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**MODERN APPROACHES TO IDENTIFYING AND
DEVELOPING GIFTEDNESS IN SCHOOLCHILDREN**

The article presents a systematic review of modern approaches to the identification and development of giftedness in schoolchildren, based on an interdisciplinary analysis of cognitive, psychological, pedagogical, and socio-emotional factors. The study was carried out in accordance with the PRISMA protocol and covers publications submitted in international databases (Scopus, Web of Science, ERIC, PubMed) over the past 5 years.

The review revealed that complex diagnostic models combining cognitive testing, pedagogical observation, self-assessment, analysis of motivation and social characteristics are recognized as the most effective. Special attention is paid to modern theories of giftedness (Renzulli, Sternberg, Gagne models), emphasizing the importance of the interaction of personal and environmental factors. It is noted that there is a need to move from static identification to dynamic support of gifted students within the framework of individualized educational routes.

The purpose of the article is to conduct a systematic review of modern scientific approaches to the identification and development of giftedness in schoolchildren.

Tasks:

– To determine the criteria for the inclusion of scientific publications for a systematic review on the topic of identifying and developing giftedness in schoolchildren.

– To conduct a systematic search and selection of relevant research in international scientific databases.

– Analyze and classify modern scientific approaches to the diagnosis and development of giftedness, summarize the results of empirical and review studies, identify trends and effective practices in identifying and supporting gifted students.

The results of the review can serve as a scientific and practical basis for improving diagnostic and support systems for gifted schoolchildren in both mass and specialized education.

Keywords: interdisciplinary approach, giftedness, competence, integration, cognitive abilities

Introduction

The modern understanding of giftedness in the context of school education has undergone a significant evolution: from a reduced interpretation focused exclusively on high intelligence to integrative models covering a wide range of cognitive, personal and social characteristics of students. Giftedness is now recognized not as a fixed quality, but as a dynamic and context-sensitive process that requires the creation of conditions for identifying and developing the potential of each child [1, p. 12].

Multicomponent models have become one of the most important directions in the theoretical understanding of the phenomenon of giftedness, among which the concepts of Renzulli, R. Sternberg and F. Gagne.

The “three rings” model by Joseph Renzulli [2, p. 182] considers giftedness as the result of the interaction of three components: above average intelligence, high motivation for activity and a creative approach. The peculiarity of this model lies in the emphasis on the development of not only the cognitive sphere, but also strong-willed qualities, emotional stability and internal motivation. According to Renzulli, giftedness is realized not in isolation from the environment, but in the process of an individual’s active interaction with the educational and social environment.

Robert Sternberg’s triarchic theory of intelligence [3] suggests considering intelligence as a system of analytical, creative and practical components, while

genuine giftedness is the ability to adapt to the environment, transform it and effectively solve life problems. Sternberg emphasizes that successful giftedness goes beyond academic achievement and requires the development of abilities applicable in real-life and social situations.

The differentiated model of giftedness and talent by Francois Gagne [4, p. 120] distinguishes between natural gifts and realized talents. Talent development, according to Gagne, occurs subject to the presence of internal (motivation, self-regulation) and external (pedagogical support, family environment) catalysts. Thus, talent is the result of the productive interaction of innate potential with the possibilities of the educational environment.

The unifying element of all three theories is the recognition of the multifactorial nature of giftedness, where intelligence, creativity and motivation act as inextricably linked components. These models emphasize that the diagnosis and development of giftedness should take into account not only IQ scores, but also personality traits, emotional background, social activity, and environmental conditions.

In this context, a new research and practice-oriented paradigm is being formed, in which giftedness is considered as an integrative education of cognitive, psychological and social resources, requiring interdisciplinary analysis and multilevel pedagogical support [5]; [6, p. 25].

Due to the above trends, the research of multidimensional diagnostic systems that are able to integrate cognitive, personal, and socio-emotional assessments adapted to the cultural context is becoming increasingly relevant. This is especially important for understanding educational practices in different countries and cultural environments.

The purpose of the article is to conduct an interdisciplinary review of modern approaches to the identification and development of giftedness in schoolchildren, covering cognitive, psychological, pedagogical and social factors. The review was performed according to the PRISMA protocol, which ensures transparency, reproducibility and methodological rigor of the study.

Materials and methods

The systematic review was conducted in accordance with the PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) protocol, which ensured transparency and reproducibility of all stages of the analysis. The use of PRISMA made it possible to structure the process of searching, selecting, evaluating and synthesizing scientific sources on the topic of identifying and developing giftedness in schoolchildren.

