| Gifted Education Database (GED): Information Management and Online Teacher Recommendation System | Üstün Yetenekliler Eğitimi Veri Bankası: Bilgi Yönetimi ve Online Öğretmen Değerlendirme Sistemi |

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Abstract

The purpose of the study is to explore the content and significance of the Gifted Education Database (GED), a Korean information service system for gifted education. The GED functions as: 1) an information management system and 2) a teacher recommendation system. The information management system collects and provides data in terms of statistics on institutions, teachers, and students, teaching and learning materials, and notifications. The teacher recommendation system helps teachers to recommend students through an on-line system. It also assists in the student selection process by providing users a step-by-step interface specifically designed for each stage. Overall, as a comprehensive collective information system in gifted education, the GED supports policy making on providing appropriate educational experiences for the outstanding individuals, particularly those with disadvantaged socio-cultural background by providing reliable data at the national level. At the user level, it increases data accessibility and provides customized services for people concerned with gifted education. As a result, the GED connects information and people and is a driving force for national growth.

Key Words: gifted education, database for gifted, Korean Information System

Öz

Bu çalışmanın amacı Kore'de üstün yetenekliler eğitimi bilgi servisi olan Üstün Yetenekliler Veri Tabanını (GED) açıklayarak önemini ortaya koymaktır. GED'in iki işlevi vardır; 1) bilgi yönetim sistemi ve 2) öğretmen öneri sistemi. Bilgi yönetim sistemi olarak kurumlar, öğretmenler, öğrenciler, öğrenme ve öğretme materyalleri hakkında bilgiler ve duyurular toplanarak istatistikler halinde sunulur. Öğretmen öneri sistemi, online bir sistemle öğretmenlerin öğrencileri aday göstermelerine yardımcı olur. Ayrıca sistem, öğrenci seçme sürecinde kullanıcılara her aşama için özel olarak tasarlanmış bir ara-yüz ile adım adım yardımcı olmaktadır. Üstün yeteneklilerin eğitimi ile ilgili toplanmış kapsamlı bilgi sistemi olarak GED, üst düzey öğrencilere özellikle de dezavantajlı sosyo-kültürel tabakadaki bireylere uygun eğitsel tecrübeler sunacak politikaların üretilmesine destek olacak güvenilir ulusal verileri sağlar. Kullanıcı seviyesinde, üstün yeteneklilerin eğitimleri ile ilgili kişilerin veri ulaşımını arttırarak onlara uyarlanmış servisler sunar. Sonuç olarak GED bilgi ve insanlar arasında bağlantı sağlayan ve ulusal büyümenin itici güçlerinden birisi olarak değerlendirilebilir.

Anahtar Sözcükler: üstün yetenekliler eğitimi, üstün yetenekliler veri tabanı, Kore bilgi sistemi

Introduction

With the enactment of the Gifted and Talented Education Promotion Act (GTEPA) in 2000, gifted education continuously develops in Korea. In particular, with the qualitative and quantitative expansion of gifted education in the past 15 years, the current number of gifted

education students in elementary, middle, and high school totals are approximately 120,000 a year. Consequently, operational aspects of gifted education institutions, such as the security of teaching and learning materials, teachers in charge, and management of gifted education subjects have rapidly increased. However, most data related to gifted education are managed by each institution in the form of document files or by hand, so it is not easy to collect and utilize this information. As a result, there is a need to manage this information with a policy consideration.

For efficient human resource development and utilization, it is essential to collect scientific and reliable information. In addition, a comprehensive information system is required to promote effective gifted education, implement efficient relevant research, and manage various materials. Accordingly, the construction of the Gifted Education Database (GED (https://ged.kedi.re.kr/)) is based on this social interest and need.

