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Serving gifted children in developmental and threshold countries — Turkey

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Abstract: The aim of this paper is to reveal the current situation of gifted education in Turkey. The talents that are valued and the concepts of giftedness were discussed according to the country's cultural and political perspectives. Studies that had been made to analyze the beliefs of lay people, teachers and parents with respect to gifted students and their education were mentioned. Programs such as special schools (science high schools, private school programs), resource rooms and after-school programs (Science and Art Centers [SACs], Education Programs for Talented Students [EPTS], child universities) were introduced. How these programs currently function was also discussed. In addition, it has emerged that the studies carried out in the past 10 years focused on the adaptation of internationally popular intelligence scales, on the development of original intelligence-, talent- and domain-specific creativity identification tests, on the guidance needs of the students and their parents, on the development of differentiated programs in different areas. In conclusion, even though the amount of research and the awareness toward giftedness in Turkey is increasing there is still much to do. In addition, it is recommended that collaboration should be increased among different institutions to be able to serve gifted students effectively.

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PUBLIC INTEREST STATEMENT

We reviewed the last development and situation of gifted education in Turkey. For this purpose first, we examined the valued talents, giftedness concepts, beliefs about gifted individuals. Secondly, we explored issues on providing appropriate programs and services for gifted learners, research findings on gifted education, and future research directions.

Results showed that Turkish people see that leadership, wisdom, humor, problem solving abilities and creativity are important characteristics of gifted individuals. Turkish people also use the metaphors 'gold mine' and 'diamond' for gifted individuals very often. Program options as special schools, after-school programs, resource rooms, and child universities are common to meet the gifted students' educational needs. We found that several well-known intelligence tests have been adapted into the Turkish language. Besides this, lots of original talent identification tools have been developed recently. Further, studies on the curriculum differentiation for Turkish gifted students proved that they were efficient.

Subjects: Gifted & Talented; International & Comparative Education; Inclusion and Special Educational Needs

Keywords: giftedness in Turkey; education of gifted students in Turkey; identification in Turkey

1. Introduction

In the first section of this article, the talents that are valued in Turkey were discussed. In addition, the primary concepts of giftedness and people's beliefs about gifted children that are important in Turkey were revealed.

2. The talents that are valued in Turkey

Turkey's geographical position can be defined with a "bridge" metaphor. Throughout history Anatolia (mainland Turkey) has been a transition point for various cultures. As culture is a dynamic, social phenomenon it both influences and is influenced by the other cultures that it interacts with. This fact has shaped the social cultural structure of Turkey over the ages. This culture has many facets like literature, folklore, history, religion, philosophy etc. Examples of giftedness can be found in all of these cultural markers and this cultural baggage, which has developed cumulatively throughout history, has deeply affected the perspectives of modern Turkish people regarding the nature of giftedness. Historically, Turkish culture has a long and profound relationship with terms like gifted or talented. Yet the formal definitions of these terms emerged only after the close interaction with Western societies.

Turkey's historical roots go back to central Asia, and they had a nomadic life style back then. As a result of this nomadic life style and the influence of shamanism the old Turks valued survival abilities, combat skills and leadership as the characteristics of exceptional people. There exist a number of folktales and epic stories (ex. Oguz Kaan, Manas, Bozkurt epics) having heroes that showed these exceptional characteristics. When the Central Asian Turks started migrating toward Anatolia and converted to Islam the schemas of exceptional people were altered too. Although martial skills and leadership characteristics were still valued, merits like *wisdom*, *humor, problem solving* and most significantly *spiritual abilities* began being underlined more. In the Ottoman Empire period, which lasted for six centuries, the rulers placed emphasis on the education of exceptional people. The Ottomans founded a special school named *Enderun Mektebi* (Palace School). Only minority groups (non-Turkish, non-Muslim) children were enrolled in these schools and they were educated according to their abilities to become the future's political and military leaders (for a more detailed discussion on the issue see Sak, 2007).

3. Concepts of giftedness in Turkey

The Republic of Turkey was founded in 1923 and can be considered to encapsulate this cultural heritage. Yet the young Republic's direction was toward Western civilizations, and this affected the new definitions and policies regarding gifted education. The mental testing movement, which began in the early 20th century, deeply affected our understanding about intelligence and giftedness. Turkey's educational policy-makers, psychologist and educators were intensively involved in mental testing issues during mid-20th century. There were different practices and legislations before the first official definition of giftedness was made in 1974 by the Turkish Ministry of National Education (MEB). In this definition intelligence was seen as a general ability, and anyone who scored more than 130 in an intelligence test when compared to his peers was identified as gifted and anyone who scored more than 120 was identified as talented (MEB, 1974). In the light of contemporary research on the psychology of giftedness these definitions were revised in 1991, 2006, and most recently in 2013 (MEB, 1991, 2006, 2013). In the 1991 definition, general intelligence and general ability were partially emphasized and IQ was not included. In this definition, the authorities used the "highly talented" concept instead of gifted. Performance fields were mentioned in the 2006 definition. According to this definition a gifted individual is one who performs better than his peers in intelligence, creativity, art, sports, leadership capacity, or in specific academic fields. Sak (2010) claims that this definition is

controversial because fields and processes are addressed equally. Lastly, in the 2013 definition the concepts of gifted and highly talented were abandoned and replaced instead by special talent.

