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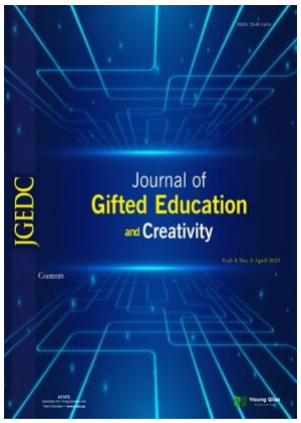

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Research Article

Effectiveness of the differentiated instructional design for value education of gifted: a mixed study

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Abstract

The aim of this study was to examine the efficiency of the differentiated instructional design for value education of gifted. This research was based according to the embedded experimental design of a mixed research method. The study group consisted of 25 gifted students (13 girls, 12 boys) at the 6th-grade level. Digital differentiation strategy was employed in instructional design. Students were asked to reflect their learning about Turkish talented people on cartoons containing both visual and auditory elements. The activities in the differentiated instructional design were applied to the students online for 8 weeks, 2 hours per week. Quantitative data were collected with the Target Behaviour Development Scale (Kanger, 2007). Quantitative data were analyzed with a dependent samples t-test. The Cohen d effect size was also calculated. In the qualitative part of this research, the views of gifted students, their products, the observations of researchers were evaluated. Qualitative data were analyzed descriptively. As a result of the research, the difference between the pre-test and post-test scores of the target behavior development levels of the gifted students regarding values was found to be statistically significant. This difference was in favor of the post-test and the effect size was high ($d=1.047$, $p<.05$). In other words, the differentiated instructional design for value education increased the values development of gifted students. Gifted students expressed their views on the differentiated instructional design the most frequently with the words "fun, instructive, and the values". The students were successful in writing cartoon scripts, turning the scripts into a cartoon, and indicated that they had some technical difficulties. Students were happy both to learn of the values and to produce technology-supported products. Comparative studies can be done by establishing experimental and control groups for different grade-level gifted students.

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Introduction

Since the inception of the gifted education field, the focus has been on the development of the individual competence, intelligence, and creativity rather than the social and global context in which the individual grows and comes to be. However, people's lives are intricately interconnected. An individual's actions, no matter how small, can have huge impacts on other individuals, societies and nature (Chowkase, 2022). Current studies, research and practices in the field of gifted education focus on supporting gifted students' socio-emotional development (Cash & Lin, 2021; Cavilla, 2019; Cross, 2021; Hebert, 2020; Hebert & Smith, 2018; Wallace & Shaughnessy, 2012), and then being social capital by supporting their moral development (Renzulli, 2020; Renzulli & D'Souza, 2014; Renzulli & Reis, 2021), being wise people (Stenberg, 2021; Stenberg et al. 2021; Sternberg & Glück, 2022).

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Gifted people contribute to the production of new information and help to transmit the knowledge of humanity to future generations (Chowkase & Watve, 2021). For this reason, the education of gifted students should be approached with care. During the realization of educational activities in schools, the individual differences of these students emerge. Individual differences are more evident in the form of learning levels or speeds, and these individuals with differences need to be provided with special education services in line with their interests and cognitive abilities (Heacox & Cash, 2020; Kaplan, 2021; VanTassel-Baska, Hubbard & Robbins, 2021). Along with cognitive abilities and interests, moral and character traits of gifted students should also be taken into account in educational practices (Berkowitz & Hoppe, 2009; Renzulli, 2020; Stenberg et al. 2021; Walton & Vialle, 2021).