The construction and management of the GED was stipulated in the revised GEPTA in 2008, and in accordance with its implementing ordinances, the Ministry of Education, Science, and Technology[1]; 16 municipal and provincial offices of education[2]; and the Korean Educational Development Institute (KEDI) collaborated for three years and developed the GED. The GED has been collecting information on gifted education since 2009. Up until now, the GED carries out a support function for educational sites while meeting the information demands with advanced system development. In this paper, major functions and the content of the GED system are reviewed and the significance of the GED will be discussed.

Primary Functions of the GED

The GED collects and manages information on gifted education in Korea. Based on the collected data, it provides indicators as well as related statistics on gifted education. In addition, the GED helps gifted educational institutions select gifted education students. GED has three main parts: 'Registration and Management' and 'Selection of Gifted Education Students.', and 'Information on Gifted Education' 'Registration and Management' is used to collect and manage gifted education statistics and 'Selection of Gifted Education Students' is used to recommend students for gifted education. 'Information on Gifted Education' is composed of three sections: A brief introduction to the GED and Q&A; statistics, gifted education institutions, gifted education students' selection, and a variety of information; and information for gifted education faculty and students. The GED introduction and basic statistical data can be accessed freely. However, to access the rest of the data, approval to be a member is required from the National Research Center for Gifted and Talented Education.

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[1] The Ministry was renamed Ministry of Education in 2013.
[2] The number of municipal and provincial offices of education in Korea increased from 16 to 17 in 2012 when Sejong Special Autonomic City was established.

Comprehensive Management of Information on Gifted Education

The GED presents vast information related to gifted education in four categories: Statistics, record, data, and notification.

Statistics. Statistics section provides overall picture of the status of gifted education by gathering comprehensive information related to gifted education. The GED is structured to calculate integrated statistics that is hard with the simple aggregation of data managed by each institution. Basic statistics are presented and detailed information is found in the statistics annual report.

In 2014, the GED conducted a survey to 17 Offices of Education (municipal and provincial offices of education and regional education supporting agencies) and educational institutions to collect data on gifted education across the country. The following is a brief description of the overall input and verification process that officers of gifted education institutions and GED staff (NRCGTE, KEDI) go through in the GED system.

Table 1. Example of Input Process of GED Statistics in 2014

Process of data input	Contents
Data input period	Aug. 23, 2014 (Sat) ~ Aug. 30 (Sat) * Additional input period: Aug. 26, 2014 (Sat) ~ Sep. 3 (Wed)
Input process	- After linking to the GED education for the gifted DB, log in to the institutional account granted, and then input the statistics - Organization for 6 phases in institution information ► status of operation ► operation data ► class information ► student information ► faculty information ► input
Data verification	- 1st examination: Each institution examines details of every input data. - 2nd examination: Each municipal and provincial office of education examines every data from institutions in the area. - 3rd examination: GED staff examines every data from each municipal and provincial office of education. - 4th examination: Each municipal and provincial office of education reexamines every data from GED staff and makes final confirmation

Basic statistics produced through the above process is shown in Table 2.

Table 2. Statistics on Institutions of Gifted Education in Korea (2014)

Segment	Gifted School/ Science high school	Gifted Education Center		Gifted Class	Total
		Affiliated with Offices of Education	Affiliated with Universities		
Number of educational institutions	26	278	71	2,545	2,920
Number of gifted education students	5,695	32,094	8,928	71,232	117,949
Ratio of gifted education students	4.83%	27.21%	7.57%	60.39%	100.00%

Table 3. Statistics on Gifted Education Students in Korea (2014)

Segment	Elementary School	Middle School	High School	Total
Number of gifted education students	64,427	39,304	14,218	117,949
Number of student population	2,728,509	1,717,911	1,839,372	6,285,792
Ratio	2.36%	2.29%	0.77%	1.88%

Since 2012, the above basic statistics and the *'Statistical Yearbook of Gifted Education'* is published at the end of each year. This report presents detailed statistics and information on gifted education. Its English version is published next year.

