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Developing a Model for Identifying Student Talents with a Qualitative Study Approach

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A B S T R A C T

Purpose: The objective of this study is to develop a comprehensive model for identifying student talents.

Methods and Materials: This study used a qualitative research approach, involving semi-structured interviews with 24 students from gifted schools in Zanjan, Iran. The participants were selected through purposive sampling. Data were collected and analyzed using grounded theory and inductive coding. MAXQDA software was employed to assist in organizing and analyzing the qualitative data, leading to the extraction of open, axial, and selective codes that informed the development of the talent identification model.

Findings: The study identified four primary factors influencing talent identification: individual, school, family, and social. Among these, school factors, particularly human resources (teachers, mentors), were found to be the most significant. Individual factors, such as internal and external motivation, also played a crucial role, with internal motivation being the more prominent driver of talent development. Family involvement, particularly parental support, was another key contributor, while social factors, including peer relationships, were found to be less influential but still relevant in specific contexts like sports and group activities.

Conclusion: The findings suggest that talent identification is a multifaceted process influenced by a combination of individual, school, family, and social factors. School resources, including teacher support and extracurricular opportunities, are critical in fostering student talent. The study underscores the need for schools to provide equitable access to resources and teacher training to ensure that all students, particularly those from underrepresented backgrounds, have the opportunity to develop their talents.

Keywords: *Talent, Talent Management, Students, Talent Identification Model.*

1. Introduction

Talent identification and development have become increasingly important in education and various fields, including sports, business, and the arts. The process of identifying and nurturing talented individuals is critical to fostering future leaders, innovators, and highly skilled professionals who can contribute to society in meaningful ways. Across different sectors, a growing body of research has focused on developing effective strategies to identify talent early and provide the necessary support for its cultivation (Andersen, 2014; Blumen, 2013). The literature reveals a variety of approaches and frameworks, each tailored to the unique requirements of specific domains such as education, sports, and industry (Aujla et al., 2014; Burgess & Naughton, 2010; Faber et al., 2021; Ofem, 2023; Wang et al., 2024).

In the context of education, identifying talented and gifted students has long been a priority, with various methods proposed to enhance the identification process and ensure that these students receive the appropriate resources to reach their potential (Albrahim, 2020; Drigas et al., 2022). Early identification is essential because it allows educators to implement targeted programs and interventions that can help students develop their abilities from a young age (Siegle et al., 2016). However, the challenge lies in accurately recognizing talent, especially when it comes to underrepresented groups and those from disadvantaged backgrounds (Anderson, 2020; Arnstein, 2023). Asplund (2019) highlights the role of professional identification in shaping employees' reactions to talent management, which could similarly apply to educational settings where students' self-perception is influenced by their recognition as talented individuals.

Visual-spatial ability, for instance, is an often-overlooked aspect of talent, especially in gifted education. Andersen (2014) notes that despite its importance in STEM fields, visual-spatial skills are frequently ignored in the process of identifying gifted students (Andersen, 2014; Rajaeinia, 2022). This is a crucial oversight, as STEM-related talent is critical for the advancement of science, technology, engineering, and mathematics, fields that are essential for innovation and national development (Lynch, 2019). The identification of such talents requires a more nuanced and inclusive approach that takes into account the diverse skills and competencies that students may possess (Gubbins et al., 2020; Rasmussen & Lingard, 2018).

The importance of talent identification is not limited to academic settings; it is also critical in sports, where early recognition of athletic talent can lead to focused training and development, potentially resulting in successful professional careers (Burgess & Naughton, 2010; Reeves et al., 2018). Studies have explored the factors affecting talent identification in various sports, such as football (Larkin & Reeves, 2018) and basketball (Hadian et al., 2016), emphasizing the need for comprehensive evaluation tools that can capture the wide range of abilities athletes may demonstrate. Social media mining has also emerged as a novel method for identifying sports talents, as Davcheva (2014) notes, allowing scouts and coaches to track young athletes' progress and performance on a global scale (Davcheva, 2014).