When the evolution of the definitions is examined it can easily be seen that Turkey is in line with the contemporary research results, which consider giftedness as a multifaceted phenomenon. However, what matters here most is consistency between theory and practice constitutes the most important part. Although the definitions have been altered radically in the last decade, the educational practices are a long way from meeting them. The identification processes of special education programs are still highly dependent on intelligence testing. This situation creates one of the biggest dilemmas in our educational system for gifted individuals. By definition we see giftedness as a multifaceted phenomenon but in educational practices we still identify children according to their IQ score. This raises questions not only for the reliability of the identification processes but also for the efficacy of the educational programs that are offered to those learners.

Not only do the formal definitions of giftedness underline different abilities and performance areas, the results of the research conducted with teachers and parents do not solely focus on IQ and academic performance. Nevertheless, they are not deep and wide enough to reflect the situation for the entire country. We consider various intellectual, emotional, and spiritual merits as talents; yet this understanding's reflection in real life is mostly dependent on success and academic achievement. Most families expect their kids to be academically high achievers and most of the teachers nominate those kids for identification processes or for enrichment programs.

4. Beliefs about gifted individuals

Giftedness is a social construct as well as a psychological one (Sternberg, 2007; Subotnik, Olszewski-Kubilius, & Worrell, 2011). More importantly, it is a construct as Gallagher (1996) wrote, "We should admit that 'gifted' is a constructed concept" (p. 235). A country's culture plays an important role in beliefs about giftedness and intelligence. Since giftedness and intelligence are belief-based according to implicit theories (Sternberg, 1990; Sternberg & Davidson, 2005), they are influenced by culture. Thus, people from different cultures can explain their beliefs about intelligence and gifted individuals in different ways. In addition to culture, religious beliefs and political views also influence beliefs about gifted individuals (Sak, 2007). Researchers reported that Islamic beliefs and Turkish folklore influenced Turkish people's beliefs. Analyzing folktales and old Turkish literature, Sak and his colleagues concluded that "practical ability", "rational thinking", and "leadership" are the most valued abilities throughout the history of the Turkish people (Sak et al., 2015). In addition, studies into the Turkish people have shown that misconceptions, dogmas and popular views about giftedness are quite prevalent.

In a recent study by Sak (2011a) 812 Turkish lay people (41.6% male and 58.4% female) were asked to answer a multiple-choice questionnaire about misconceptions, dogmas and popular views about giftedness and intelligence. The misconceptions about giftedness and intelligence that were included in this research were: the *omniscient person belief* (implies the misconception that gifted individuals are gifted in everything), *the entity belief* (the belief that implies that giftedness is entirely innate), *the syndromic belief* (implies that most gifted people have psychological symptoms and problems), *the classless belief* (implies that all children are gifted), *the unintelligent talent belief* (it implies that while children with high IQs are intelligent, children with high ability scores in performing areas are talented). The popular beliefs about giftedness and intelligence that were included in the study were: *the trendy view* (individuals believe that people have more than one intellect), *the worker view* (individuals believe that people start life with nothing and earn everything in their life by hard work, denying the genetics' role). The dogmas about giftedness that were included in the study were: *the gift belief* (according to that belief, skills and talents have divine or metaphysical origins, thus genetics are not important), *the deterministic belief* (the role of fate and chance), *the relativist belief* (implies the belief that the intellect devoted to mysticism is smarter than the intellect devoted to rationality).

There are also studies that examine teachers' and teacher candidates' perceptions about gifted students. Akar and Şengil-Akar (2011), investigated in-service teachers' perceptions about giftedness. According to the results, in-service teachers believe that gifted students have at least one area in which they are very talented, that they act differently from their peers and that they are not very social. However, further analyses showed that teachers were unable to explain this difference thoroughly. For example, only 18.1% were able to identify them as curious and 13.5% as creative. Özsoy (2014), examined the perceptions of teachers that are working in Science and Art Centers (SACs). The results showed that the teachers regard a gifted student as (1) hardworking person, (2) someone who needs the appropriate education, (3) mysterious and difficult to understand, (4) a precious person, (5) a person who looks different from his/her peers, (6) a person with high capacity, and (7) a sophisticated person. Another study by Çapan (2010), who used metaphorical analysis, mentioned that the teacher candidates used terms such as "gold mine", "computer", "bomb", and "diamond". The categories that came from the study were that the gifted student (1) shows high performance, (2) tries to develop under less than adequate conditions, (3) needs appropriate education, (4) is mysterious and requires effort to understand, (5) valuable, (6) is suggestible and easily led, (7) is forward looking and gives direction to the future, (8) investigates and is able to look at events from different points of view, (9) looks different from his/her peers, (10) has high capacity, (11) is productive, (12) is creative, and (13) is versatile (Çapan, 2010). Altıntaş and Ilgun's (2015) study investigated the perceptions of gifted students' parents about the term giftedness. 50 parents were included in the study, and when the answers of the parents were coded three themes emerged: academic features, personal features, and creativity. There were 12, 36, and 8 categories on academic, personal, and creativity features, respectively, which can be interpreted as parents being mostly aware of their children's personality features.

