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Domain-Specific Identification of Talented Students in the Republic of Korea

Kore Cumhuriyeti'nde Üstün Yetenekli Öğrencilerin Alana Özgü Tanılanması

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Abstract

Korean practices of gifted identification have special features such as being highly selective to the top 1.87% of all students, alignment of identification with gifted education curriculum, identification by specific domains mostly in STEM, multi-step screening with multiple measures, yearly identification, and identification of under-represented gifted students. Gifted education in elementary and middle schools is mostly provided through gifted classes, followed by school district gifted education centers, and university affiliated gifted education centers, whereas gifted education for high school students is mostly provided in special schools. One of the well-established principles is collecting multiple pieces of evidence that measure different constructs and characteristics aligned with the gifted program's goals and objectives, ideally utilizing a variety of assessment formats (e.g., paper-and-pencil, performance assessment). A newly introduced policy for identification is to promote selection of gifted students solely based on teacher observation-recommendation in order to reduce parents' excessive tutoring practices for test preparation. However, its expansion should be carefully reconsidered, due to its relatively low validity and reliability. Rather, teacher observation-recommendation should be used as a supplementary identification procedure to create a talent pool or as additional assessment in conjunction with test scores.

Key Words: identification, Korea, STEM, domain-specific identification

Öz

Kore'de üstün yeteneklilerin tanılanması uygulamaları, üst %1,87'lik öğrencileri seçmek gibi aşırı seçici olması, üstün yeteneklilerin eğitim müfredatları ile uyumlu olması, özellikle STEM gibi alana özgü tanılama, çoklu araç ve çok basamaklı tarama, her yıl tanılama ve dezavantajlı üstün yeteneklilerin tanılanması gibi özelliklere sahiptir. İlkokul ve ortaokullarda üstün yetenekliler eğitimi genellikle özel sınıflarda sağlanırken, eğitim bölgelerindeki ve üniversitelerdeki üstün yetenek eğitim merkezlerinde de hizmet verilmektedir. Liselerde ise üstün yetenekliler eğitimi çoğunlukla özel okul uygulamaları ile verilmektedir. İyi yapılandırılmış prensiplerden birisi üstün yetenek programlarının amaç ve hedefleri ile uyumlu, farklı yapı ve özelliklerin çeşitli ölçme formatları (kâğıt-kalem testleri ve performans ölçümleri gibi) kullanılarak ölçüldüğü, çoklu değerlendirme yaklaşımıdır. Yeni tanılama politikasında sadece öğretmen gözlem ve önerisini temel alınarak, sıklıkla başvurulan sınava hazırlık uygulamalarının azaltılması amaçlanmaktadır. Ancak bu uygulamaların yaygınlaştırılması nispeten düşük geçerlik ve güvenirliklerinden dolayı dikkatli bir şekilde tekrardan düşünülmelidir. Bunun yerine öğretmen önerileri bir yetenek havuzu oluşturmak veya test puanları ile birlikte tanılama sürecinde tamamlayıcı veri olarak kullanılmalıdır.

Anahtar Sözcükler: tanılama, Kore, STEM, alana özgü tanılama.

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Legal Foundation of Gifted Education Students Identification

Gifted education in Korea is based on the Article 19 (Gifted and Talented Education) of Fundamentals of Education Act, the Gifted and Talented Education Promotion Act (GTEPA) and the Gifted and Talented Education Promotion Enforcement Decree (GTEPED) (Ministry of Government Legislation, Legislative Information Division, 2014).

GTEPA Article 5 (Selection of gifted education students) states how to identify gifted education students. It can be summarized as follows: Directors of gifted education institutions can select their students among those who exhibit high performance or high potential in the following traits or disciplines such as general intelligence, specific academic aptitude, creative thinking ability, artistic talent, physical talent, and other areas of talents and those whose talent domain is well aligned with the education programs of the gifted education institution. Directors of gifted education institutions should also develop a procedure for identifying under-represented students including those who are economically disadvantaged, culturally diverse, challenged by disabilities, or from geographically remote areas (Cho, Lee, Jeong, Hwang, & Lee, 2006; Lee, Yoo, & Yeo, 2011).

The GTEPA Article 5 guides the selection of gifted education students as follows:

1. GTEPA specifies only the procedure and does not regulate various aspects of identification such as domains of giftedness, target age /grade for identification, or the ratio of students to be selected.
2. GTEPA requires alignment between the gifted education programs and identification in terms of talent domains. Therefore, gifted education institutions design gifted education programs first, and then plan gifted identification.
3. Directors of gifted education institutions are responsible for ensuring the identification of promising students from under-represented groups.
4. Selection of students will be discretionarily conducted by directors of gifted education institutions.