The moral interests and sensitivities of gifted children develop at an earlier age in direct proportion to their intelligence level (Silverman, 1994, cited in Kurnaz, 2018). Silverman states that he was influenced by the moral sensitivities of the gifted students he had followed for more than thirty years. There are dozens of cases of gifted students protecting and befriending their friends with special needs, conserving natural resources, getting upset when a classmate is destroyed, believing that all forms of violence are morally wrong and refusing to fight, writing letters to the authorities to end the war (Silverman, 1994, as cited in Kurnaz, 2018). Gifted children have a strong desire to help others and to destroy evil and wars. They have a sense of justice. They have a desire to clear off evil, war, poverty and inequality. They have beliefs about achieving world peace (Gündüz, 2010; Özkan, 2013). Being emotionally oversensitive can cause their reactions to issues such as injustice in the society to be concerned and distresful. When they cannot solve these situations, they may become disappointed and become depressed (Bakan & Onat, 2020; Orman, 2020). Gifted students who have these sensitivities are at risk of being treated as if they are misfits and being pushed around in an environment that is insensitive to them (Hökelekli & Gündüz, 2004; Silverman, 1994, as cited in Kurnaz, 2018). For this reason, the approach of families, teachers and society to gifted students is also important. Care should be taken when arranging the learning environments of gifted students and communicating with them (Orman, 2020).

Gifted students inevitably surprise their teachers with their outstanding features from their peers. This situation reveals the false belief of many teachers that gifted children are perfect or should be perfect, that they can never make mistakes, and that they always embody values such as tolerance, respect, love and cooperation. These children may lack several of these values like their peers with normal abilities (Yıldırım, 2016). There is a belief that these children can be self-sufficient in the affective sense as well as in the cognitive sense. However, gifted students need special needs and attention in order to develop both their cognitive and psychological potentials (Özbay & Palancı, 2011). From a moral point of view, the fact that being gifted does not guarantee that he or she is in fact moral. Intelligence and social, emotional and pedagogical variables play important roles together in moral development (Gündüz, 2010). While they can use their special talents and intelligence for the benefit of the society, gifted students can also use their powers to the detriment of the society due to misdirections and learning. They may also have ethically problematic decisions (Hökelekli & Gündüz, 2013).

The ethically problematic decisions of gifted people not only affect themselves, but also all humanity. Decisions made by leaders who have made significant impacts in history (for example, Fatih Sultan Mehmet, Mustafa Kemal Atatürk, Adolf Hitler) are a reflection of their moral and character developments (Tortop, 2018). An European country with a high level of education dropped atomic bombs on Nagasaki and Hiroshima, causing great destruction and death. The gifted people who created these destructive technologies and policies have turned into monsters (Kenan, 2017; Maslow, 1996, as cited in Turgut Yıldırım, 2019). Edison, who made great contributions to humanity by inventing the light bulb, and Warner Von Braun, who found the v8 type bomb and caused very severe destruction, are also gifted people (Yıldırım, 2016). Assuming that the virus, which is the starting point of the Corona virus pandemic, which affects the whole world, is made by human hands in a laboratory environment, it can be thought that the person causing this situation is a gifted person in the field of molecular biology and genetics. The need for values education is quite clear in a society where wars, murders, perversions and exploitation are increasing day by day. It is also an important fact that gifted students should benefit more from the values education they need (Hökelekli & Gündüz, 2013; Yıldırım, 2016). Values education is needed for gifted students to increase their moral and spiritual level and to preserve their sensitivity about ethical rules, values, and moral rules (Hökelekli & Gündüz, 2004). Gifted children need a learning-teaching environment equipped with values that will guide them to exhibit positive behaviors, make humane and moral decisions (Renzulli, 2020). Unfortunately, there are not many studies, research, and practices to support the field of gifted education (Tortop, 2018).