In conclusion, as in every country, beliefs in Turkey about gifted individuals were influenced mainly by culture. Of course, we cannot neglect the effects of conditions that facilitate or obstruct the situation, such as the educational and learning resources that a country can provide for gifted individuals (Ziegler, 2005). Misconceptions, dogmas and popular views about gifted individuals can be found in every culture. The main point is to give opportunities to people to improve themselves and change these misconceptions and false beliefs.

5. Issues that need to be addressed in order to provide appropriate programs and services for gifted learners

Generally speaking, there are various issues that need to be addressed in order to improve education facilities in Turkey so they can better cater to gifted students. One of these issues is the lack of a qualified public education policy to meet the special education needs of gifted individuals. Various decisions regarding the education of gifted students have been made in development plans and by the National Education Council. However, a systematic and integrative plan for the gifted classroom has not been put into practice yet.

Teacher training as a part of gifted education planning is another issue that needs to be considered. There were gifted teacher training bachelor programs until 2016 in Turkey. Since then all special education programs have been covered by the Special Education Teacher Training Program. This is not promising in terms of expert training.

Another issue concerns, the scientific and academic studies relating to gifted education. However, the results obtained from those studies do not usually transfer to real-life. Speaking of scientific studies there are two major problems with the research. One of them is the small sample sizes. This makes it impossible to generalize the research results. Furthermore, since most of the research results on gifted education are based on a comprehensive master thesis or doctoral dissertations, parents and teachers find it hard to benefit from them. Publishing more summarizing examples and suggestions for practice would also be helpful for parents and teachers (Leana-Taşcılar, Özyaprak, & Yılmaz, 2016).

The identification process for special programming is also an important issue for Turkey. Most educational establishments do not have a valid, comprehensive and current identification process. Finally, counseling services for gifted students and their parents are not adequate. These main issues will be discussed below in detail within the context of significant educational and administrative establishments in company with their important contributions.

6. Important contributions to gifted education

There are different types of educational arrangements for gifted students in Turkey. These educational models can be investigated under the headings of *special schools*, *private classes,* and *after school programs*. Science high schools, social science high schools, conservatories, fine arts and sport high schools can be considered as *special schools*. Science high schools enroll academically high achievers in the science and math domains and their curriculum focuses mainly on enriching and widening their students' talents in these fields.

Private classes can be found within the schools that are run by the private sector. Public policies regarding gifted students in state schools do not support private classes due to the concern that these classes can cause discrimination between students and labeling, which can affect gifted students negatively. *After school programs* make up the majority of the educational practices for gifted learners. In this section we will discuss some of these program options, their contribution to gifted education in Turkey, and the issues concerning these programs.

6.1. Science high schools

Science High Schools are five-year schools that include a one-year preparatory class for a foreign language. They have been in service since 1964 for students selected via a general exam mostly based on academic achievement. Science High Schools aim to create qualified scientists particularly in the natural science and math domains. Thus, their target groups are scientifically and mathematically high achievers. However, their identification process is not sufficient since it is simply a multiple-choice country-wide exam that basically assesses academic achievement (MEB, 2015a).

Science High Schools have a specific curriculum that enables enrichment and course-based acceleration particularly for science and math courses. It is a disadvantage that this differentiation occurs at the 2nd year of school (10th grade). The weekly hours of science and math courses increase dramatically especially after 10th grade. At 12th grade the content of science and math courses matches that offered in the first year in universities, thus demonstrating a good example of acceleration (Sak, 2010). However, students do not earn any credits from those accelerated courses to use at university. Another drawback of the Science high schools' (SHSs) system is the old-fashioned learning environment (Kanlı & Özyaprak, 2015). The number of these schools should be increased and have more qualified educational and organizational arrangements.

6.2. Science and art centers

SACs were founded in 1993 by the General Directorate of Special Education Guidance and Counseling Services in Ankara. SACs are examples of after school programs that enable *enrichment and grouping* (Sak, 2010). They aim to enable, to realize and to fulfill the primary, middle and high school's gifted and talented learners' potential (MEB, 2007). Gifted and talented students who are selected for and are enrolled in the SACs after their school class hours. There are 106 SACs in Turkey (MEB, 2016), and they serve only 4 percent of the gifted population (Sarı, 2013).

A three-step evaluation process is used to identify students for SACs. Teachers nominate students by filling a form from the Internet as the first step. In the second step, a group test is applied to the nominees. And the students who perform at and above the stated level are evaluated by a committee judging the student's performance in the talent domain chosen in his/her application. These talent domains are: *general intellectual ability, painting, and music* (MEB, 2016).

