted programs in elementary schools, comparing students enrolled in gifted programs, gifted students not enrolled, and non-gifted students. Statistically significant differences were found in cognitive and affective variables. Specifically, gifted students in private schools achieved higher academic performance than their peers not enrolled in gifted programs.
- 2. Ibrahim [42]: The only study to examine affective learning outcomes of summer talent programs. The findings demonstrated statistically significant positive effects of summer talent programs on decision-making skills and causal attribution styles, indicating improvements in these areas among participating students.
- 3. Al-Jughaiman, et al. [23]: A study evaluating gifted programs in Saudi Arabia revealed statistically significant positive effects on achievement motivation and attitudes toward learning among gifted children participating in the programs.

4.4. General Implications

Overall, research on the evaluation of gifted programs indicates diverse impacts on cognitive and affective learning outcomes. These programs provide high-ability students with opportunities to learn alongside peers with similar interests and abilities in a challenging educational environment. This contributes to enhanced achievement motivation, increased academic performance, and the development of critical and creative thinking skills.

5. Conclusion

The findings of this study demonstrate a statistically significant positive effect of the gifted program on fostering multifaceted independence among enrolled students, operationalized through three core dimensions: directional autonomy (goal-oriented decision-making), socioemotional regulation (self-awareness and resilience), and functional self-efficacy (practical skill application). Post-intervention assessments revealed marked improvements across all domains (p < 0.05), underscoring the program's efficacy in aligning pedagogical strategies with its foundational objectives. These outcomes corroborate extant literature emphasizing the role of specialized gifted programs in cultivating environments that synergistically enhance cognitive rigor, emotional intelligence, and creative agency—factors directly linked to elevated academic performance and adaptive problem-solving competencies.

Notably, the consistency of these results with prior empirical work—such as studies highlighting the interplay between structured autonomy and critical thinking development—reinforces the paradigm shift toward learner-centered frameworks in gifted education. By prioritizing self-determination and metacognitive reflection, the program exemplifies how tailored interventions can transcend conventional academic metrics to nurture holistic intellectual and psychosocial growth.

These insights hold critical implications for educational policymakers and practitioners, advocating for the scalability of such programs and the integration of autonomy-focused curricula across diverse learning contexts. Future research should explore longitudinal trajectories of independence development and cross-cultural adaptations to optimize relevance within global educational ecosystems.

5.1. Research Recommendations

- 1. While the study results highlight the strong impact of the gifted program on shaping gifted students' personalities, including their cognitive aspects, personal traits, and social skills, the researcher emphasizes the importance of considering the gifted students' opinions regarding the program content. This feedback can help identify positive and negative aspects and improve the program and its facilitators in alignment with the abilities and potential of the gifted.
- 2. Incorporate feedback from program implementers to enhance the programs and explore their potential extension to university-level education.
- 3. Engage gifted students in designing programs tailored to their diverse personal dimensions and in fostering their multiple and varied intelligences.
- 4. Investigate the impact of these programs on achieving mental well-being and fulfilling gifted students' needs for knowledge and understanding.
- 5. Explore the influence of non-traditional learning environments, such as STEM camps, extracurricular activities, and interactive digital platforms, on developing Autonomy.
- 6. Examine the relationship between emotional intelligence and Autonomy among gifted students and ways to enhance it through educational programs.
- 7. Study individual differences in gifted students' Autonomy needs based on their age, culture, and social environment.
- 8. Analyze the long-term impact of Autonomy-promotion programs on academic performance, creativity, and personal growth.
- 9. Utilize digital learning tools to enhance Autonomy, such as educational applications that encourage self-directed learning and project management.

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