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Research Article

Online Identification of Gifted Students: UYCEP Module

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Abstract

The purpose of this study is to identification gifted students using the online module. The sample selection of the scientific research project 'The effect of gifted students' differentiated social studies education on their verbal creativity' was carried out with the help of this online module. This research project was supported by the Akdeniz University. The solution partner in the project is UYCEP, which provides training for gifted students. This research was used qualitative model to the case study design, which is intensive research on experts of gifted and talented. This research uses a single case multi-side exploratory case study. The study was carried out with demographic characteristics, culture-free intelligence tests and creativity tests based on UYCEP virtual results. With the module both intelligence and creativity of the students were measured. Formal and informal data were also collected for identification. Students using the module are middle school students in Antalya Province. Based on the identification model, demographic information is obtained first and then intelligence and creativity tests are held. Teachers' opinions are consulted for the latest confirmatory information. A detailed evaluation score about the students is obtained from all the data. It has been observed that the online module used in the implementation of the model works flawlessly with all its functions. Later, a module that can be used in online identification of gifted students was introduced.

Keywords: *Gifted and talented, distance education, online identification*

Introduction

The most researched topics in the field of gifted education in recent years are about their technology use and identification. The use of technology has increased rapidly in recent years. This increase is observed in many areas from education to other sectors (Belland, 2009). These technological adaptations are also made in the identification process of gifted students. Many intelligence tests and other psychometric tools can be accessed online. In this sense, it is important to understand what identification is and what tools are used for it.

Identification of gifted students is an evaluation process of areas such as intelligence, talent, success, creativity, and leadership. Tests are applied in many areas to increase the validity and reliability of the evaluation (Moore, 1992). Intelligence tests, ability tests, creativity tests, and teachers' opinions are used to identify gifted students (Çetinkaya, 2014; Şahin & Çetinkaya, 2015). While psychometric tools mostly measure individual characteristics, others measure traits such as leadership, motivation.

The importance of identification is understood by answering the questions of why, when and how (Pfeiffer, 2008). There are different ways of identification for all ages and purposes. Certain principles need to be taken into account in order to set standards for identification. These principles are usefulness, scientificity, comprehensiveness, equality, continuity, and the use of appropriate tools and so on (Sak, 2014). Identification is generally made on an individual basis or on a program (Heller &

Schofield, 2008). This situation contains two different approaches within itself. These approaches are one-dimensional and multidimensional.

There are different opinions in the identification of gifted people (Çetinkaya & Inci, 2019). In one of these opinions, it is explained as having a g factor or a high intelligence level. This is the one-dimensional approach. According to the one-dimensional approach, only the intelligence level is taken into account. The other approach is the multilateral one. It is possible for an individual to show high talent in more than one field (Pfeiffer, 2003). In this perspective, high talent is considered in areas such as creativity, motivation, and leadership. Multidimensional evaluation is made using multiple criteria or multiple tests (Stephens & Karnes, 2000). Current identification models focus on using all scales as multiple (Heller, 2004).

The evaluation should be renewed periodically. It is unreasonable to identify once and arrange the entire educational process according to that test result (Sutherland, 2008). Many innovative models, such as the constructivist approach, plan to evaluate the process. Intelligence tests and psychometric tools can be used at certain intervals. In this sense, program-based identifications in which students are checked regularly should be preferred instead of following a training program without being checked after being identified once (Heller & Schofield, 2008).

Use of technology in identification

Nowadays, the concepts of intelligence and technology have started to be used together frequently (Belland, 2009). Fields such as artificial intelligence applications show themselves in new research fields. The field of information technologies makes a difference compared to other fields in the world, especially with its studies on intelligence (İşman, 2005). As it is known, the internet is a communication tool that enables access to information in a short time and interactively (Ceyhan, 2008). In many areas, problems can be solved by accessing via internet without the need for people (Shavinina, 2009). Today, internet use provides information and interaction in the field of education as in almost all field.

Computer-based teaching environments provide students with access to much information simultaneously. The use of information technologies makes it easier for gifted students to gain their goals in the field of education. Comprehensive training modules for students allow them to be identified online (Çetinkaya, 2020). Online identification modules can serve as a part of the education environment of gifted students (Rotigel, 2003).