In Turkiye, the education of gifted students is carried out in Science and Art Centers (SAC), which is an after-school enrichment program (Sak, 2014; Şahin, 2015, 2018). In SAC, gifted students spend a significant part of their time with learning activities planned for their interests, needs and abilities (Gür, 2017). Educational activities carried out with mutual interaction and group work also shape the value judgments of gifted students (Çoban, 2019; Tortop, 2018). As a matter of fact, in the SAC Directive, the educational services offered in SAC are aimed at gifted students:

> "a) Adopting Atatürk's principles and reforms; b) adopting, protecting and developing the national, moral, humanitarian, spiritual and cultural values of their country; has the power of free and scientific thinking and a broad world view; raising and developing individuals who are leaders, constructive, creative and contributing to the development of the country, c) to be brought up as productive, problem-solving and self-realized individuals who combine scientific thoughts and behaviors with aesthetic values, to realize their talents and creativity at an early age and use them at the highest level"

"Values education is included at every stage of the education programs implemented in SAC" (Ministry of National Education of Turkiye [MNET], 2016, p.6). The values that are aimed to be adopted by the students in the educational practices to be carried out in SAC also coincide with the values that should be included in the education programs in the Values Education Directive published in 2015 (MNET, 2015, p.4). As a matter of fact, gifted students receive education at their schools together with their peers with normal ability level, apart from SAC. In this context, it is a positive situation that the normal education programs and the education programs applied in SAC overlap in terms of the values (love, respect, self-confidence, sensitivity, fairness, aesthetics, solidarity, protecting the cultural heritage, self-sacrifice, etc.) that are aimed to be gained by all students. Of course, gaining these values should start in the family first, and the values gained in the family should be reinforced in SAC and the schools. Values education carried out in this way will gain a permanent and real meaning in the lives of gifted students (Hökelekli & Gündüz, 2004, 2013). Families of gifted students also want their children to reinforce moral, national and universal values in SAC (Sezer, 2016). In SAC, only science and mathematics lessons and cognitive development should not be prioritized, and moral, national and universal values should be included in educational practices. In order for values to be transformed into behavior, they must be completed cognitively and affectively (Akbaş, 2004). It is thought that gifted students, who are a great social treasure, will contribute to the peace and happiness of humanity thanks to suitable development environments and appropriate educational practices that will contribute to values education (Gündüz, 2010).

Educational practices to be carried out with gifted students should focus on high-level thinking skills, allow students to learn to think and work individually or in groups on texts, resources and various materials (Sak, 2014; Şahin, 2015, 2018; Tucker et al. 1997; Tortop, 2015; Türkman, 2017; VanTassel-Baska & Stambaugh, 2006). The common feature of learning-teaching activities that increase the learning of gifted students is that they integrate the skills and techniques that can improve their high-level thinking skills and they are of high quality (Türkman, 2017). A quality educational activity; a. is interesting to the student, b. encourages students to think at higher levels of thinking, c. enables students to use their knowledge, skills and understanding, to perceive how they are related to each other, and thus to make the best sense of their thoughts and knowledge (Tomlinson, 2015). It is thought that values education activities to be carried out with gifted students should also be quality educational activities. Quality educational activities can be at the center of the education programs to be developed for gifted students, as well as at the center of the studies on the differentiation of the curriculum (Maker, 1982a,b akt. Tucker et al. 1997; VanTassel-Baska & Stambaugh, 2006). In differentiated instructional designs, it is possible to adapt the general curricula according to the individual characteristics of gifted children, to diversify them according to their learning profiles, and to enrich them in a way that will increase their interest and motivation (Avcı & Bal Sezerel, 2018). The basis of differentiated teaching practices is the development and implementation of challenging educational activities and teaching strategies that will increase students' learning (Emir & Yaman, 2017).

VanTassel-Baska (2003), identifies six strategies that promote openended, interactive, and generative learning in the gifted. These are problem-based learning, bibliotherapy, pacing, problem solving, questioning techniques, inquiry and content-based strategies. With the technological developments, it also becomes necessary to use digital tools within the differentiated instructional designs in order to enhance the differentiation process. Digital differentiation is a strategy for designing flexible learning paths and aiming at facilitating student learning process by asking essential questions and using digital tools (Kaplan Sayı & Soysal, 2022). In this strategy, teachers and instructional designers can use digital materials and tools for facilitating the instruction based on students' needs (Kaplan Sayı, 2022). Digital

differentiation can be used as a strategy in differentiated values education instructional designs for gifted. In digital differentiation for values education, tools and techniques in the literature can be used together with digital tools.