- 1 Formulation of the purpose and inclusion criteria:
- 2 Search strategy
- 3 Selection and analysis of publications
- 4 Data processing and synthesis

Results and discussion

Conducted in accordance with the international PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) protocol, the systematic review provided a comprehensive and methodologically sound analysis of modern scientific approaches to identifying and developing giftedness in schoolchildren. The object of the analysis was publications published in leading scientific databases over the past five years. The use of a structured scheme for the search, selection and interpretation of sources made it possible to ensure transparency and reproducibility of all stages of the study.

At the first stage, the purpose and criteria for the inclusion of publications were clearly formulated. Priority was given to interdisciplinary research, in which the diagnosis of giftedness was considered not only from the perspective of intellectual testing, but also taking into account motivational, creative, personal, and socio-emotional components. This approach ensured the selection of relevant empirical and review papers reflecting current trends in psychological, pedagogical and cognitive discourse.

The search strategy covered international bibliographic databases (Scopus, Web of Science, ERIC, PubMed), which allowed for a wide methodological and geographical coverage. The use of validated keywords in English and Russian ensured the identification of both global and regional (including Kazakhstani) scientific experience on the studied issues.

At the stage of data analysis and synthesis, the most commonly used diagnostic approaches to identifying various forms of giftedness were identified. Most of the studies included in the review demonstrated a shift away from exclusively IQ-based models in favor of multilevel and context-sensitive approaches. The works focused on the need for a combination of quantitative and qualitative methods, including cognitive tests, observation, peer review, self-assessment scales and portfolios. Tools such as Torrance Tests of Creative Thinking (TTCT), Scales for Rating the Behavioral Characteristics of Superior Students (Renzulli), DISCOVER Assessment, as well as author's diagnostic models developed within the framework of national educational systems were often mentioned and used.

A systematic review of Kazakhstani and international scientific publications on the topic of identifying and developing the giftedness of schoolchildren has shown that complex models combining cognitive diagnostics, pedagogical observation, motivational assessments and consideration of the social context demonstrate the greatest effectiveness.

Thus, methodological support has been developed and tested in Kazakhstan, including interactive technologies, project activities and elective courses. The experiment involved 1,200 students in grades 3, 7, and 10. Following the results

of the 4-month intervention, students showed a statistically significant increase in academic, creative, social, and intellectual giftedness, as well as motivation [7].

In another Kazakh study, teachers investigated the introduction of adaptive learning in schools for gifted children. The results showed that individualized educational trajectories contribute to increasing academic engagement and meeting the needs of students with different levels of opportunities [8, p. 43].

In addition, a comparative study of pedagogical practices in Russia and Kazakhstan has shown that the success of interaction with gifted students depends on the differentiation of education, the use of individual educational routes and the integration of additional education with the main school curriculum. Teachers have a high level of motivation, an understanding of the need to create a supportive environment and a methodological system to support giftedness [9].

The study [10], which included more than 104 articles (from more than 25 countries and involving >77,000 children aged 5 to 18), showed that gifted children consistently perform better in cognitive tests (including working memory, attention switching), as well as in tests of intrinsic motivation, self-efficacy and openness to experience. This review highlights the need for a comprehensive approach: using both cognitive tests and psychological assessment methods, which increases the accuracy of identification and helps plan support for gifted students.

The TDMM model provides for the integration of academic, psychological, and socio-emotional components through well-structured enrichment programs, individual learning paths, and recommendations for career and personal development. This approach supports the development of talents in children of different social groups and ability levels, which is especially important for inclusive educational environments [11].

In a study by Giraldo-Moral et al. [12, p. 34], performed according to the PRISMA protocol, a systematic review of educational interventions aimed at developing giftedness in schoolchildren was conducted. The authors analyzed the programs implemented in various countries and came to the conclusion that complex models combining cognitive testing, individualized educational trajectories, pedagogical mentoring, as well as socio-emotional support demonstrate the greatest effectiveness. According to the results of the analysis, such multi-level approaches ensure the sustainable development of both academic and personal giftedness, as well as improve the adaptation of students in the educational environment. Interventions limited only by unilateral (for example, cognitive) diagnostics are inferior in effectiveness to programs with an interdisciplinary basis.

Identification of giftedness is a complex interdisciplinary task in which cognitive, psychological, pedagogical, social and emotional components are

intertwined. Modern methodological approaches to the identification of gifted students can be classified in the following areas::

1 Cognitive diagnostic approach. The most traditional and widely used method of identification is testing of intellectual abilities, such as IQ. Standardized tools are used:

- Wechsler Intelligence Scale for Children (WISC-V)
- Stanford–Binet Intelligence Scales
- Raven’s Progressive Matrices, etc.