Online identification module

An application form has been created in order to receive the applications of the students in the module. Students have been provided with access to information such as demographic information, identification of giftedness and anamnesis. When the technical features of the module are examined, it is seen that it works as a subdomain on the website. The application website has been developed using .Net Core Framework and MVC architecture. MySql database is used to secure the data. The project environment has been developed using Pomelo Entity Framework and MySQLConnector used with Visual Studio software. C # programming language, HTML, CSS and Javascript were used together in the project. The database consists of a total of six tables as shown in Figure 1.

Admin Info	Cevap	Sinav	Sonuc	Sorular	Student Info
Id	studentId	sinavId	sonucId	soruId	studentId
Email	soruId	totalSure	dogruSayisi	soruImg	Name
Password	cevap		yanlisSayisi	ans1_Img	Surname
Name	cevapId		bosSayisi	ans2_Img	Email
Surname			baslamaSuresi	ans3_Img	Password
TC			bitisSuresi	ans4_Img	Age
				ans5_Img	Grade
				ans6_Img	
				ans7_Img	
				ans8_Img	
				dogruCevap	
				sinavId	

Figure 1. **Database table structure**

Figure 2 and Figure 3 show the registration and login screens. Questions and options consist of visual elements.

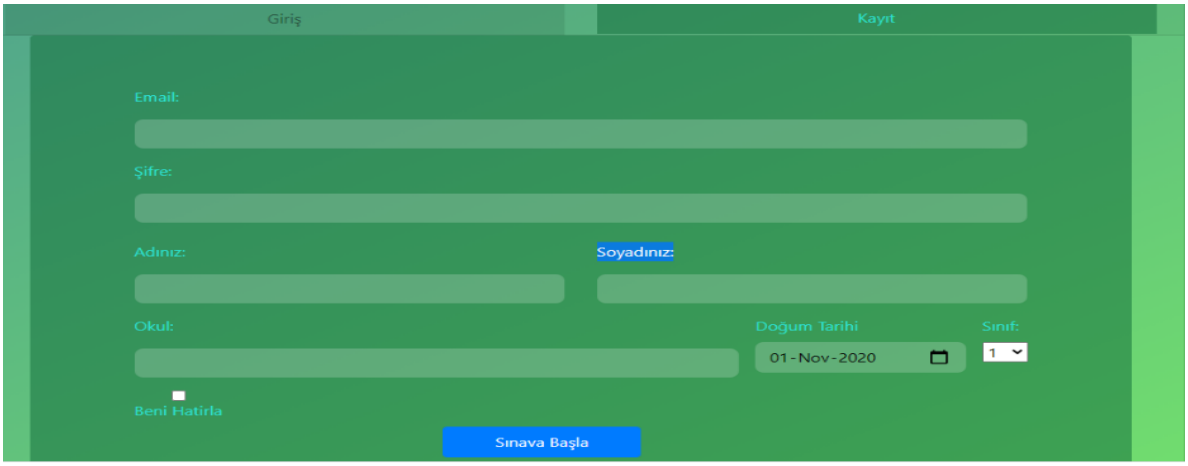

Figure 2. **Student registration page**

Figure 3. **Student login page**

The information shown in Figure 4 is given to the student on the login screen.

Figure 4. **Exam entry screen**

Figure 5 shows the exam screen. After marking each question, the student must save the answer. Then move onto the next question will be made. The exam ends with the command “Finish the exam”.