Kurnaz (2012) lists various tools and techniques that can be used in values education. These can be proverbs, social activities, learning by service, historical events and our cultural heritage, Nasreddin Hodja anecdotes and Qur'an anecdotes. In addition to these, the lives of important personalities in culture, children's literature, creative drama, mentoring, movies, documentaries, cartoons, games, Mevlâna and Mesnevi, tales, and Turkish Mythology can be used in values education. Moral discussions with gifted students, projects focusing on social justice, reading and writing activities on moral issues, participating in intercultural projects can contribute to values education (Orman, 2020). Roeper and Annemarie (2009) describe the activities that can be done in the values education of gifted students as follows (As cited by Gündüz, 2010, p. 172):

- The biographies of great personalities who devoted their lives to the service of society and humanity can enable them to discover human values. Visual and audio materials can be given to students to get to know the great personalities who are in the position of moral leaders and to meet with role models.
- Students can critically examine the development of value-thought systems in history and their effects on the evolution of society.
- Students can be informed about figures who lived in history and spent their lives devoted to the well-being, existence, health and salvation of others.
- Activities that allow students to develop their perspectives can be carried out through role playing and simulations. It can be ensured that students discuss daily issues and events, develop perspectives, express their feelings and thoughts, and make comments and evaluations.
- By allowing them to work in mutual interaction and cooperation, activities can be organized to respect each other's rights, develop empathy and gain social responsibility.
- Working with non-governmental organizations such as an activist to identify, analyze and solve real-life problems.
- Gifted students can be prompted to think about what kind of contributions they can make to society and the effects of the environment on them.
- Adults should be models for gifted students.

In the literature, there are studies investigating the effect of values education applied to gifted students. Dilmaç, Kulaksızoğlu and Ekşi (2007) concluded that the human values education program of high school students is effective in the development of students' value acquisition levels. In another study, it was found that the education given to gifted students at the secondary school level helps to increase their awareness of tolerance, love and democracy is effective (Çetinkaya & Kıncal, 2014). Ateş (2014) determined that the values education given to gifted 6th grade students resulted in a difference in favor of the posttest in the scores of the target behavior development scale. Tortop (2018) suggested a differentiated program called Moral and Character Education Program for Gifted (MCEPG). Çoban (2019) investigated teacher opinions about MCEPG. All the teachers stated that they found it effective, appropriate, and correct to use texts consisting of the lives of scientists in MCEPG.

There are few values education studies applied to gifted students in the literature. Unfortunately, there are not many studies to support this field (Tortop, 2018). In addition, the knowledge level of gifted students in the 7-12 age group about values is not sufficient. Values education should be given to gifted students in this age group, starting from the receiving step in the teaching of affective acquisitions. In values education, activities that will make the meanings related to values clear should be used (Kurnaz, Çiftci & Karapazar, 2013).

The Jodie Mahony Center for Gifted Education, affiliated with the University of Arkansas, has published a book called "Blueprints for Biography" for STEM (science, technology, mathematics, engineering) and character education (Jodie Mahony Center for Gifted Education, 2009). This book includes biographies of famous scientists, book recommendations and quality teaching activities. In a sense, science and character education are supported. In Turkiye, the book called "We are Valuable with Our Values, Values Education Activity Book with Biographies" under the editorship of Çalışkan and Öntaş (2020) was published. In this book, personality-values were matched, and values were tried to be gained through reading-writing activities.

In the current study, the differentiated instructional design for the value education of gifted was created and examined its efficiency. In the instructional design, biographies of talented Turkish people were included and digital differentiation tools were used.