Gifted students who are enrolled in SACs study with their gifted peers guided by their teachers. Their education program contains of five phases: *orientation, support education* (which includes social skills, problem solving techniques, group study techniques, scientific research techniques, and social activities), *discovery of personal skills, development of specific talents, and projects* (Sak, 2010). The educational philosophy of SACs is mainly based on *project- and problem-based learning* (MEB, 2007).

There is no established curriculum that can be used as guidance by teachers and administrators at SACs. There are six domains in which students may choose to study based on their talents and interests (MEB, 2007; Şeker-Sezginsoy, 2012). The content of the courses of those domains is decided by the students and their teachers/mentors. The process usually emphasizes making projects. Process modifications consist of higher levels of thinking, open-endedness, discovery and invention, freedom of choice, and cooperative learning (Sak, 2010). Speaking of content modification, very few predefined frameworks are used. The learning environments of the SACs are student centered since mentors mostly guide students in their projects. With respect to the product dimension, there is a modification since students' scientific studies mostly address real-life problems. However, there needs to be a more comprehensive product differentiation in which students are given the opportunity to share their products with third parties like businessman, field experts, etc. (Kanlı & Özyaprak, 2015).

There are aspects to be developed for SACs. First of all, the identification processes of SACs seem to be problematic because of the assessment tool used. The group test is a combination of the academic and general aptitude tests and there is no research considering tests' validity and reliability. Secondly, the number of the students that SACs serve is not adequate in comparison with the gifted population within the country. Thirdly, although the teachers are experts in their domains, some of them are not fully equipped to teach gifted students. Yıldız (2010) research results support that argument. In addition, the lack of a specified curriculum or curriculum model also creates limitations for the program evaluation. Fourthly, they do not offer any advantages such as extra credit to be counted at university or extra scores to be added to central exams. This may decrease students' motivation especially before important central exams (Özkan, 2009). Lastly, both teachers and students stated that the physical conditions were inadequate and that there needs to be better cooperation between SACs and schools (Şenol, 2011; Sezginsoy, 2007; Yıldız, 2010).

6.3. Resource rooms

The resource room is used as an enrichment strategy that aims to serve students with special needs at K-12 grade levels in Turkey. It aims to support all students with special needs as well as gifted students that were included in this group by regulations. The Special Education Services law obliges school administrations to open resource rooms when it is documented that there are gifted students in the school (MEB, 2016). Eligible intelligence test scores are valid for identification. Currently, the identification process for resource rooms is run by Guidance and Research Centers.

After identification, the school administration is informed and is responsible for curriculum modifications and organizational arrangements. Gifted students spend a portion of their time with their gifted peers or individually in the resource room. Students attend the resource room for up to 40% of the weekly course hours. Gifted students meet with a teacher to engage in enrichment or extension activities that may or may not be related to the curriculum being taught in the regular classroom.

Resource rooms are meant to provide *individual curriculum differentiation* for which there is an "individual education programming" team in every school. This team is responsible for differentiating the curriculum based on the interests and talents of gifted students at the beginning of the year. Classroom teachers and the school administration members form this team. Thus, every gifted student has his/her unique curriculum modifications and practices unless there are other students with similar needs and interests, in this case group activities can be planned and practiced but the size of the groups is not allowed to exceed six students. Curriculum modifications mostly include enrichment activities that aim to encourage gifted students to carry out research and make real-life

projects. Resource rooms mean to provide gifted students with a more detailed and richer content. Also, students expect to experience a more sophisticated and complex thinking process.

The teachers employed primarily in resource rooms are special education teachers. Primary school teachers and subject teachers can also be employed. Resource room teachers are not required to have any formal background in gifted education, which is a disadvantage mostly because there are not enough gifted specialists. The Ministry of National Education organizes in-service training courses, but considering the time and the number of participants the efficiency and permanency of those courses are doubtful.

6.4. Education program for talented students

The Education Program for Talented Students (EPTS) was founded at Anadolu University in 2007. Mathematically and scientifically talented students are offered a university-based after-school program at EPTS. Fifth- to eighth-grade gifted students take advanced and accelerated science and math courses at EPTS (Sak, 2011b, 2012; Sak & Karabacak, 2010). It was accredited by the European Council of High Ability (ECHA) as a European Talent Center in 2015.

Being an after-school program, the EPTS program model is one of the best matches for the Turkish educational system because the Turkish educational system is not flexible enough for systematic and radical acceleration practices (Sak, 2006, 2007). The implementation of acceleration is a general issue in Turkey. Acceleration practices are not widely and effectively used since the formal education system does not support it. For example, gifted students can skip a grade twice, and subject acceleration strategies are never used. Therefore, EPTS offers one of the best possible acceleration strategy for Turkish pupils (Sak, 2006, 2007, 2016).