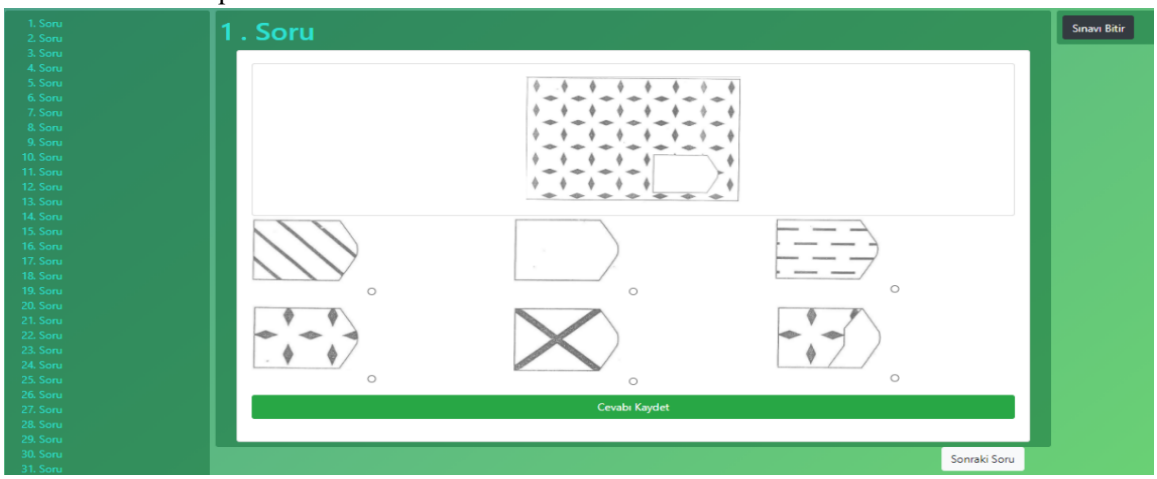

Figure 5. **Exam screen**

Figure 6 and Figure 7 show the exam results screen on the student and administrator side. Student information and details about the exam are displayed by the administrator on this screen.

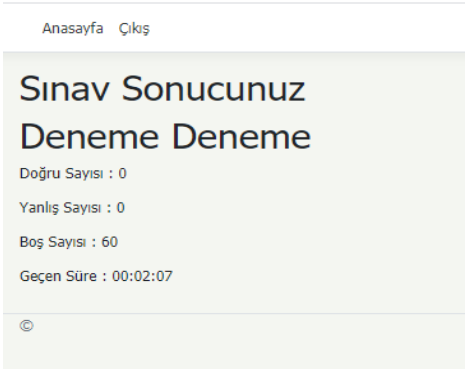

Figure 6. **Student exam result screen**

Figure 7. **Student exam result screen**

When the content features of the module whose technical features are given above are examined, it is seen that it consists of sub-components. Three basic criteria are used to identify gifted students. These are norm-based, sample-based, and criterion-based identifications (Flanagan & Harrison, 2012). Since the model has criteria within the scope of the program, it is criterion-based. The process in the model works as follows respectively: nomination of the student, pre-evaluation, group screening, individual review, and making the final decision.

Nomination

Valid and reliable tools filled out by the teacher are needed to determine the indicators of giftedness (Pfeiffer & Jarosewich, 2003). Teachers' views are one of the most used methods in recent years. Teachers nominate candidates by making more accurate observations than parents (Çetinkaya, 2015; Davis & Rimm, 2003). In the nomination process of teachers, tools have been used such as:

Gifted Rating Scale (GRS) (Pfeiffer & Jarosewich, 2003).

The Scales for Identifying Gifted Students (SIGS); Ryser & McConnell, 2004).

Scales for Rating the Behavioral Characteristics of Superior Students, (SRBCSS); Renzulli et all, 1997).

Gifted Evaluation Scales (GES); McCarney & Artahud, 2009).

Pre-evaluation, screening

Scales whose validity and reliability have been studied are used for screening. Screening is done especially from the preschool period to the high school level. Gifted Rating Scale-Preschool / Kindergarten has been used for screening (Pfeiffer & Jarosewic, 2003). The evaluation of students' cognitive, intellectual, academic, creativity and motivation areas are made at this stage. The data in the nomination process are confirmed at this stage. According to the data obtained, it is decided which tests will be applied to the students in the next stage.

Group screening

Group screening is an effective method to reach a large number of people. It is also easy to score; it does not require training for application and scoring, and it is economical. Data obtained from Raven Standard Progressive Matrices Test Plus (RSPM Plus) has been used as a group intelligence test in the study. RSPM Plus is a non-verbal formal test (Raven, 2000). Its first output has been in the form of RSPM. Two more versions have been published afterwards. These are Raven Colored Matrices Tests and Advanced Progressive Matrices Tests (Mills, Ablard, & Brody, 1993). RSPM has been made difficult to prevent ceiling effect in the 7-16 age group. In this way, it has been diversified as Plus.

RSPM Plus is a test that requires the completion of the patterns and in which each new question is asked over the previous one and as a continuation of it, so it is getting more difficult accordingly (Çetinkaya, 2007; Zaaiman, 2001). While applying this test, cultural characteristics (education, nation,

race, etc.) are considered free (Fould & Forbes, 1975). It is an equally useful test for all ages, education, nationality or physical condition. There is a total of 60 items in the test. These are made up of 12-item subsections indicated by the letters A, B, C, D, and E. RSPM measures "eductive ability", so it is aimed to measure the types of talents with this test. Consequently; nonverbal analytical argumentation, problem solving, reasoning, correct and regular thinking, abstraction, scrutinising and mental skill speed are measured. In this test, it has been revealed that a complete transformation of the processes of children, over the age of 8, like argumentation and reasoning could be achieved (Raven, 1960).