Beyond sports and education, talent management is also a key concern in the business world, where organizations strive to identify, develop, and retain highly skilled employees (Annakis et al., 2014; Hafez et al., 2017). The role of line managers in spotting and nurturing talent is critical, as they are often the first to recognize the potential in their employees (Blanco & Golik, 2021). However, there is often a gap between recognizing talent and effectively developing it within organizations, as noted by Lotfi et al. (2019) in their study of talent management systems. This gap can result in talented individuals leaving the organization or failing to achieve their full potential (Lotfi et al., 2019).

The intersection between education and talent management is particularly evident in higher education, where universities play a crucial role in identifying and fostering talent among students (Leikuma-Rimicāne et al., 2022). Studies have highlighted the importance of creating a conducive environment for talent development in academic settings, where students can be nurtured through personalized education and mentorship programs (Romiani et al., 2021). Universities, especially those involved in cutting-edge research, are key players in shaping the talent pool that will drive future innovations in various fields (Li, 2023; Wei, 2023).

However, challenges remain in ensuring equitable access to talent identification programs, particularly for students from marginalized communities. Anderson (2020) and Arnstein (2023) emphasize that systemic barriers often prevent students of color, low-income students, and those with disabilities from being recognized as gifted or talented (Anderson, 2020; Arnstein, 2023). These students may be overlooked due to biases in the identification process, which often favors students from more privileged backgrounds

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(Gubbins et al., 2020; Siegle et al., 2016). This issue is particularly pressing in the context of global talent development, where nations are increasingly reliant on a highly skilled workforce to remain competitive in the global economy (Roudgar & Kanagasundram, 2018; Woolcock & Burke, 2013).

In sports, talent identification practices have evolved over time, with an increasing focus on developing a holistic understanding of an athlete's potential, beyond just physical capabilities (Gray & Plucker, 2010). Reeves et al. (2018) argue that factors such as psychological resilience, motivation, and the ability to perform under pressure are equally important in predicting long-term success (Reeves et al., 2018). This aligns with the findings of Croston (2013), who revisited physical education teachers' perceptions of talent in sports, noting that traditional metrics of physical ability are often inadequate in capturing the full spectrum of talent in young athletes (Croston, 2013).

The integration of technology into talent identification processes has also been a significant development in recent years. Wiblen et al. (2012) discuss the role of technology in talent identification, particularly in its ability to streamline and enhance the evaluation process (Wiblen et al., 2012). This is particularly relevant in large organizations or institutions, where managing and tracking the development of multiple talented individuals can be challenging. The use of data analytics, artificial intelligence, and other technological tools can help decision-makers identify patterns and predict future performance, thereby making the talent identification process more efficient and accurate (Lowman, 2016).

Furthermore, the role of teachers and educators in identifying and nurturing talent cannot be overstated. Vrabie and Crețu (2018) highlight the importance of teachers as promoters of values in education for talented students, emphasizing that the relationship between teacher and student plays a crucial role in the latter's development (Vrabie & Crețu, 2018). Teachers are often the first to recognize a student's potential and can provide the support and encouragement needed to cultivate that talent. However, as Arnstein (2023) points out, many teachers lack the training necessary to identify and support underrepresented gifted students, which can result in these students not receiving the attention they need to thrive (Arnstein, 2023).

In summary, talent identification is a complex, multidimensional process that spans various fields, from education to sports to business. It requires a holistic approach that takes into account the diverse abilities and potential of individuals, as well as the systemic challenges that may hinder the recognition and development of talent. By integrating insights from multiple disciplines and utilizing modern technology, educators, coaches, and managers can more effectively identify and nurture talent, ensuring that individuals reach their full potential and contribute meaningfully to society. This process is not without its challenges, but with the right tools and strategies, the future of talent development looks promising. Thus, this study aims to develop a comprehensive model for identifying student talents.