GTEPED Article 11 further specifies the procedures of student selection as follows: Students or parents should submit an application to the director of the gifted education institution with a recommendation letter from the teacher or principal of the school where the student is currently attending. Director of the gifted educational institution should obtain approval from the selection committee of the institution on the final candidate students to be selected. Then, the director should inform the applicants of the results. Instruments or assessment methods might include the following:

1. Standardized intelligence test, thinking test, creative problem solving test, or other tests, interviews or observations to identify superior aptitude in specific subject or specific disciplines.
2. Performance assessments, interviews or observations to identify talents in artistic or physical talents.

GTEPED Article 11 on selection of gifted education student is characterized as follows:

1. It specifies the procedure that parents should take initiative in the gifted identification process by requesting teachers to recommend their children. Teachers in regular classrooms should be trained on the characteristics of gifted children in order to be able to write a valid recommendation.
2. The use of standardized tests is stated as one of the various assessment alternatives.
3. Any assessment method can be used for identification of gifted education students including paper-pencil test, interviews, performance assessment, and observations. For the paper-pencil test, the Article 11 listed but not limited the aspects that can be assessed.

Although gifted education institutions are permitted to choose from various alternatives for identification, national and/or provincial policies influence the directors' decision on gifted identification and education programs. Directors of gifted education institutions are also permitted to develop new identification instruments every year. They can commission experts or the National Research Center for Gifted Education at KEDI to develop new identification instruments.

General Trend in the Identification of Gifted Education Students

Although each gifted education institution can choose its own identification instruments, assessment methods, and specific procedures, there is a general trend in gifted identification in Korea: Alignment of identification with gifted education curriculum; identification by specific domains; multi-step screening, teacher observation-recommendation system; yearly identification; and identification of under-represented gifted students (Suh, Park, Park, Cheong, Lee, & Chae, 2013).

Alignment of identification with gifted education curriculum. In Korea, the goals and nature of educational program is decided first, and then students who will succeed and get the most benefit from the educational program are selected. This approach is more based on talent development paradigm, where identification measures are directly relevant to the curriculum (Dai & Chen, 2013; Peters, Matthews, McBee, & McCoach, 2014).

Identification by specific domains. Since each gifted education institution provides programs in one or two specific domains such as STEM, Humanities, Social Studies, Arts, or Sports, the identification is also conducted by specific domains. Especially, creative problem solving tests or performance assessments are designed to assess domain-specific talents. Eighty-three percent of gifted education students are served with math and science programs, which are defined as scarcity talent by Tannenbaum (2003), because these investigative talents are always in short supply. Meanwhile, gifted education students in the surplus talent areas such as arts, music, and sports each include much lower ratio of all gifted education students, as seen in Table 1. Out of various academic talents, gifted education pro-

grams in STEM are the most prevalent, whereas gifted education programs in social studies and humanities are rare.

Table 1. Number of Gifted Education Students by Domain

Domains	Math	Science	Math Science	Invention	Information	Foreign Languages	Music	Arts	Sports	Humanities	Other	Total
No. of Students	19,133	20,488	61,619	4,448	3,385	3,286	1,571	1,873	666	4,046	918	121,433
%	15.76	16.87	50.74	3.66	2.79	2.71	1.29	1.54	0.55	3.33	0.76	
	89.45%						10.55%					100%

Note: Science Academies and Science High school students are categorized into math and science.

Multi-step screening. A multi-step screening procedure is mostly used at the specialized science academies and science high schools because of its cost-effectiveness and high validity. It begins with the least costly methods for all applicants and proceeds to the next costlier methods with less number of students. Assessments proceeds from (1) teacher recommendation; (2) group paper-pencil test of creative problem solving ability in the related specific domain or cognitive ability; to (3) performance assessments such as interviews, camps, or workshops. As the identification proceeds, the number of students participating in assessment is gradually reduced. In the beginning with a large number of applicants, a less costly method such as document review or a group paper-pencil test is used. At the last step, when the number of students is getting close to the actual number of students to be accommodated in the program, a highly valid, but costly performance assessment is employed. It is a rule not to combine the scores across several screening steps, since the nature of assessments at each step is so different that combining scores of different nature will result in a total score whose assessment construct becomes obscure (Ministry of Science and Technology, 2002; Seo, 2004).