Individual review

In the model, individual intelligence test is applied to candidates determined by group intelligence test. In this way, both a detailed identification and a group intelligence test result are compared. Among the individual intelligence tests, the Wechsler Intelligence Test, which is the most widely used across the country, is used. The scale is an individual intelligence test and requires expertise in application and interpretation. It is disadvantageous in terms of time and cost compared to group intelligence tests. The Wechsler intelligence test fed on the theories of C. Spearman and E. L. Thorndike (Zhui and Weiss, 2005). The test gives total intelligence quotient (IQ) score, verbal and performance IQ score.

Another test used is the Stanford Binet Intelligence Test. It is the first intelligence test developed in 1905 by Alfred Binet and Teodor Simon. It consists of 30 items for ages 3-13 and progresses from easy to difficult. It was later updated by Terman at Stanford University in 1916. The updated version includes 90 items for 3-14 years and adults. In Turkey, it took its last revision in 1972. It is used as such in all institutions (Öner, 2012).

Torrance Test of Creative Thinking (TTCT) is another tool used as well. The test consists of the Formal A-B and Verbal A-B forms. The formal part of the test consists of two categories: norm-based and criterion-based. Norm-based determinants: Fluency, originality, abstraction of titles, enrichment, and resistance to early closure. Criterion-based determinants: Emotional expression, ability to verbalize the story, movement or activity, articulation of the titles, incomplete shapes and line synthesis, unconventional visualization, internal visualization, fantasy, stretching the boundaries, humor, richness, and colorfulness of imagination. While the test was being developed, many assumptions such as creativity as a natural ability, incompatibility in activities, awareness of incompleteness, and problem solving were accepted. (Torrance, 1966; 1967; 1974).

The final decision

The final decision mechanism of the model is based on Renzulli's 3-ring theory. According to Renzulli, gifted individuals have three skill sets that interact with each other. In order for an individual to have a giftedness consisting of general-special ability levels, motivation and creativity clusters, he/she must be at least 85% more successful than his peers in each cluster and have 98% of success rate in at least one of the clusters. One of these areas is creativity which means creating new thoughts and using these thoughts in solving problems. Special abilities are the talents in scientific fields such as music, theater, mathematics, science and chemistry. Motivation, on the other hand, is considered as the ability to take responsibility for superior tasks. In order to achieve giftedness, there must be an interaction between these three feature sets (Renzulli, 1999; 1998; 1986; 1978). A score about the students is obtained by taking the equally weighted average from the three fields.

Method

This research was used qualitative model to the case study design, which is intensive research on experts of gifted and talented (GT). This research uses a single case multi-side exploratory case study (Yin 1994). Data were collected using semi-structured interviews (Gall, Gall & Borg, 2003) with sixteen respondents consisted of two GT academic staff, eight GT teachers, six teaching assistants. 16

people from the teaching part of the module participated in the research. Two of them are academicians who have completed their doctorate. Age ranges of them are between 38-45. Their professional experience is over 20 years. There is a total of 8 teachers in the research. The age range of the teachers is between 26-35. Their professional experience is over at least 5 years. 6 assistants also participated in the research. Age ranges of them are between 20-24. Their professional experience varies between 1-3 years.

Data were collected by face-to-face interviews conducted with respondents including gifted academic staff, teachers of teaching assistants of gifted education. The interview process was conducted through the preparation of recording and verbatim procedures based on the interview questions. Interview respondents were determined by using purposive sampling involving individuals who have specialized experience in building gifted students. Interview data analysis was conducted through processes of transcription, data reduction, data coding, validation and conclusion upon completion of the data gathered process.

Participants were given a consent form to be completed prior to data collection process. The form consisted of consent for recording, information on confidentiality and an explanation of the aims of study. In this study questionnaire form on demographic characteristics was completed by the participants. For the interview, a semi-structured interview was developed comprising of general questions about participant's views on module' contents. Participants were enrolled after ethical approval was gained. Data were collected from September 2020 to February 2021 via UYCEP online services. Data collection procedures face-to-face interviews which were conducted in Turkish language. Interviewees were asked to effect on their experience of working with gifted and talented students. A semi-structured interview using interview was utilized throughout the research process to the data and analysis process. The interview process for 30 to 60 minutes and were recorded and transcribed verbatim. All of questions from the interview were;

Answers to the following questions were sought during the interview.