2. Methods and Materials

In general, data collection methods in research can be classified as either quantitative or qualitative. In quantitative research, the collected data can be analyzed using statistical language. However, in qualitative research, quantitative scales are often insufficient or sometimes impossible to use for data analysis. While quantitative research typically utilizes four types of measurement scales (nominal, ordinal, interval, and ratio), qualitative research deals with non-numerical data. In qualitative research, the data consist of concepts that are embedded within the collected information and are extracted and discovered through specific scientific procedures. Quantitative research is often grounded in a scientific theory, and hypotheses or research questions are formulated based on that theory. Data are then collected accordingly. In contrast, qualitative research is frequently theory-free, and the analysis of the data leads to the emergence of a theory. It is important to note that no research can be exclusively categorized as purely quantitative or qualitative. Both approaches support one another. When the collected information is not quantitative, it is referred to as qualitative research, and when the collected information is qualitative, it is referred to as qualitative research. There is also a theory that combines both qualitative and quantitative methods, referred to as mixed methods research. In mixed methods research, quantitative data are typically collected either before or after qualitative research, or even simultaneously, to enhance the quality of the qualitative analysis and conclusions.

As the results of research often lead to new understandings of the phenomena being studied, understanding the nature of knowledge and the nature of the phenomenon is critical before delving into the research methodology. Since this study focuses on managerial issues and examines human behavior, it cannot strictly adhere to

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any specific paradigm from a theoretical or philosophical perspective. While positivism, which largely supports quantitative research methods, has dominated most previous research, human behavior is complex and cannot be exclusively studied through quantitative methods. Therefore, research on human subjects often relies on the interpretivism paradigm.

This study is applied in nature and follows a qualitative approach. To determine the research sample, data on high school students from the General Directorate of Education in Zanjan province were obtained. Following this, purposeful sampling was employed through brief conversations with the principals of gifted schools, resulting in the selection of 24 students who were invited to participate in an initial interview session.

In this research, the method of member checking was used to confirm the validity of the findings. For this purpose, the researcher provided a portion of the findings to the study participants and asked them to review the analysis and answer whether the researcher had accurately interpreted their statements and whether the analysis made sense to them. Additionally, the researcher asked some of the interviewees to review the first-stage analysis report or the identified categories and share their thoughts.

To calculate the reliability of the coding process, the test-retest reliability method was used. Three interviews were selected from the conducted interviews (interviews M3, M6, and M9) as a sample, and each was re-coded by the researcher after a short and specific time interval. The identified codes were then compared across the two time intervals for each interview. The test-retest method is employed to assess the stability of the researcher's coding. Codes that were consistent across the two time intervals were marked as agreements, and inconsistent codes were marked as disagreements. The following formula was used to calculate the reliability:

For the reliability calculation of the coding process, the test-retest method was used. From the interviews conducted, three interviews (M3, M6, M9) were selected as samples, and each was re-coded by the researcher after a short, defined interval. The identified codes were then compared for consistency across the two intervals for each interview.

3. Findings and Results

Table 1 shows that 477 codes were extracted: 75 codes in individual factors (external motivation and internal motivation), 352 codes in school factors (school human resources, extracurricular activities, textbooks, educational equipment and facilities, school environment), family factors (parents, other family members), and social factors (social interactions, peers).

Table 1

Extracted Codes Output in MAXQDA Software

Selective Codes	Axial Codes	Open Codes (Total)
Individual Factors	External motivation (14 codes)	75 codes
	Internal motivation (61 codes)	
School Factors	School human resources (150 codes)	352 codes
	Extracurricular activities (29 codes)	
	Textbooks (50 codes)	
	Educational equipment and facilities (94 codes)	
	School environment (29 codes)	
Family Factors	Parents (20 codes)	31 codes
	Other family members (11 codes)	
Social Factors	Social interactions (15 codes)	19 codes
	Peers (4 codes)	

The research model was developed based on the codes extracted from the interviews with students in the MAXQDA software. The model reveals that four factors influence the identification of student talents.

Factor 1: Individual Factors, identified through two criteria: external motivation and internal motivation.

Factor 2: School Factors, identified through five criteria: human resources in school, educational equipment, textbooks, extracurricular activities, and school environment.