However, studies indicate the limitations of such methods: they often do not reveal social, creative and emotional giftedness [3, p. 5; 12, p. 42].

2 Multifactorial and complex models

Modern models are focused on the integration of various types of assessment:

- cognitive testing;
- pedagogical supervision;
- expert assessments;
- self-assessment and questionnaire;
- analysis of educational motivation;
- Inclusion of social and cultural context.

A systematic review by Giraldo-Moral et al. [12, p. 27] emphasizes that such interdisciplinary approaches provide a more complete understanding of the individual characteristics of students and make it possible to identify different types of giftedness, including latent.

3 Alternative and dynamic methods. Modern schools and talent centers also use:

- portfolio-documentation of achievements;
- project and research activities;
- dynamic evaluation (Vygotsky-ZPD based approaches);
- observation in a natural educational environment;
- analysis of socio-emotional factors (group participation, empathy, leadership, etc.).

Such methods are especially important in the context of inclusive education and in working with children whose giftedness may manifest itself outside the box (children with disabilities or with migration experience).

The modern methodology for identifying giftedness focuses on a multidimensional, dynamic and context-sensitive approach, in which cognitive diagnostics is integrated with the analysis of motivational, personal and social characteristics of students. This complexity allows not only to more accurately identify gifted students, but also provides effective support for their development in the educational environment.

In this context, specialized diagnostic tools for diagnosing giftedness play an important role, covering its various aspects – cognitive abilities, creativity, personality traits, and socio-emotional factors. The use of such a multi-level set of methods, widely used both in Kazakhstan and in international practice, contributes to the formation of a holistic view of the abilities and needs of each child, which is the key to the successful implementation of programs to support gifted schoolchildren (Table 1).

Table 1 – Specialized diagnostic tools for diagnosing giftedness

№	Title	Description
I	Cognitive tests (intellectual abilities)	
1	Diagnostic complex «Talent»	Multidimensional diagnostics based on intellectual and creative abilities
2	WISC-V (Wechsler Intelligence Scale for Children)	One of the most recognized tests of general intelligence. It includes verbal, visual-spatial, working memory, and information processing speed.
3	Stanford–Binet Intelligence Scales (5th ed.)	Multi-level IQ test. It is used to assess high intellectual talent.
4	Raven’s Progressive Matrices	A culturally independent test of abstract thinking. It is widely used in mass screening.
II	Tests of creative and creative thinking	
1	The method of identifying giftedness according to the model of complex diagnostics	An integrated tool combining cognitive testing, observation, and self-assessment
2	KazNAU Creative Thinking Test	Assessment of creativity and non-standard thinking among schoolchildren
3	Torrance Tests of Creative Thinking (TTCT)	Evaluates fluency, flexibility, originality, and elaboration of ideas. It is considered an international standard for evaluating creativity.
4	Wallach–Kogan Creativity Tests	An alternative to TTCT is based on associative thinking and divergent tasks.
III	Questionnaires of personal and motivational characteristics	
1	Self-Efficacy Scale (Bandura)	It measures the child’s level of confidence in their ability to complete tasks.
2	Academic Motivation Scale (AMS)	Evaluates internal and external motivation to learn.
3	A.A. Rean’s School Motivation Questionnaire	Russian adaptation for the assessment of educational motives and interests.

4	Big Five (NEO-PI-R, BFQ-C)	A personality questionnaire based on the 5-factor model (extraversion, openness, etc.) allows you to identify personality traits associated with giftedness.
IV	Observation and expert assessment	
1	Scales for assessing the behavioral characteristics of high school students (Renzulli)	Rating scales of gifted children's behavior in 10 parameters (leadership, motivation, creativity, etc.) are filled in by teachers.
2	Proposal on the topic «Checklists of giftedness characteristics»	They are used in schools and psychological and pedagogical councils for primary detection.
3	Portfolio of achievements	Systematic collection of data on the results of a student's academic, project, and extra-curricular activities.
V	Tools for multifactorial diagnostics (combined)	
1	DISCOVER Assessment (Manufacturer, USA)	Comprehensive diagnostics based on creativity, motor skills, and social interaction. It is used in multicultural schools.
2	Renzulli–Harts Model (Three-ring Concept)	It uses a combination of intelligence tests, observation scales, and motivation assessment questionnaires.
3	Sternberg Model-Triarchic Ability Test (STAT)	It includes the analysis of analytical, creative and practical abilities.