Record. There is a larger number of gifted education students in Korea in the lower grades than in the higher grades, forming a pyramid shaped development system. Therefore, the record management on how gifted education students go through their educational and career path is important. This data serves a solid foundation for establishing systematic and strategic policies on gifted education.

The GED collects and manages the records of gifted education students, including courses completed in particular education programs and awards in competitions. However, information is voluntarily inputted so only approximately 80% of the information is collected each year. In addition, some information is omitted or not detailed enough to serve the initial purpose of tracking the educational and career paths of individual students.

Furthermore, the revised Individual Information Protection Act in 2013 restricts the collection of private information. With the minimization of the collection of individual information in the GED, efforts to improve the record management system turn to determining the core status of educational advancement and career paths and increasing safety to prevent information disclosure. The rearrangement of this data management system has been planned and is underway. Currently, data about gifted education history and choices of college major of gifted school students is collected in the system.

GED library. The GED provides outstanding and verified teaching and learning materials for gifted education through the GED library, which is equipped with a nationwide data sharing system to improve the quality of the educational field.

The GED library is structured to provide data through an advanced search on applicable data related to gifted education. Following the classification system, data may be searched by policy, research, teaching and learning, institution operation, student selection, faculty training, parents, and others. The data search is available by region, year, author, keyword, data source, and so forth.

In order to facilitate structuring of the GED library, high quality data needs to be uploaded in sufficient volume. The teaching and learning data often do not specify their source, so

there is frequent revision and supplementation of specific parts of existing data that need a thorough review related to copyrights. To assist in collecting data efficiently, the GED includes an online guide with cases of copyright infringement and precautions related to copyrights.

Notification system: Allimy. To decrease the gap in gifted education opportunities caused by discrepancies in SES, private tutoring experiences, and the socio-cultural background of high potential students, the GED structured the information notification system for gifted education institutions with the name 'Allimy' (which means notifier) at the end of 2013.

Allimy for gifted education institutions is a system that provides all information of each institution, including student selection process, curriculum/program, program regulation, etc., available on gifted education throughout the country in full view. It is expected to improve educators' understanding of and access to gifted education.

Teacher Recommendation Selection System (TRSS) for Student Selection

The need for the introduction of the TRSS for student selection was expressed in the 2nd National Comprehensive Plan for the Promotion of Gifted Education in 2008. Since 2009, the Ministry of Education, Science, and Technology promotes the teacher recommendation system nationally to replace the existing selection system of paper and pencil tests. However, the heavy burden on teachers resulting from complicated screening steps as well as reliability and validity issues are needed to be addressed. To alleviate these issues, KEDI constructed an online TRSS as a part of the GED in 2009. It allows teachers to recommend students through online system efficiently and conveniently.

Online provision of various checklists. The GED TRSS provides various checklists developed by KEDI and related experts. The checklists are used by students, parents, and teachers to enhance their understanding of the recommendation process and its results through their participation.

Table 4. Checklist for GED Teacher Recommendation System

Segment	Kinds of checklists
For students	KEDI leadership characteristics checklists (full version, simplified version, elementary & middle level), KEDI creative personality inventory, student self-report
For parents	Parent's application form, KEDI-Gerric checklists for parents
For teachers	KEDI gifted behavioral characteristics checklist, KEDI leadership characteristics checklists (simplified and full versions), KEDI creative personality test, Science aptitude checklist (elementary and middle), Mathematics aptitude checklist (elementary and middle), Information science aptitude checklist (elementary and middle)

These checklist and reports are stored online and revised until their final submission. Therefore, it is possible for teachers to begin observing and continue updating records of their students' gifted behaviors throughout the year.

Online student selection system for gifted education. Even though the Ministry of Education and Human Resources encourages gifted education institutions to utilize the GED online student selection system as much as possible, not all gifted education institutions use the online student selection system yet.

The GED student selection system supports the process of selecting gifted education students from teacher observation/recommendation, screening at each school, and selection into gifted education institutions. The GED online system establishes a more efficient selection system and enhanced user convenience.