Factor 3: Family Factors, covering parents and other family members.

Factor 4: Social Factors, including social institutions and peers.

To further analyze the first research question, the identified factors and their criteria were presented to the

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same students who participated in the interviews for ranking. After collecting the data, the results were analyzed using non-parametric statistics and the Friedman test, and the findings are described in the following tables.

Table 2

Friedman Test: Average Ranking of Human Factors

Human Factors	Mean Rank	Rank
Parents	1.18	1
Teachers	2.64	2
Friends	3.55	3
Principals	5.36	4
Assistants	5.91	5
Siblings	6.00	6
Counselors	6.27	7
Relatives	7.00	8
Coaches	7.09	9

Note: T-test results: Frequency = 11, χ^2 (df = 8) = 50.206, p < .000.

The descriptive statistics in Table 2 show the average ranks of the variables related to human factors. The smaller the mean rank, the higher the importance of the variable. Therefore, parents, teachers, and friends were ranked first, second, and third, respectively. The T-test confirmed that the differences in rankings were statistically significant, with a chi-square value of 50.206, 8 degrees of freedom, and a significance level of less than 5%.

Table 3

Friedman Test for Ranking Environmental Factors

Environmental Factors	Mean Rank	Rank
Family	1.45	1
School	1.82	2
Society	3.27	3
Virtual Space	3.45	4

Note: T-test results: Frequency = 11, χ^2 (df = 3) = 20.236, p < .000.

Table 3 shows the average ranks of environmental factors, with family, school, and society ranked first through third, respectively. The T-test revealed significant differences in rankings, with a chi-square value of 20.236, 3 degrees of freedom, and a significance level of less than 5%.

Table 4

Friedman Test for Ranking Facility Factors

Facility Factors	Mean Rank	Rank
Libraries	1.27	1
Laboratories	2.91	2
Sports Halls	3.09	3
Workshops	3.45	4
Technology Sites	4.27	5

Note: T-test results: Frequency = 11, χ^2 (df = 4) = 21.236, p < .000.

Table 4 presents the average ranks of facility factors, with libraries ranked first, followed by laboratories and sports halls. The T-test indicated significant differences in rankings, with a chi-square value of 21.236, 4 degrees of freedom, and a significance level of less than 5%.

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Table 5

Friedman Test for Ranking Textbook Factors

Textbook Factors	Mean Rank	Rank
Supplementary Books	1.73	1
Ministry Textbooks	2.14	2
Non-Textbooks	2.86	3
SAMPA Complementary	3.27	4

Note: T-test results: Frequency = 11, χ^2 (df = 3) = 9.716, p = .021.

In Table 5, the average ranks of textbook factors show that supplementary books were ranked first, followed by ministry textbooks. The T-test demonstrated statistically significant differences in rankings, with a chi-square value of 9.716, 3 degrees of freedom, and a significance level of .021.