Main Problem Statement

The problem of the current research is defined as "What is the efficiency of the differentiated instructional design for value education of gifted?" For this purpose, answers to the following questions were sought during the research process.

- Does the differentiated instructional design for value education affect the values development of gifted students?
- What are the views of gifted students about the differentiated instructional design?
- How do the cartoon scripts, cartoons, and cartoon presentations developed by students reflect the implementation process of the differentiated instructional design?
- What are the observations of researchers about the implementation process of the differentiated instructional design?

Method

Research Pattern

In this study, the mixed method, in which quantitative and qualitative methods are used together, was used. Mixed methods research can be expressed as a research approach in which both quantitative and qualitative data are used by researchers to understand the research problem. The collected data are combined and the results are drawn by using this combination (Mertkan, 2015). This research was modeled according to the embedded experimental design. Embedded experimental design or intervention design is a mixed research design in which one of the qualitative or quantitative approaches is dominant and the secondary approach is embedded in the dominant approach or hidden in the dominant approach (Creswell & Plano Clark, 2014). Embedded experimental design emerges when the researcher embeds qualitative data into experimental designs. Qualitative data are included in the application before, during or after an experiment. The research process is given in Figure 1.

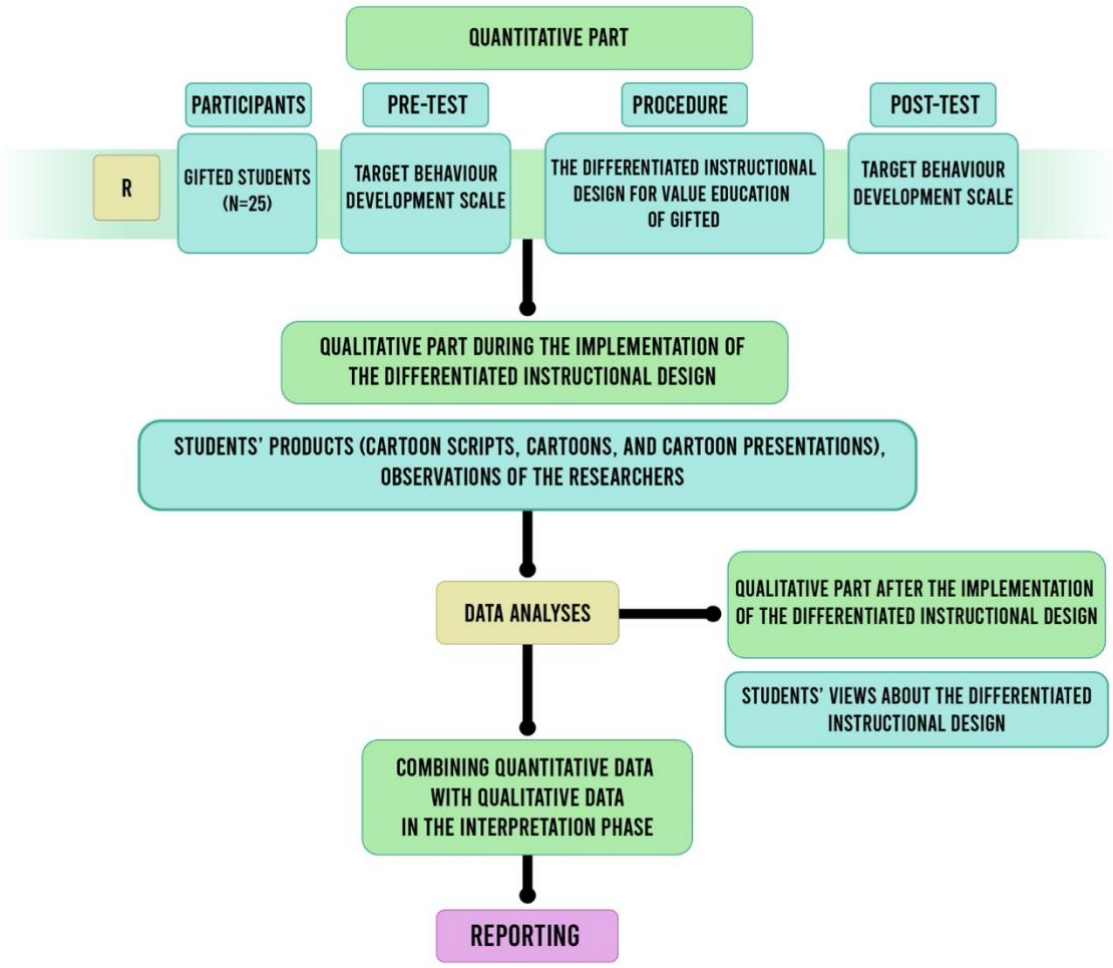


Figure 1.

Research Process

R: Subjects are assigned to groups randomly

The quantitative part of the study was carried out using a single-group pre-test-post-test experimental design. The single-group pretest-posttest experimental design is one of the weakest among the experimental designs. However, as Creswell (2012) stated, it is the nature of the research to prefer the single-group experimental design in studies where a new educational module is developed and applied. The effect of the experimental procedure was tried to be tested by the operation performed on a single group of gifted students. The measurements of the subjects regarding the dependent variable were obtained with the same measurement tool on the same subjects as the pre-test before the experimental procedure and the post-test afterwards (Büyüköztürk et al. 2014).

The qualitative part of the study consists of the products developed by the students during the implementation of the values education activities with biographies (cartoon scripts, cartoons and cartoon presentations), the observations of the researchers and the students' views on education after the experiment. Cartoon scripts are the stories of the cartoons. Cartoons are digital products created in Animaker animation program. Students presented their cartoons to their families and friends. Their presentation in this process is also a product.