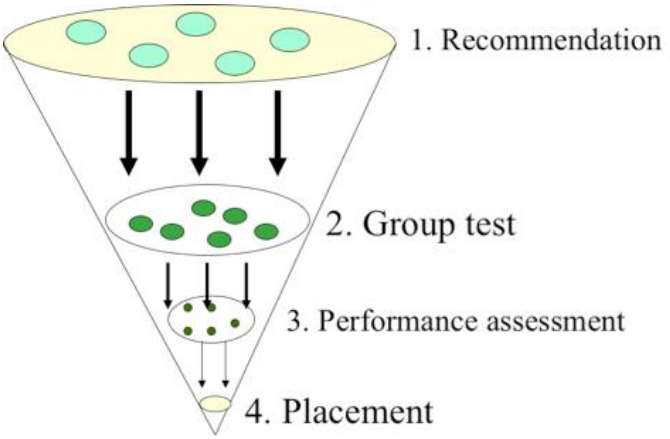

Figure 1. Multi-Step Identification System

Teacher observation-recommendation system. Teacher observation-recommendation system has been promoted for identifying gifted education students at the gifted education centers and gifted education classes since 2010 (Suh, et. al 2013). Instead of administering group tests or performance assessment on creative problem solving, teachers

are encouraged to recommend students to gifted education programs based on their classroom observation. Regular classroom teachers are provided with a behavioral checklist and professional development on the gifted behaviors that are to be observed. This change in the selection policy was intended to minimize the influence of private tutoring on test preparation and select more students who might have high potential but exhibit low performance. However, the risks of the teacher observation-recommendation system were found to be greater than its benefits (Han, Yang, & Park, 2014; Kim, H. & Han, 2013; Kim, S. Y. & Han, 2013; Lee & Han, 2009; McBee, 2016). Difference in general intelligence of students identified between multi-step screening and teacher observation-recommendation system was not significant. However, those who were identified through teacher observation-recommendation showed higher vocabulary use, comprehension, and schematization than those selected through multi-step screening tests. Career aspirations were also significantly different. Students selected through teacher observation-recommendation system showed diverse career aspirations including enterprising, social, realistic, investigative, and conventional career, where as 72% of the students selected through multi-step identification belonged to investigative career category. Probably because regular classroom teachers who are not trained on gifted education may not be able to recognize investigative characteristics, whereas they can recognize leadership, inter-personal relationship skills, and communicative skills more easily. Although teacher observation-recommendation system was intended to provide more under-represented gifted students with opportunities to participate in enrichment programs, it is highly possible that more of the teachers' favorite students who demonstrate high achievement, good behaviors and good communication skills are selected more than those who might have high potential with unfavorable behaviors and lower communication skills (Han & Oh, 2011; Han, Yang, & Park, 2014).

These findings demonstrate that the teacher observation-recommendation system for student selection does not contribute to the alignment of identification with the educational programs, since gifted education programs aim to nurture investigative talents, whereas selected students are interested in other kinds of careers. Alignment of assessment tools with the definition of giftedness, and with the gifted program's goals and objectives and desired outcomes for students should be secured for high validity of identification (Feldhusen, Asher, & Hoover, 1984; Peters, Matthews, McBee, & McCoach, 2014).

Yearly identification. Most gifted education institutions except self-contained specialized high schools, practice yearly identification to determine who will participate in the program again the following year. Admission to a program is limited only for a year, even though selected students can continue participation in the program for three years. Therefore, the students who were admitted previously may have to leave and those who were not admitted may have a chance to participate in the program the next year based on the yearly screening results.

Identification of under-represented gifted students. There are four socially disadvantaged groups of students classified by Korean laws of social welfare: Geographically remote, economically disadvantaged, culturally different, and personally challenged because of disabilities (Cho, Lee, Jeong, Hwang, & Lee, 2006; Lee, Yoo, & Yeo, 2011). Children from the socially disadvantaged groups are under-represented in gifted education programs. For example, gifted children from multi-cultural families may not be recognized because of their double barriers with economical disadvantage and limited Korean language proficiency. As of September 2013, only 2.76% of students in gifted education institutions are from these minority groups (Suh et al., 2012). However, they are likely to drop out from the gifted program. Recent research (Suh et al., 2012) found that only a few, but more than before, gifted education institutions provide the under-represented gifted students with bridge programs in order to help them to be mainstreamed into the gifted education programs successfully.

Number of Participating Gifted Education Students

As of 2013, there are 121,433 (1.87% of all students) students participating in a gifted program (see Table 2). Gifted education classes accommodate the greatest number of students, mostly in elementary and middle schools, followed by gifted education centers managed by school districts, gifted education centers affiliated with universities, and special schools for the gifted.