Table 6

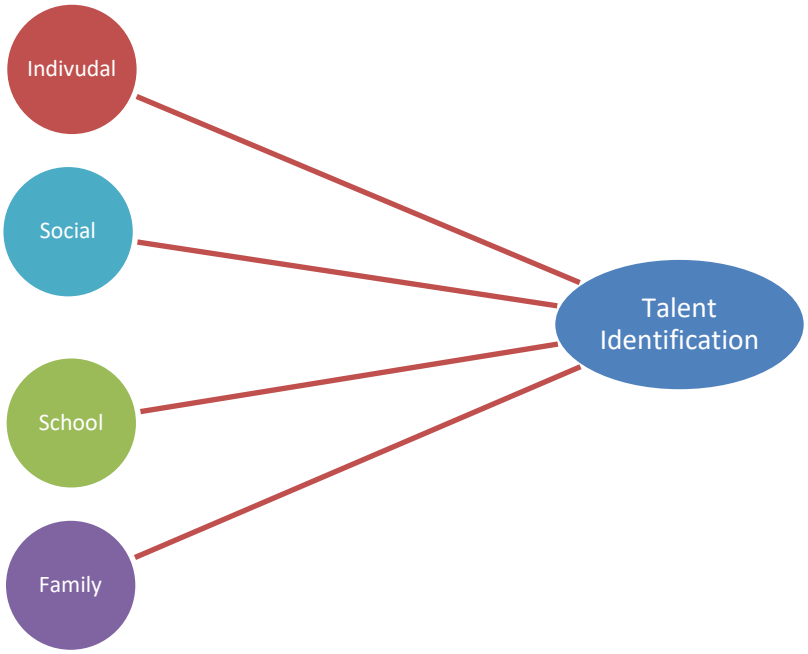
Comparison of Identified Components

Factors	Code Frequency	Percentage
Individual	75	16%
School	352	74%
Family	31	6%
Social	19	4%
Total	477	100%

Table 6 compares the frequency and percentage of the identified components. School factors accounted for 74%, followed by individual factors (16%), family factors (6%), and social factors (4%). This analysis underscores the dominance of school-related factors in the talent identification process based on the qualitative study conducted.

Figure 1

Conceptual Model of the Study



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4. Discussion and Conclusion

The results of this study provide valuable insights into the factors that influence the identification of student talents in various contexts, particularly in gifted education and sports. The four primary factors identified—individual, school, family, and social—each play a significant role in shaping how talent is recognized and nurtured. The findings align with a body of existing research on talent identification and development, reinforcing the importance of a multi-faceted approach that considers the diverse influences on student potential.

The study highlights that both internal and external motivations significantly contribute to talent identification, with internal motivation being the more prominent factor. This finding is consistent with previous research, which emphasizes the importance of intrinsic motivation in talent development, particularly in gifted and talented students. Studies by Andersen (2014) and Drigas et al. (2022) argue that students who are internally motivated tend to engage more deeply with their learning environments and are more likely to excel in areas where they exhibit talent. Moreover, Albrahim (2020) highlights that intrinsic motivation is crucial for the sustained development of gifted students, particularly in academic settings where personal interest drives learning. The prominence of internal motivation in this study suggests that educators need to foster environments where students' intrinsic interests can be explored and developed.

External motivation, while less significant, also plays a role in talent development, particularly in structured environments like schools. This supports research by Gray and Plucker (2010), who found that external encouragement, including from teachers and parents, can significantly impact the early stages of talent identification, particularly in sports (Gray & Plucker, 2010). The findings also align with those of Reeves et al. (2018), who identified external motivation, such as recognition and rewards, as a catalyst for talent development, especially in competitive environments (Reeves et al., 2018).

School-related factors emerged as the most influential in the identification and development of talent. Human resources within schools, such as teachers and mentors, were identified as the leading factor (Sun et al., 2024; Wang et al., 2024). This is supported by studies from Vrabie and Crețu (2018), who emphasize the role of teachers in recognizing and nurturing student talent. Teachers often serve as the first point of contact for students and play a crucial role in creating environments that either encourage or inhibit talent development (Vrabie & Crețu, 2018). Similarly, studies by Siegle et al. (2016) and Anderson (2020) highlight the need for teacher training programs to help educators identify and support underrepresented gifted students, ensuring that all students have an opportunity to develop their talents (Siegle et al., 2016).

Educational facilities and equipment also ranked highly in the study, further supporting the idea that the availability of resources plays a crucial role in talent development. This finding is consistent with research by Burgess and Naughton (2010) and Reeves et al. (2018), who argue that access to state-of-the-art facilities can provide students with the tools they need to excel, particularly in sports and STEM education (Burgess & Naughton, 2010; Reeves et al., 2018). These results suggest that schools with limited resources may struggle to identify and nurture student talents, which could lead to talent being overlooked or underdeveloped.