Participants

The participants are 25 gifted students who continue their education in a Science and Art Center (SAC) located in Balikesir Province. In Turkiye, gifted students continue their education in Science and Art Centers in addition to their formal education processes. SAC work like an out-of-school program and the students are active in weekend or after school hours (Kanlı & Özyaprak, 2016). In SAC, the activities designed for the students are carried out in a way to ensure development by using the existing potentials of the students at the highest level. Gifted students have education in general mental ability, visual arts talent, and musical talent in SAC (MNET, 2016). Thirteen of the students are girls, 12 of them are boys and all of them are 6th grade students. Typical case sampling, one of the purposive sampling methods, was used to determine the study group. Purposive sampling methods allow for in-depth examination of situations that are thought to have rich information (Büyüköztürk et al. 2014; Yıldırım & Şimşek, 2013). In typical case sampling, an average, that is, a typical example, is determined among many cases in the universe and information is collected from this sample (Büyüköztürk et al. 2014). The study group in current research is a typical example among 182 SAC located in 81 provinces of Turkiye. The current research was carried out in the fall semester of the 2021-2022 academic year and lasted for 8 weeks.

Data Collection Tools and Data Collecting Process

Target Behaviour Development Scale

Target Behaviour Development Scale; it was developed by Kanger (2007) and its validity and reliability study was carried out by Ateş (2014). The scale is a 112-item, one-dimensional, four-point Likert-type scale developed for students studying in 4th, 5th, 6th, 7th and 8th grades. The scale was developed to measure the extent to which the students acquired the target behaviors related to the 14 values selected after the educational applications. The fourteen values are as follows; cleanliness, honesty and reliability, fairness, responsibility, benevolence, compassion, respect, patience, optimism, frugality, valuing neighborly-relative relations, humility, toleration, bravery. The Cronbach's alpha reliability coefficient of the scale was 0.93, and the test-retest reliability coefficient was found to be 64. High scores that can be obtained from the scale indicate that students' target behavior development is high. The lowest score that can be obtained from the scale is 112 and the highest score is 448. In the analysis of the data set obtained in a study conducted by Akan and Tatık (2020) with 262 secondary school students, the KMO value was found to be 902 and the Cronbach Alpha value to be .921. In the same study, a single factor structure that met 48.68% of the total variance was obtained in the exploratory factor analysis, and the values of the fit index were found to be at acceptable levels in the confirmatory factor analysis.