The presented table contains a systematic list of diagnostic tools classified according to the main areas of assessment of schoolchildren's giftedness: cognitive abilities, creative thinking, personal and motivational characteristics, observation and expert assessment, as well as multifactorial complex techniques.

The first category, cognitive tests, includes both internationally recognized standardized tools (WISC-V, Stanford–Binet, Raven's Progressive Matrices) and Kazakhstani developments, such as the «Talent» diagnostic complex (developed at the Kazakhstan Institute of Pedagogy). These tools are aimed at measuring intellectual potential, including verbal, spatial, and abstract abilities. The use of such tests makes it possible to objectively assess the level of general intelligence and identify students with high intellectual endowment.

The second group includes tests of creative and creative thinking, among which there are both international standards (Torrance Tests of Creative Thinking, Wallach–Kogan) and local methods, for example, the KazNAU creative thinking test and the integrated diagnostic model, a method for identifying giftedness based on the integrated diagnostic model (a team of authors led by Professor

Bekmagambetov). These tools assess the ability to generate new ideas, flexibility of thinking and originality, which is an important component of giftedness that goes beyond traditional IQ tests.

The third block, questionnaires of personal and motivational characteristics, is aimed at studying internal motivation, self-confidence, and personality traits associated with success in research and creative activities. The table shows both classical methods, for example, Bandura's Self-Efficiency Scale and Academic Motivation Scale, as well as adapted Russian and international versions (Rean's questionnaire, Big Five). These tools allow for a comprehensive assessment of the factors influencing the manifestation and development of giftedness.

The fourth category covers methods of observation and expert assessment, which involve the active participation of teachers and specialists in the process of identifying giftedness. Tools such as Renzulli rating scales, checklists of characteristics of gifted children and a portfolio of achievements make it possible to assess the real behavioral and educational manifestations of a child, which is especially important for identifying giftedness in the natural conditions of the educational process.

The fifth group includes multifactorial diagnostic models that combine various methods and approaches for a comprehensive assessment of giftedness. Examples of such tools are the DISCOVER Assessment, the Renzulli-Harts model, and the Sternberg-Triarchic Abilities Test, which integrate cognitive, creative, and socio-emotional components to provide a holistic picture of a child's abilities and needs.

In general, the analysis of the presented tools shows that modern diagnostics of giftedness requires a comprehensive and interdisciplinary approach, including both objective quantitative methods and qualitative expert assessments. This provides a more accurate and multifaceted understanding of the potential of schoolchildren, which is a prerequisite for the effective development of their abilities in educational practice.

Conclusions

A systematic review of scientific publications over the past five years has shown that the identification and development of giftedness in schoolchildren requires a comprehensive, interdisciplinary approach combining cognitive diagnostics, assessment of creative potential, analysis of motivation, socio-emotional characteristics and pedagogical support. Modern models of giftedness (Renzulli, Sternberg, Gagne, etc.) confirm the need to move away from narrowly intellectual interpretations in favor of systemic, context-sensitive strategies that integrate both the internal characteristics of the child's personality and the characteristics of the educational environment.

Multilevel diagnostic systems are considered the most effective, which use both standardized tests (for example, WISC-V, TTCT, Raven's Progressive Matrices), as well as observation, expert assessments, portfolios, and self-assessment tools. At the same time, the emphasis is shifting towards dynamic monitoring of the development of giftedness, rather than one-time identification.

It is important to note that the high effectiveness of programs for the development of gifted students is achieved in conditions of comprehensive support, where professionally trained teachers, individualized educational routes, as well as access to a developing extracurricular environment (scientific communities, design laboratories, mentoring programs, etc.) play an important role.

Thus, giftedness should be considered as a developing potential, the disclosure of which is possible only with systematic pedagogical and social support based on interdisciplinary diagnostic data. A promising area of further research and practice is the integration of cognitive and affective criteria into giftedness assessment systems, as well as the development of context-oriented models of support for gifted children in mass schools. At the same time, there are a number of unresolved issues regarding the adaptation of diagnostic techniques to a multicultural environment, the long-term effectiveness of interventions, as well as the formation of inclusive conditions to support different forms of giftedness.