Table 2. Number of Students by Type of Gifted Educational Institution

Type of Institution	Science Academies	Gifted Education Centers		Gifted Education Classes	Total
	Science high schools	School Districts	Universities		
Number of Institutions	25	269	66	2,651	3,011
Number of students	5,263	32,444	8,735	74,991	121,433
%	4.33%	26.72%	7.19%	61.76%	100.00%

Source: GED (2015)

Note: Students of Science Academies are recruited at the national level, whereas those of science high schools from their provinces or cities.

The number of elementary and middle school students identified for gifted education is greater than the number of high school students in gifted education (see Table 3). This is because elementary and middle school students attend gifted classes and gifted education centers which provide enrichment program as extracurricular activities, whereas high school students mostly attend self-contained specialized schools, which provide challenging curriculum throughout the academic year during the regular school hours.

Table 3 Number of Students by School Level

School levels	Elementary	Middle	High	Total
Gifted Education Students	67,396	40,607	13,430	121,433
All students	2,784,000	1,804,189	1,893,303	6,481,492
%	2.42%	2.25%	0.71%	1.87%

Source: GED (2015).

Figure 2 shows that gifted education in elementary and middle schools is mostly provided through gifted classes, followed by school district gifted education centers, and university affiliated gifted education centers, whereas gifted education for high school students is mostly provided in special schools.

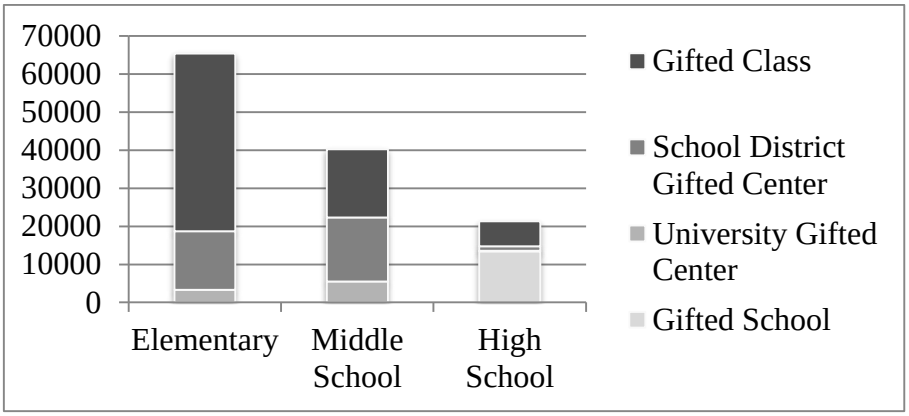

Figure 2. Number of Students in Gifted Education by Type of Institution and School Level

In summary, the statistics on the number of students participating in gifted education demonstrate that gifted education students in Korea are selected by each domain, by directors of each gifted education institutions following the multi-step screening rule.

Examples of Identification in Each Institution

In order to illustrate the practice of identification of gifted education students, examples of identification procedures, instruments, and criteria at specialized high schools for gifted education, gifted education centers, and gifted classes will be reviewed.

Specialized high schools for gifted education share many commonalities each other with slight differences in the choices of instruments, number of students to be selected, educational domains, procedures, and criteria. Out of 24 specialized high schools for gifted education, the example of the Korea Science Academy (KSA) will be reviewed, since it is evaluated as attempting to assess students' creative problem solving abilities the most authentically (Lee, Kim, Seo, Kang, Kim, & Lee, 2013).

Selection of Students at Korea Science Academy

KSA is a specialized high school for the gifted and it was established in 2003 to provide a challenging science and math program to 144 students recruited at the National level. KSA's goal is to cultivate creativity of students in Math and Science. Therefore, it is natural to select students who have demonstrated creative problem solving abilities in this domain (Ministry of Science and Technology, 2002; Seo, 2004).

For selecting students, KSA applies three steps assessment model: First stage is to review documents to select the best 1500 students out of all applicants; second stage is to administer

group paper-pencil tests to screen the best 200 out of 1500 students; third stage is to administer performance assessment to finalize the best 144 students. Specific identification criteria, instruments, and details of the procedure are prepared by the Students Selection, Recommendation, and Evaluation Committee (SSSC) of the KSA.

The 1st stage of screening is to review students' school records including grade point averages (GPAs), creativity, motivation for learning, passion, and personality. The 2nd stage of screening is to administer a group paper-pencil, creative problem solving tests in math and science. Problems used in the test should require students to solve math and science problems in a creative manner utilizing their knowledge and skills in math and science. Problems used are mostly open-ended in order to require students to think and solve using a multiple disciplinary approach. KSA has a unique policy to select students whose score in any one subject out of Math, Physics, Chemistry, and Earth Science is within top 5% of 144 students, even if their average score of all subjects is ranked below 144th.