EPTS is a comprehensive education program with six program components. These components are: *identification, curriculum, instruction, assessment, program organization, and teacher training models* (Kanlı & Özyaprak, 2015). The identification and curriculum models of EPTS are based on the EPTS curriculum model, which was developed based on an integration of the theory of successful intelligence and its teaching principles and research into creativity and problem solving. The EPTS Curriculum has two dimensions. The first dimension includes the analytical, practical, and creative components of ability. All three components have their broad skills which are labeled as the EPTS skills. The second dimension is the content component. The content component includes national standards at each grade level and is used with the EPTS skills for developing an accelerated and enriched curriculum. Aligned with this theoretical background, the EPTS enables the enrichment and acceleration of curricular programs for gifted students (Sak, 2016).

The EPTS identification is composed of four components. These are; domain-specific identification, use of multiple criteria, sample-based identification, and natural selection—selective retention (Sak, 2011b, 2012). Because EPTS concentrates on science and math acceleration and enrichment, domain-specific assessment tools like the Test of Mathematical Talent, the Creative Scientific Ability Test (Ayas & Sak, 2014) and math and science end-of-school grades are used for identification. Thus an alignment occurs between the content of the curriculum and the identification method. This process also refers to using multiple criteria (Sak & Karabacak, 2010; Sak, Karabacak, & Kılıç, 2009; Sak, Karabacak, Kılıç, & Öksüz, 2010). Sample-based identification is referred as the best method for contextual assessment, which makes it possible to offer an advance micro-level program for the most capable students of a region, city or school. EPTS is a unique model with its curriculum and identification. The EPTS model has also been tested in several studies and has been found to be effective in developing gifted students' creativity in mathematics and science (Sak, 2011b, 2013).

6.5. Turkish education foundation İnanç Türkeş special high school

This is a magnet boarding school established in 1993. It aimed to create contemporary leaders for various domains such as science, economy, politics, art and social science by providing differentiated education for gifted and talented students. Turkish education foundation İnanç Türkeş special

high school (TEFITSHS) does not have an approved curriculum for gifted students, but there are curricular differentiations that are grounded in enrichment. Extra foreign language classes, charging students with school duties, letting students set up committees to evaluate and develop the school system and mentoring via real field experts are some particularly good examples of enrichment. Furthermore, there is no classical class concept. Classes are organized based on such domains as math classes instead of grades. Students have the opportunity to choose the subjects they want to study. There are several clubs like Comenius projects, journalism, cinema and, etc. (Baykoç-Dönmez, 2014). Students can also attend exchange programs, the international baccalaureate program, and summer schools (Birgili & Çalık, 2013).

TEFITSHS uses a four-step identification process: nomination, group exam, individual evaluation, and observation camp. Firstly, the students are nominated by their parents. Secondly, the nominees are given Raven's Standart Progressive Matrices Test as a group test. Successful applicants take the WISC-R test as the second step. After that, the top 120 learners are invited to join the observation camp, which lasts one week. Nominees take performance-based assessment in various domains such as science, math, literature, painting, and music. Due to the under-representation of girls in gifted education, a regulation is made at the assessment procedure every year that enables an equal number of boys/girls to enroll (Kanlı & Özyaprak, 2015).

6.6. Beyazıt Ford Otosan primary school

Beyazıt ford otosan primary school (BFOPS) was active between 2002–2012. It was the first governmental magnet school for gifted students at elementary level that enabled acceleration, enrichment, and grouping. BFOPS aimed to meet the cognitive, emotional, and social needs of gifted learners without isolating them from their non-gifted peers. The Turkish Ministry of National Education and Istanbul University signed a protocol to implement the "Gifted Education Project", which was developed by the Istanbul University team.

Twenty-four gifted learners (age 6–7) were selected for the school every year and were split into two classes. There were 24 students per class: 12 gifted and 12 non-identified students. All students regardless of their intelligence were able to progress at their learning pace within the framework of the governmental curriculum. The students were grouped based on their readiness and learning pace for various domains. The gifted students' curriculum provided enrichment and acceleration according to their abilities (Davaslıgil & Leana, 2004). Those groups were flexible so group members could change based on their progress and achievement level (Kanlı & Özyaprak, 2015). In addition to higher level thinking skills like creativity, social-affective skills were included in the program (Davaslıgil, 2004). This school provided a good example of enrichment and acceleration for gifted students based on their ability level in the early years of education.

The identification process had three steps. First, parents or teachers nominated their children/students as gifted. The nominees were referred to the Guidance and Research Centers. The names of the gifted children identified by those centers were sent to the Istanbul University. The committee of the university individually evaluate the identified students one more time. Twenty-four students out of all nominees were selected to enroll in the school. There was not any elimination procedure for non-gifted students (Davaslıgil, 2004). BFOPS was a good option because it enabled gifted students to study with both their gifted and non-gifted peers. Acceleration, grouping, and enrichment strategies were used effectively in BFOPS's curriculum modifications.