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ОҚУШЫЛАРДЫҢ ДАРЫНДЫЛЫҒЫН АНЫҚТАУ МЕН ДАМУДЫҢ ЗАМАНАУИ ТӘСІЛДЕРІ: КОГНИТИВТІ, ПСИХОЛОГИЯЛЫҚ-ПЕДАГОГИКАЛЫҚ ЖӘНЕ ӘЛЕУМЕТТІК ФАКТОРЛАРДЫ ПӘНАРАЛЫҚ ТАЛДАУ

Мақалада когнитивті, психологиялық-педагогикалық және әлеуметтік-эмоционалды факторларды пәнаралық талдауға негізделген оқушылардың дарындылығын анықтау мен дамытудың заманауи тәсілдеріне жүйелі шолу берілген. Зерттеу PRISMA хаттамасына сәйкес жүргізілді және соңғы 5 жылдағы халықаралық деректер базасында (Scopus, Web of Science, ERIC, PubMed) ұсынылған басылымдарды қамтиды.

Шолу когнитивті тестілеуді, педагогикалық бақылауды, өзін-өзі бағалауды, мотивация мен әлеуметтік сипаттамаларды талдауды біріктіретін кешенді диагностикалық модельдер ең тиімді деп танылғанын анықтады. Дарындылықтың қазіргі заманғы теорияларына (Ренцүлли, Стернберг, Ганье модельдері) ерекше назар аударылады, бұл жеке және қоршаған орта факторларының өзара әрекеттесуінің маңыздылығын көрсетеді. Дараланған білім беру маршруттары шеңберінде дарынды оқушыларды статикалық сәйкестендіруден динамикалық сүйемелдеуге көшу қажеттілігі атап өтіледі.

Мақаланың мақсаты: Оқушылардың дарындылығын анықтау мен дамытудың заманауи ғылыми тәсілдеріне жүйелі шолу жасау.

Тапсырмалар:

– Оқушылардың дарындылығын анықтау және дамыту тақырыбы бойынша жүйелі шолу үшін ғылыми жарияланымдарды қосу өлшемдерін анықтау.

– Халықаралық ғылыми дерекқорларда тиісті зерттеулерді жүйелі түрде іздеу және іріктеу.

– Дарындылықты диагностикалау мен дамытудың заманауи ғылыми тәсілдерін талдау және жіктеу, эмпирикалық және шолу зерттеулерінің нәтижелерін қорытындылау, дарынды оқушыларды анықтау және қолдау саласындағы үрдістер мен тиімді тәжірибелерді анықтау.

Шолу нәтижелері жаппай және мамандандырылған білім беру жағдайында дарынды оқушыларды диагностикалау және қолдау жүйелерін жетілдіруге ғылыми және практикалық негіз бола алады.

Кілтті сөздер: пәнаралық тәсіл, дарындылық, құзыреттілік, интеграция, танымдық қабілеттер.

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СОВРЕМЕННЫЕ ПОДХОДЫ К ВЫЯВЛЕНИЮ И РАЗВИТИЮ ОДАРЕННОСТИ У ШКОЛЬНИКОВ: МЕЖДИСЦИПЛИНАРНЫЙ АНАЛИЗ КОГНИТИВНЫХ, ПСИХОЛОГО-ПЕДАГОГИЧЕСКИХ И СОЦИАЛЬНЫХ ФАКТОРОВ

В статье представлен систематический обзор современных подходов к выявлению и развитию одаренности у школьников, основанный на междисциплинарном анализе когнитивных, психолого-педагогических и социально-эмоциональных факторов. Исследование выполнено в соответствии с протоколом PRISMA и охватывает публикации, представленные в международных базах данных (Scopus, Web of Science, ERIC, PubMed) за последние 5 лет.

Обзор выявил, что наиболее эффективными признаются комплексные диагностические модели, сочетающие когнитивное тестирование, педагогическое наблюдение, самооценку, анализ мотивации и социальных характеристик. Особое внимание уделяется современным теориям одаренности (модели Ренцулли,

Стернберга, Ганье), подчеркивающим важность взаимодействия личностных и средовых факторов. Отмечается необходимость перехода от статичной идентификации к динамическому сопровождению одаренных учеников в рамках индивидуализированных образовательных маршрутов.

Цель статьи – проведение систематического обзора современных научных подходов к выявлению и развитию одаренности у школьников.

Задачи:

– Определить критерии включения научных публикаций для систематического обзора по теме выявления и развития одаренности у школьников.

– Провести систематический поиск и отбор релевантных исследований в международных научных базах данных.

– Проанализировать и классифицировать современные научные подходы к диагностике и развитию одаренности, обобщить результаты эмпирических и обзорных исследований, выявить тенденции и эффективные практики в области выявления и поддержки одаренных школьников.

Результаты обзора могут служить научной и практической основой для совершенствования систем диагностики и поддержки одаренных школьников в условиях как массового, так и специализированного образования.

Ключевые слова: междисциплинарный подход, одаренность, компетентность, интеграция, когнитивные способности.

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