Information on student selection period, criteria, and procedures at each gifted education institution can be searched through a search engine. This search system allows any student, parent, or teacher to access information on selection of gifted education students throughout the nation.

Application: Students and parents apply by accessing the 'Application' menu. Students and parents complete forms such as a self-report, parental application, checklists on gifted behaviors, and results of tests on student leadership characteristics, student creative personality, and student interest for self-recommendation. Recommendations are made by homeroom teachers, subject teachers, gifted education teachers, and third parties who know the student's characteristics well by using checklists provided by the GED and other materials, including data written by students online.

Selection: School recommendation committees at each school access the 'Selection' menu for the school recommendation committee and review teachers' submitted recommendations. Next, the Screening Selection Committee at each gifted education institution use the 'Selection' menu to input final selection results. Information about selected students is linked to the GED status information on gifted education students.

The GED TRSS provides a step-by-step interface so users can understand and conduct each screening procedure easily. In addition, powerful selection management functions are provided for utilization of evaluation factors and a variety of screening steps responding to characteristics of each institution.

Significance of the GED

The GED can help stakeholders manage or search a wide range of information on gifted education. It also provides various users with customized services. In addition, it is possible to carry out student selection efficiently since all people involved in the selection process com-

pile, submit, and review the documents through the online TRSS. The following describes the significance of the GED in detail.

Availability of the GED at the National Level

E-management of gifted education records. Since systematic management of information on gifted education has not been done since the 1980's, it is difficult to locate information on Korean gifted education. To put into place national plans for the continuous development of gifted education, it is essential that information related to gifted education in terms of when, where, by whom, what, and how gifted education has been implemented be compiled and managed systematically.

For Korean general education, the National Education Information System (NEIS) records and manages information on general education, and it is expected that the GED functions similarly to the NEIS in gifted education. In this respect, the construction of the GED is significant in that it contributes to long-term and comprehensive e-management of gifted education records by standardizing gifted education information created at each gifted education institution, city, or province and by establishing a national-level management system for individuals to the Ministry of Education.

Reducing the gap in gifted education opportunities. While private tutoring and private education businesses are prevalent, recognition and selection of gifted and talented students from disadvantaged families is a serious issue in Korea in accordance with Clause 1, Article 1 of GTEPA. In big cities, affluent and motivated parents maneuver the information dissemination routes to access detailed information on criteria, instruments, and processes of student selection. In remote areas, information related to gifted education reach parents only if school teachers are diligent enough to disseminate information to them. This information gap on gifted education hinders the national goal of gifted education, which is to recognize the gifted and talented and to actualize their potential to the maximum, regardless of their environmental limits.

Fortunately, based on fast and inexpensive Korean broadband internet, the GED TRSS easily connects most families and individuals to gifted education information online. Since the GED TRSS allows parents to access detailed selection information and educational courses suitable for their child, time and cost required to obtain critical information are greatly reduced. In addition, parents can draft and store records of their children's giftedness and write web documents required for the selection process through the GED. The stored data are important materials for the selection of gifted education students, such as teacher recommendations, that contribute to the discovery of hidden talents and to a fair selection process. In addition, the 'Allimy system for gifted education institution' allows general public to access to information on gifted education.

Availability of the GED: At a User Level

The availability of the GED is presented more specifically by a comparison of users' convenience before and after construction of the GED, as shown in Table 5.