6.7. Child universities

Child University (CU) is a concept specific to Turkey and corresponds to the after-school and summer programs offered by some universities. Some of these programs offer education to gifted and talented learners mostly aged between 10–17. Students are offered different courses that they can choose, according to their interests. The courses are given by the university academicians (including professors) and range from archaeology, genetics, physics, and math to linguistics. While these courses provide an enriched learning environment for students due to their talents and interests,

they do not provide extra credits for further university life. Child Universities run weekend, summer, and winter programs. There are currently 20 child universities located in different regions of the country (Kanlı & Özyaprak, 2015).

7. Research findings for the last decades

Many studies have been carried out in recent years not only by researchers but also by the government. The Ministry of National Education (MEB), The Grand National Assembly of Turkey (TBMM), and The Scientific and Technological Research Council of Turkey (TUBITAK) support research and research projects especially on developing psychometric assessment scales (MEB, 2014; TBMM, 2012; TUBITAK, 2016). MEB (2014) spearheaded a comprehensive study on the adaptation of the more popular and commonly used intelligence tests in the world. TBMM assigned a commission that included some parliamentarians to investigate the problems with the identification and education of talented children with the aim of providing effective employment for talented people for national development.

There have been increases in the number of studies in the gifted and talented area in the last decade. Sak et al. (2015) reported that 47 articles were published between 2003–2014 years; 306 papers presented by the Turkish participants in three international and two national congresses that were organized in Turkey. In this section we discussed the most important studies and their findings with respect to the subject of identification, the psychological needs of gifted students and specific topics such as gender differences in a domain, program development, and differentiation.

Much of the identification research focused on the adaptation of the intelligence scales that are more common and popular in the world. For instance, the researchers investigated the psychometric properties of the Kaufman Brief Intelligence Scale for children aged 7 to 16 (e.g. Atalay, 2007); of the Cognitive Assessment System for 8 to 14 years (e.g. Gürpınar, 2006); of the Raven Standard Progressive Matrices for 5.5 to 15 years (e.g. Acar, 2007) and of the Wechsler Intelligence Scale for Children IV for 6 to 16 years (Öktem, Gençöz, Erden, & Sezgin, 2012). However, most of the studies were considered as preliminary studies for standardization processes except Öktem et al. (2012). Thus, they need to conduct follow-up studies for effective usage in the Turkish students sample.

In addition to the adaptation of popular intelligence scales, some other researchers were interested in developing original intelligence and/or talent identification scales. Sak et al. (2009) developed an instrument called the Test of Mathematical Talent (TMT) which can be used for the identification of mathematically talented students. The test was based on the Three Mathematical Minds Model developed by Sak (2005) and included 12 subtests (number series, numerical analogies, figurative rotation, figurative series, figurative analogies, categorical logic, conditional logic, linear logic, measurement, algebra, geometry, and statistics-probability) that measure mathematical domain knowledge, analytical math ability, creative math ability, and spatial math ability.

One of the other math talent identification instruments was called the Similarity and Relation-Based Test of Thinking in Math (SRTT-M) designed based on the Similarity- and Relation-Based Model of Thinking in Math (SRMT-M) (Güçyeter, 2015). SRTT-M consisted of six subtests: similarity-based problem solving, relation-based problem solving, similarity-based problem posing, relation-based problem posing, finding similar problems and lastly, finding relational problems. The researcher started revision studies of the test to increase its effectiveness (Güçyeter, 2016a, 2016b, 2016c).

There were two important creativity test development studies in the math domain in the literature. In the first study, Türkan (2010) examined the psychometric properties of the Creative Mathematical Ability Test (C-MAT). The test, developed by a team of experts, included five subtests each of which had three types of score: fluency, flexibility, and creativity, as well as a total score for fluency, flexibility, and creativity (Türkan, 2010). The second study was conducted by Akgül and Kahveci (2016), they developed a Mathematical Creativity Scale (MCS) for fifth-grade to eighth-grade students. The researchers took into consideration the divergent production in three important subjects: logical thinking, spatial thinking, and problem formation for MCS.

Besides developing mathematical creativity test, there were studies on the development of scientific creativity based on different theoretical backgrounds. To measure scientific creativity Ayas and Sak (2009) developed the Creative Scientific Ability Test (C-SAT), which included five subtests from the physics, chemistry, biology, ecology, and interdisciplinary domains. After the preliminary studies, there were two follow-up researches (see Ayas, 2010; Ayas & Sak, 2014) in order to provide evidence for the validity and reliability of the test. The researchers concluded that the C-SAT could be used as an objective measure of scientific creativity both in research and in the identification of scientifically creative students.

Kanlı (2014), emphasized that existing scientific creativity theories and tests do not focus on associative and analogical thinking, which can be considered crucial in creative scientific problem solving. She proposed an alternative model called Creative Scientific Associations Model (C-SAM) and developed a scientific creativity test based on the proposed model. The Creative Scientific Associations Test (C-SAT) consisted of three subtests; associations, analogical reasoning, and analogical problem solving. According to the results, the factorial structure of C-SAM was supported and revealed that C-SAT was a valid and reliable measure of scientific creativity.