Is the module easy to use and understand?

What are your views on the identification steps?

Is it suitable for multilateral identification?

Result

In this section, answers to the questions in the research are sought. Many questions from the structure of the module to its functionality were answered by the participants. Within the framework of these answers, opinions were reached on whether the model chose the right people or not. In this sense, the module's ability to reach the kits widely and its multidimensional measurement are among the remarkable features of it. In the research, the usefulness of the module was examined first.

Usefulness of the module

In many systems working online, the most basic expected feature is to serve the purpose. When students enter the evaluation panel for identification, they should easily complete the study. In particular, the needs should be met at the access and speed point. In the module, students' needs are met in terms of easiness of access, software optimization and convenience of using interfaces. The software languages used are suitable for both mobile applications and computer use. In this sense, it is thought to be useful both in terms of software and content of identification. The opinions of the participants in the interviews can be listed as follows;

*"The module is very useful, and it is clearly explained where and what to do. There is no difficulty in entering and exiting. Providing easy access is advantageous for students to use" (*GTt2)

As it can be seen from the GTt2 participant's views, the most important thing expected from a software program is usability. The software language used is also effective in using the program effectively. The evaluation processes of the students' progress step by step. This allows them to

progress on the module without causing confusion. Students move on to the next stages by answering the questions in the tests that come to them at each step. The parameters to be measured in each step are measured clearly.

Identification Steps

Steps in identification; nomination, pre-evaluation, group screening, individual review, final decision. Large masses are reached with these steps. An important step to get the best sampling from the population is provided by the module. Manuals for teachers are designed to nominate students. Manuals guide teachers on how to evaluate students in the cognitive domain. The module is also suitable for group screening. It has a database and server capable of evaluating hundreds of thousands of students simultaneously. In the next step, it also provides the opportunity to apply individual intelligence tests and psychometric tools. The module also includes algorithms that provide a weighted average from all data and obtain a result score. The opinions of the participants in the interviews regarding this area can be listed as follows;

"The module includes all steps in the identification process a student. When the literature is examined, it is seen that the identification made with these steps was successful. All the necessary parameters for finding the gifted student and training him/her are included in the module." (GTas1)

"The cognitive skills of the students such as memory, postprocessing etc. are evaluated very well in steps. It is a desired result that the student is evaluated in all areas as a whole to obtain a total score" (GTt5)

"The identification process goes gradually. The students know where, when and what to do. This allows them to be evaluated as post-processing" (GTta1).

Considering the views of GTas1, GTt5, GTta1 participants, it is seen that the module progresses step by step. At each step, irrelevant students are eliminated. The remaining students move on to the next step. Overall scores of the students who have completed all the steps are obtained. This shows that a multidimensional and systematic evaluation has been made. It has a suitable structure especially for longitudinal and multidimensional evaluation. This situation is important in revealing the general and special ability areas of the students in a multi-dimensional way. Since data about students are obtained in many areas, it provides opportunities to direct them to different curricula for their individual characteristics.

Multidimensional Identification

In recent years, the tendency to multilateral identification has been increasing worldwide. Not only formal tools but also informal tools are used. Students are not recognized only by the results they get from intelligence tests thanks to multidimensional identification. Data are also obtained in areas such as creativity and motivation (Şen et al, 2014). Teachers' opinions are also taken into account in the evaluation. Multidimensional evaluation has an important place in determining the general and special ability areas of students. In particular, it makes possible to evaluate for a certain program. For example, when a student is directed to a program in the field of software, a decision is made about the student by considering the parameters specific to this area. The opinions of the participants about this section are as follows;

"Evaluation in the module is done systematically in a multi way. Nomination, pre-evaluation, group screening, individual review, final decision stages are working properly. All areas included in the definition of giftedness can be evaluated in the process" (GTas1).

"The module is progressing sequentially. It's like a computer game that goes one step at a time. Each level is related to the next and has the necessary content for multiple evaluation" (GTt3).