The 3rd stage of screening is to select the final 144 students and it is conducted in two different ways: One way is evaluating students' performance in math and science for 3-4 days while students stay in a school dormitory and the other way is, a newly introduced approach, student portfolio review by an admission officer. KSA is going to compare the validity and efficiency of the two methods through follow-up research. Students choose one of the two methods for screening when they apply. Out of the final 144 students, 100 (70% of 144) students will be admitted through multi-step testing, whereas 44 students (30% of 144) will be admitted through the admission officers' review of portfolio. Specific methods for performance assessment may include observation of open-ended problem solving processes, science lab research, and an oral defense through intensive Q&A session. In this process, not only their creativity in math and science, but also their personality is also evaluated.

The portfolio should include application, school record, recommendation, statements (reason for application, science talent, Goals of study, future plan), and an essay on a topic which can reveal one's science talent by writing about personal experiences, or creative products that might reveal their science talent. Officers will evaluate the portfolio in terms of their originality, relevance, value, elaboration, and integrity.

Selection of students in KSA has strengths of evaluating multiple aspects of giftedness using information from various sources. However, it is criticized for low cost-effectiveness, since it costs high to have students stay in the dormitory for 3-4 days requiring many proctors.

Selection of Students for After-School Programs at Gifted Education Centers

Gifted education centers are affiliated either with universities or with provincial/municipal offices of education. These gifted education centers provide enrichment programs during after-school hours (Lee, 2012). The centers affiliated with universities provide more challenging and advanced programs than the gifted education centers affiliated with provin-

cial/municipal offices of education. Since 2002, selection of students at these after-school gifted education centers is generally conducted through a multi-step screening procedure. The multi-step screening is quite similar to the procedure used at the specialized high school for gifted students, except that the performance assessment will be conducted only during the day time. For example, Kyungwon University's gifted education center selected students through firstly, multiple-choice testing in math and science, secondly, creative problem solving tests in math and science, and lastly, performance assessments on inquiry and an in-depth oral defense. However, since 2010, the Ministry of Education, Science, and Technology started promotion of student selection through teacher observation-recommendation system because they were concerned that too many students were being privately tutored on test preparation.

Student Selection for Gifted Education Classes in Elementary Schools

Kim, H. and Han (2013) found that one of the four different methods is used in elementary schools to select students for after-school enrichment gifted classes: Multi-step screening (including paper-pencil tests, performance assessments, and interviews), group paper-pencil tests only, academic achievement records only, or self-nomination only. 594 Students who have been selected through different selection methods were compared in terms of their intelligence, creativity, motivation and self-regulated use of learning strategies. The comparison found that the gifted education class students at the school level were not significantly different from the gifted education center students at the district level. However, gifted class students were significantly different from the regular education students. In addition, gifted class students who were selected through group paper-pencil tests, multi-step identification, or academic achievement record were different from those who were self-nominated. The self-nominated gifted class students showed significantly lower intelligence, creativity, motivation, and self-regulated use of learning strategies than those who were selected through various kinds of assessments. The results warned that the selection processes based solely on teacher observation-recommendation should be examined for validity and reliability. Teacher observation-recommendation is generally recommended as a supplementary identification procedure to create a talent pool or as additional assessment in conjunction with test scores (Renzulli, 2004). Renzulli's identification system includes 50% of students identified as gifted through teacher recommendation. But another 50% of students were identified as gifted through testing first.

Summary and Discussions

The Korean practices of gifted identification have special features such as highly selective to the top 1.87% of all students, alignment of identification with gifted education curriculum by identifying talented student mostly in STEM, multi-step screening, teacher observation-recommendation system, yearly identification, and identification of under-represented gifted students. Korean gifted identification practices are mostly based on current theories and es-

tablished principles in identification of gifted education students. One of the well-established principles is collecting multiple pieces of evidence that measure different constructs and characteristics aligned with the gifted program's definition, goals, and objectives (Callahan, Tomlinson, & Pizzat, 1993), ideally including a variety of format types (e.g., paper-and-pencil, performance assessment). The multi-step identification at specialized high schools for gifted education follows this principle. However, selection of students based on teacher observation-recommendation at the gifted education centers and gifted classes does not. Although the concern for influence of test preparation tutoring should not be under-estimated, the basic principles should be observed. In addition, NAGC (2014) also clearly states that "the use of rating scales and interviews should play only a supplementary role in the identification process. Collecting these types of information is very difficult to do well because all individuals are affected by bias and prejudice, even if only at a subconscious level (p.3)."

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