One of the most important studies made recently concerns the development of the first national intelligence scale called Anadolu-Sak Intelligence Scale (ASIS), which is based on the general intelligence theory, the Cattel–Horn–Carrol theory and the Planning, Attention-Arousal, Simultaneous and Successive Theory (PASS) (Sak, 2015). The Education Programs for Talented Students (EPTS) team developed this test within the scope of the project called Project IQ, which took a research grant from Anadolu University (Project IQ, 2016). The research team has already finished the pilot study by applying ASIS to 1,202 children ageg 4 to 12 years old. The researchers stated that the preliminary results were very good. The research team also selected norm regions for Turkey and trained testers to conduct the norm studies. They plan to complete the study in 2017. The Ministry of National Education has assigned a protocol to use the test as one of the principal intelligence tests for identifying gifted and talented children.

Apart from the studies on developing psychometric assessment scales, there have also been studies on psycho-social aspects of giftedness. Öpengin and Sak (2012) investigated the effects of labeling students as “gifted” on their perceptions of themselves and of how their parents and friends regarded them. According to the research findings, the gifted label did not have any significant effect on their perceptions about themselves and on their perceptions about their parents’ and friends’ attitudes toward them.

Akar (2010) investigated the guidance needs of primary school gifted and talented students by gathering data from their parents and from SAC teachers. The researcher designed a check list to collect data about the academic needs and the socio-emotional needs of the gifted and talented students. The results showed that parents most frequently emphasized the following academic needs: multifaceted personal development, future planning, and lack of motivation. On the other hand, teachers thought that being aware of his/her talents, participating in group studies effectively, expressing him/herself, multifaceted personal development, and lack of motivation were the most pressing academic needs. In addition to academic needs, the parents of gifted and talented students mostly emphasized the following social-emotional needs: sentimentalism, susceptibility, stubbornness, planning leisure time activities, and sentiment. In addition, the teachers mostly emphasized the following social-emotional needs for gifted children: stubbornness, being social, empathy, self-distrust, parent relations, and planning leisure time activities.

A similar important study was carried out by Altun (2015) that examined gifted and talented students’ guidance needs, their psychological guidance experience and the competence level of counseling teachers. It was found that the needs expressed by the parents differentiated depending on the children’s age. For instance, parents mostly observed over-excitability and perfectionism behaviors in the pre-adolescence period. By contrast, parents expressed that carefulness and quick temper

behaviors were common in the adolescent period. In addition, research revealed that students might have worries in educational areas, vocational/professional areas, and personal-social areas. Further, research revealed that teachers' current knowledge and skills are not adequate to meet the needs of talented students.

Some studies have been conducted to meet parent's guidance needs. Saranlı (2011) examined the needs of third-, fourth-, and fifth-grade gifted and talented students attending the SAC first, then she developed a program called the Hacettepe Family Guidance Program for Parents of Gifted Children (HUYAP). The program was applied to 20 parents of gifted children for 10 weeks. The results showed that HUYAP model had statistically significant effects in the communication, problem solving, behavior control, and general family functions subscales of the Family Evaluation Scale. In another similar study Afat (2013) designed a program to increase parents' awareness of their gifted children. The program was applied for 10 weeks to the parents of first-grade gifted students enrolled at the BFOES for gifted and talented children. The Parent Awareness Scale developed by the researcher was applied as both pre-test and post-test. The results showed positive changes in the awareness of the parents after the program.

To support gifted and talented children's friendship skills, Uysaler (2015) designed a program and implemented to the fourth-grade gifted students enrolled at the BFOES. The program was applied to 12 gifted students who had been selected for the experimental group and consisted of 12 weeks of sessions. The Friendship Relations Evaluation Scale (FRES) developed by the researcher was used to test the program effectiveness as both pre-test and post-test. The results of the study showed that the "Friendship Skills Development Program" significantly improved the friendship relations of gifted students.

In addition to tools for identifying gifted children, another major research area was designing curriculum programs. There are many studies in the literature about developing a differentiated program in a specific domain such as math (e.g. Battal-Karaduman, 2012; Deringöl, 2012; Özyaprak, 2012), science (e.g. Çalıkoğlu, 2014; Camcı-Erdoğan, 2014; Kanlı, 2008; Yaman, 2014), social science (e.g. Atalay, 2014), and language (e.g. Akça-Üşenti, 2013; Kaplan-Sayı, 2013) for gifted and talented students. In these studies, the researchers differentiated some units of the curriculum by considering popular curriculum models and/or differentiation strategies. Then they examined the effects of the differentiated program in various grade levels, generally fourth- and fifth-grade gifted students enrolled at the BFOES and frequently they conducted an experimental test design. A common result of all studies was that the differentiated programs had positive effects on the students' academic achievement, creativity, attitude toward the domain, and critical thinking skills, etc.

A few researchers investigated specific topics such as gender difference in a specific talent area. In the first study, Özdemir and Sak (2013) examined whether there were any gender differences in scientific creativity and its components. To assess students' scientific creativity, the researchers applied the Creative Scientific Ability Test. According to the results, male students' scores on hypothesis generation components of scientific creativity, fluency and creativity were found to be significantly higher than female students. But the effect sizes of the differences were found to be lower. Although, male students' scores on the flexibility, hypothesis testing and evidence evaluation components were higher than female students, the differences between the groups were not significant. The researchers interpreted these findings as stemming from differences in some particular processes specific to male and female students.