Table 5.Data Access and Management Before and After the GED

Users	Function	Before the GED	After the GED
Students and parents	Obtain information on student selection at gifted education institutions	Through community of the private institute. The validity of information is not guaranteed.	Through a national-level system. The validity of information is guaranteed.
	Apply to a gifted education institution	Documented and submitted offline	Documented and submitted offline
Gifted Education Teachers	Compile education courses and teaching/learning materials	Personally secured and managed data created by an individual teacher or gifted education institution	Systematically compiled comprehensive information for using and sharing
	Recognize students' characteristics	Personal interview and survey	Review of students' annual records
	Implement selection process	Offline paperwork	Online operation
Administrators and researchers	Monitor operating status	Collected and edited excel status reports created by individual gifted education institution	Real-time views through a statistical system
	Share specific information	Information obtained by personal efforts	Information acquisition through a shared network

Gifted education students and their parents. Above all, it is meaningful that the GED encourages prospective gifted education students to draft and manage information on their gifted education experiences every year. In the GED, gifted students' educational information is stored annually, and it is possible for students with high potential to experience monitoring and management of their educational records through the GED.

From the parents' perspective, the greatest advantage of the GED is that they can choose educational institutions and courses for their children's talent domain based on reliable information through the GED.

Gifted Education Teachers. Planning educational courses using good teaching and learning materials are important to ensure high quality gifted education. Gifted education teachers refer to operating plans of gifted education in Korea and view teaching and learning materials created by other institutions, cities, and provinces through the GED. In addition, gifted education teachers plan individualized education and guide students by accessing individual student records that are readily available through the GED. The work load caused by additional duties such as preparation and management of related documents for student recommendation and selection are greatly relieved.

Gifted Education Administrators and Researchers. The GED compiles and manipulates real-time information to create complex statistics based on basic data input man-

aged by each institution; discloses real-time gifted education statistics to the public; and provides policymakers, administrators, researchers, and experts with valuable analytical data. In addition, accumulation of long-term data will contribute to development of macroscopic and empirical policies on gifted education. Furthermore, information on research projects and technical reports as well as performance information is shared with administrative institutions, research institutes, and professionals to enhance gifted education research quality and collaboration among experts.

Conclusion

In this paper, it has been examined various features, merits, and significance of the GED, which is considered an overall information system on the gifted education. The GED not only provides officials concerned with gifted education at home and abroad with reliable and specific information, but also allows them to participate actively in the database construction and manage related information. In this regard, if the GED is managed and operated efficiently, the positive ripple effect on all areas of gifted education will be enormous. However, there still exist many issues to be solved to satisfy this expectation.

A database is just a chunk of information combined and stored systematically. To extract information from a database, process the information for users' convenience, and provide it to a user interface, a completely separate operation is required. The advantage of the current GED is that it can provide various functions required to maintain and manage the database. In the future, continuous improvement on the diverse data held by the GED will be needed so that data are easily available and conveniently useable for users.

In addition, since the GED has personal key information on numerous human resources, its security needs to be strengthened. This matter is related to the invasion of privacy due to personal information disclosure of the NEIS, considered as Korea's typical educational administrative information system. This is already a social issue and has great implications for the GED. The GED needs to refrain from excessive collection of personal information and be very strict in selecting key information required to help understand gifted education correctly and enhance its quality. In particular, since the GED is accessible to overseas users, security measures will need to be enhanced so that users in foreign countries can utilize the system through a safe security system.

In terms of information input, the GED is operated by an autonomous system without coercion since methods and procedures of information collection are based on the voluntary participation of users. Aside from an accurate understanding about the system and its usefulness, the utilization level of the system is low. Accordingly, consistent improvements that consider users' convenience are top priority. Publicizing the system and targeting a wide variety of users are also required so that those concerned with gifted education can have a correct understanding of the GED and utilize it efficiently.

To solve pending issues and provide superior services, the security of stable financial resources to operate the GED is required. The GED is operated through cooperative links with the Ministry of Education, 17 municipal and provincial offices of education, and KEDI, but the financial resources are somewhat fluid and unstable. In the future, to ensure stable financial resources, government funding should be provided.

The GED is considered to be a system with infinite potential. In this sense, it is expected that the GED will develop into a system integrating and connecting information on gifted education laterally and longitudinally beyond time and space, based on the interest and support of all persons concerned with gifted education.

References

GED website: https://ged.kedi.re.kr/