Extracurricular activities and the school environment were also significant factors, reinforcing the importance of providing diverse opportunities for students to explore their interests outside of the traditional classroom setting. This finding aligns with the work of Gubbins et al. (2020) and Faber et al. (2021), who stress the importance of extracurricular programs in offering students alternative avenues for talent exploration (Faber et al., 2021; Gubbins et al., 2020). Whether through sports, the arts, or academic clubs, extracurricular activities provide students with opportunities to develop their skills in a low-pressure environment, which is essential for long-term talent cultivation.

Family influences, particularly parents, were another critical factor in talent identification. The study found that parental involvement and encouragement were key to recognizing and nurturing student talent, a finding that aligns with existing literature on family dynamics in talent development. Research by Siegle et al. (2016) and Renzulli and Reis (2020) emphasizes the importance of parental support in creating environments where children feel encouraged to pursue their interests (Reis & Renzulli, 2020; Siegle et al., 2016). Parents not only provide the emotional support necessary for students to explore their talents but also often serve as advocates for their children's inclusion in gifted and talented programs (Reis & Renzulli, 2020).

However, the study also highlights that not all parents are equally equipped to identify their child's talent, particularly in lower socioeconomic households. This finding mirrors the

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work of Anderson (2020) and Arnstein (2023), who emphasize the systemic barriers that prevent underrepresented students from being recognized as talented. These barriers are often exacerbated by a lack of resources and support systems within the family, making it difficult for parents to advocate effectively for their children (Anderson, 2020; Arnstein, 2023).

Social interactions, particularly peer relationships, were the least influential factor in talent identification according to the study, but they still play a role. This finding aligns with the work of Anderson (2020), who found that peer relationships can influence how students perceive their own abilities (Anderson, 2020). In particular, gifted students often feel isolated from their peers, which can either hinder or motivate their talent development depending on the context (Anderson, 2020; Arnstein, 2023). Additionally, the influence of peers is often more pronounced in group-based activities such as team sports, where social dynamics can either encourage or stifle talent development (Burgess & Naughton, 2010; Reeves et al., 2018).

The findings suggest that while peer influence is less significant in the initial identification of talent, it becomes more important in the later stages of development, particularly as students begin to compare themselves to their peers. This observation is consistent with the work of Croston (2013), who noted that in sports and physical education settings, peer recognition often motivates students to further develop their abilities (Croston, 2013). Similarly, in academic settings, peer competition can either foster a competitive spirit or cause talented students to feel alienated, depending on how talent is perceived by their classmates (Anderson, 2020).

While this study provides significant insights into talent identification and development, it is not without its limitations. First, the sample size was relatively small and restricted to students from a specific geographic location. This limits the generalizability of the findings to other regions and cultural contexts. Second, the study relied heavily on self-reported data from students, which may introduce bias, as students might have under- or overestimated the factors influencing their talent identification. Third, while the study employed a qualitative approach, it did not incorporate a longitudinal component, which could have provided more in-depth insights into how talent identification evolves over time.

Future research should address the limitations outlined above by expanding the sample size and including students from diverse cultural and geographic backgrounds. A larger, more varied sample would provide a broader understanding of how different factors influence talent identification in different contexts. Additionally, future studies should consider employing a mixed-methods approach, combining qualitative and quantitative data to capture a more comprehensive view of the factors influencing talent development. Finally, longitudinal studies are needed to track students' talent development over time, providing insights into how these factors interact and evolve as students progress through their educational journeys.

Educators and school administrators should prioritize professional development programs that equip teachers with the skills needed to identify and support talented students, particularly those from underrepresented backgrounds. Schools should also invest in improving their facilities and offering diverse extracurricular programs, as these factors were found to significantly influence talent identification. Moreover, parents should be encouraged to actively participate in their children's educational journeys, advocating for their inclusion in gifted and talented programs. Lastly, policymakers should ensure that schools in low-resource areas have access to the same facilities and opportunities as more affluent schools, ensuring that talent is not overlooked due to a lack of resources.

Authors' Contributions

All authors significantly contributed to this study.

Declaration

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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Ethical Considerations

In this study, to observe ethical considerations, participants were informed about the goals and importance of the research before the start of the interview and participated in the research with informed consent.

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