Mentimeter web 2.0

Mentimeter web 2.0 tool was used to measure the views of gifted students on the differentiated instructional design for value education. Mentimeter is a cloud-based web 2.0 tool used to add interactivity to presentations using live questions, quizzes and polls to improve student engagement. After the implementation, the students were asked to describe their views on education in three words in Mentimeter.

Checklist for Students' Products

During the implementation of the the differentiated instructional design for value education of gifted, students' products (cartoon scripts, cartoons and cartoon presentations) were collected as documents and evaluated using a checklist. Information on the criteria in the checklist is included in the findings section of the current study.

Observations

While trying to understand the observations of researchers about the teaching process, the video recordings taken while the activities were carried out over the Zoom program were watched. The researchers noted down their observations using the videos, the notes they took together and the points of hesitation were discussed with the three researchers, and the observations were reflected in the project report in line with the joint decisions.

Data Analysis

The data obtained in the quantitative part of the study were analyzed using SPSS 22 software. When analyzing the data on the target behavior levels regarding the values, first of all, the mean, standard deviation, mode, median, skewness and kurtosis values of the data set were calculated and then the distribution of the data was examined. The kurtosis and skewness coefficients of the pre-test and post-test scores obtained from the target behavior scale for values were calculated. The kurtosis coefficient for the pre-test scores is -.594, and the skewness coefficient is -.238. The kurtosis coefficient of the posttest scores is -.907 and the coefficient of skewness is -.533. Skewness and kurtosis values being within the limits of -1 and +1 are an indicator of normality (Garson, 2012; George & Mallery, 2010; Tabachnick & Fidell, 2001). After examining the distribution, it was decided to apply parametric tests.

In order to understand whether the difference between the pre-test and post-test scores of the gifted students regarding the target behavior levels regarding values is significant, the dependent samples t-test was performed. In addition, the effect size (Cohen d) was calculated in order to understand how effective the experimental procedure was.

Using the Mentimeter web 2.0 tool, the students explained their thoughts about education in three words. Mentimeter creates a word cloud with the words entered by the students, and the sizes of the words with high frequency are also large in the word cloud. In addition, the frequencies of the words can be seen by clicking on them. Frequencies are noted. Student products were analyzed with a descriptive approach. On the checklist consisting of ten criteria, markings were made as "yes" or "no". In the checklist, it was determined how many criteria were stated as “yes” or “no”. The researchers' observations were analyzed descriptively.

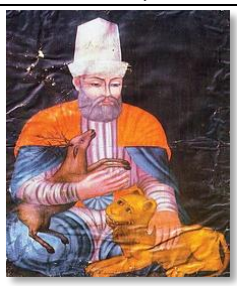
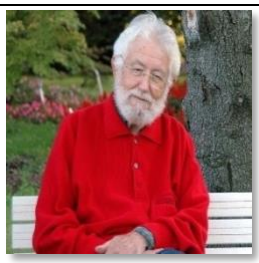
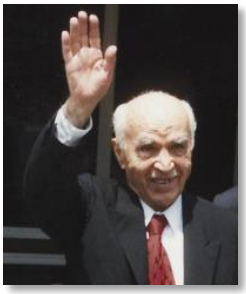
Procedure

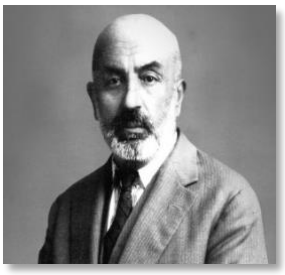
Turkish talented people and the values we can see in their lives have been determined as follows (Çalışkan & Öntaş, 2020).