"It plays an important role in the selection of students for the purpose. For example, it offers multilateral data to find a student capable of reasoning. It provides a composite score from these." (GTt7)

"With this module, we can see students' knowledge in all field. Each step provides new data on them. We can do a job like a mine or archeology excavation online" (GTta2)
"There are steps within the module that allow evaluation from many aspects. It's like playing a game on the computer" (GTta3)
"Here I experienced a vivid example of the multiple evaluation we learned in lessons. It is pleasing to see the theoretical information we learned in the books on the computer screen for multiple evaluation" (GTta5)
Considering the opinions of GTas1, GTt3, GTt7, GTta2, GTta3, GTta5 participants, it is seen that the module provides all the features of multiple evaluation. With the module, results are not only obtained from intelligence tests. Teacher opinions, general and special ability tests, multiple intelligence tests, and all special ability areas are included in the module. In each step, like the steps of the pyramid, it is passed to the upper level. Finally, the best students can be reached at the top of the pyramid. It plays an important role in finding and bringing out gifted individuals in society. It also directs the identified students to receive training for their abilities according to their scores in different fields (Çetinkaya, 2013).

Dıscussıon And Suggestıons

According to the results of the research, the module is suitable for multidimensional evaluations in terms of content and technical features. The application website in the module has been developed using .Net Core Framework and MVC architecture. MySql database is used to store the data. The project is developed using used Pomelo Entity Framework and MySQLConnector with Visual Studio software. C # programming language, HTML, CSS and Javascript are used together in the project. It is used very easily in terms of accessibility and applicability. The increase in online education environments in recent years has also improved online evaluation processes. Çetinkaya (2020) emphasized the importance of online education modules in the life of gifted students in his study. In an educational environment, such activities as identification, teaching can be designed online for gifted students.
Online developments in educational technologies increase diversity in learning and identification. With the use of open-source codes in this area, the widespread impact is increasing. Online platforms constitute the basis of distance education. It is known that students are highly motivated in easy-to-use programs. Touretzky (2014) states that the easy-to-use menu of the program in his study is liked by the students. According to the study, choosing easy-to-use programs increases students' motivation and success. It is a remarkable feature that the module includes steps for evaluation and has an easy algorithm. Kelly (2013) stated in her study that students enter the program with visual supports and simple steps. On the whole, students have positive attitudes towards technology use. It is known that especially gifted students and others have high motivation to participate in online studies (Alfehaid, 2019; Çetinkaya, 2020). Being evaluated online by using technology is welcomed by students. Rennie & Jarwis (1995) states that students have positive opinions about using technology. Again, Rohaan et al. (2008) states that students' perception of technology use is at the desired level and positive.
The identification module works in steps. It has a structure that selects gifted students from general to special. It is reached with a purposeful sampling module that will best describe the population. Similar studies have been done for each of the steps. There are studies for the screening and nomination stages that the identification module deals with. Especially recent research produces solutions for the nomination, screening, and determination of general and special ability areas of gifted students (Alma, 2015; Budak, 2007; Çetinkaya, 2007; Dağlıoğlu, 2002; Karadağ, 2015; Yakmacı Güzel, 2002). Similar processes are operated for all the students and the principles of equality are provided. It has the potential to reach large masses from pre-school to high school level. The module contains short explanations and instructions. Descriptive instructions are of great importance in obtaining accurate

results (Feldhusen, Asher & Hoover, 1984; Feldhusen & Jarwan, 2000). These instructions serve as a guide especially for teachers. Giftedness and talented are expressed by teachers also as highly mental power and mental performance (Rohrer, 1995). Scott and Delgado (2005) advocate the need to be aware of and identify the characteristics of gifted children. Pegnato and Birch (1959) show in their research that teachers do not have enough information about the characteristics of gifted children.
The module allows for multidimensional evaluations. Intelligence and ability measurements are made in detail. Many similar studies are conducted in Turkey (Akgül, 2014; Güçyeter, 2015; Kanlı, 2014). This measurement is multidimensional and is a preferred approach worldwide (Chen & Gardner, 2005; Feldhusen & Jarwan, 2000). The results obtained with the model are based on reliable and quantitative data. Hafenstein and Tucker (1995) stated that in order to identify gifted children, a decision should be made multidimensional, valid and reliable data. Shavinina (2009) states that technologies that meet the needs of gifted students such as being identified in educational environments have developed. Online environments that are used individually, independent of time and place, allow students to be evaluated in multiple.

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