Ayvaz (2014) investigated gender differences in mathematical ability by using the TMT. Gender differences were examined by comparing students' general mathematical ability and the sub-skills of mathematical ability and of the top and bottom 10% of the students. The results showed that male students' performance was found to be statistically higher than female students' performance in general math ability. Male students also scored significantly higher than female students in number series, numerical analogy, linear logic, conditional logic, algebra, numbers-measurement, and

figurative rotation subtests. However, there were no statistically significant difference between male and female students in the geometry, statistics-probability, figurative series, and figurative analogy subtests. Another interesting finding was that there was no statistically significant score difference between male students and female students in the top and bottom 10% in general math ability and the sub-skills of mathematical ability. Moreover, the researcher emphasized that the proportion of male students in the top 10% was significantly higher than female students and the proportion of female students was higher than male students in the bottom 10%. The researcher concluded that the results supported gender difference in math ability in favor of male students.

8. Future directions for research and program development

The findings and the results of the past studies plus the policies of the MEB and Council of Higher Education give direction to future research. In this section, we discussed the direction of research and program development for gifted students in Turkey. Last year, the MEB announced the latest regulation for talented students that was required to open a resource room in the school in order to meet the needs of talented students (MEB, 2015b). The regulation revealed a new research and program development area for the talented students who will receive special education in the resource room. Even if the student is identified using the standard intelligence test, the educators need many more assessment tools to determine the students' performance level in order to develop an effective personalized education plan for the talented students. Schools should also offer differentiated curriculum/program for the talented students. Therefore, teachers need to know more about the characteristics of gifted children, teaching models, strategies, techniques, and differentiation strategies in order to meet the talented students' educational needs. Researchers should develop teacher-training programs for in-service and pre-service teachers in order to increase teachers' competence and, then they should examine the effect of the programs.

In the first section, we examined the definitions of gifted and talented in our education system. There was controversy about the definition of gifted and the identification instrument. We need to solve this issue first. According to the latest special ability/talented definition, we not only need to consider intelligence but also creativity, arts, sports, leadership capacity and specific academic talent while we develop identification tools or educational programs. Therefore, researchers need to do much more research in order to develop identification tools and program options for those talent areas. On the other hand, there were some misconceptions about gifted and talented students and their education. Therefore, researchers should perhaps develop awareness activities or programs to alter these misconceptions.

Recent research results showed that many of the adapted identification tools were examined using small samples. Thus standardization studies for effective usage should be done. There were some original test development studies in the literature. These studies need follow up studies to increase their psychometric qualities. Standardization research is needed before using these tests nation-wide. Many of these identification tools are appropriate for middle school students' level, but we need to develop new versions of these national talent tests to apply them to elementary and high school level students. Many of the national identification tools mostly consider talent in math and science. Therefore, researchers should focus on developing national identification tools for such areas as social science, music, art, sports, leadership, etc.

On the other hand, as we discussed in the previous sections, there are many differentiation studies. Researchers might do new studies on curriculum differentiation. Differentiation methods also may help teachers to develop effective activities for resource rooms. Researchers also might use these differentiation models/techniques to develop teacher-training programs for in-service teachers. Research is needed to assess these current gifted and talented programs in order to revise and increase their quality (Sak et al., 2015).

There are few family guidance programs for parents of talented students. Researchers might develop more family counseling programs which meet their diverse needs. Past research results

indicated that talented students need counseling about academic subjects, social emotional subjects, career decisions, etc. Researchers might develop mentoring programs as well.

The last and perhaps the most important research area is teacher-training. The Council of Higher Education opened a new branch called Special Education Teacher Program for undergraduate level. Special education teacher candidates take common courses in the first two years and then they specialize on a chosen special education area (such as learning disabilities, mental retardation, gifted children education etc.) for the last two years. About all special needs students for two years, and then the candidate teachers take courses about one of the special education areas such as special talent for the next two years. After graduation, these special education teachers can work specifically at elementary level. However, there is a lack of special education teachers for secondary and high school level. Therefore, secondary and high school level teachers could take courses in the undergraduate level to meet talented students' needs in future. Researchers should investigate the teacher competence standards for teaching gifted students and later develop programs to present selective courses for secondary and high school teacher candidates to enhance their teaching competence.

To sum up, even though the amount of research into giftedness and awareness toward it is increasing in Turkey, there is still much to do. One of the most important actions should be to eliminate the inconsistency between theoretical definitions and their reflections in real life. Giftedness should be defined from the country's own socio-cultural perspective by taking into consideration the multifaceted and dynamic nature of the phenomenon. Afterwards, the educational programs and practices should be reorganized even if we have to go back to square one in order to develop effective and appropriate educational opportunities for our capable children.

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