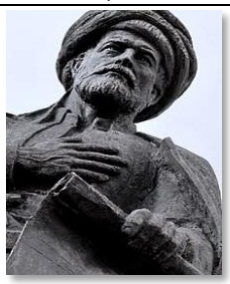
Table 1.

Turkish Talented People and the Values

Turkish Talented People	Talent Field	Value/Values
 Ahmed Yesevi Born:1093 CE, Died:1166 CE	He has important works on literature, morality and ethics. For detailed information: https://en.wikipedia.org/wiki/Ahmad_Yasawi	Unity and Solidarity
 Aşık Veysel Şatıroğlu Born:1894, Died:1973	He has important works on the field of literature and music. For detailed information: https://en.wikipedia.org/wiki/Asik_Veysel	Patience

 Aziz Sancar Born:1946, Died:-	He is a Turkish doctor, academician, biochemist, molecular biologist and a scientist who won the 2015 Nobel Prize in Chemistry. For detailed information: https://en.wikipedia.org/wiki/Aziz_Sancar	Diligence
 Haji Bektash Veli Born:1209 CE, Died:1271 CE	He is a Muslim mystic, saint, Sayyid and philosopher from Khorasan who lived and taught in Anatolia. He is revered among Alevis for an Islamic understanding that is esoteric (spiritual), rational, progressive, and humanistic. For detailed information: https://en.wikipedia.org/wiki/Haji_Bektash_Veli	Peace
 Hayrettin Karaca Born:1922, Died:2020	He is a Turkish industrialist and environmental activist. In his fifties, he established Turkey's first private arboretum. He is also one of the founders of Turkish Foundation for Combating Soil Erosion (TEMA). For detailed information: https://tr.wikipedia.org/wiki/Hayrettin_Karaca	Environmental Awareness
 İbn-i Sina Born:980, Died:1037	He is often known in the West as Avicenna, was a Persian polymath who is regarded as one of the most significant physicians, astronomers, thinkers and writers of the Islamic Golden Age, and the father of early modern medicine. He was a Muslim Peripatetic philosopher influenced by Greek Aristotelian philosophy. For detailed information: https://en.wikipedia.org/wiki/Avicenna	Diligence
 Mustafa İzzet Baysal Born:1907, Died:2000	He is an architect and businessman known for his helpfulness. For detailed information: http://www.ibu.edu.tr/izzet-baysals-life	Helpfulness

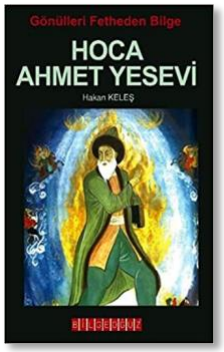
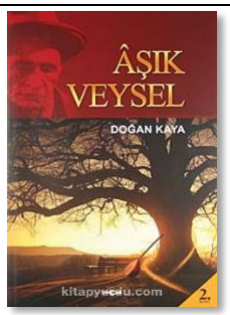
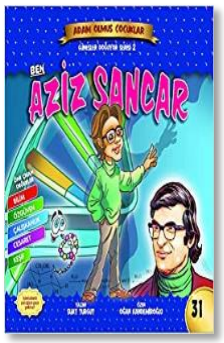
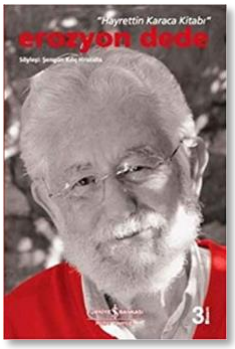
 Mehmet Akif Ersoy Born:1873, Died:1936	He was a Turkish poet, writer, academic, politician, and the author of the Turkish National Anthem. Widely regarded as one of the premiere literary minds of his time, Ersoy is noted for his command of the Turkish language, as well as his patriotism and role in the Turkish War of Independence. For detailed information: https://en.wikipedia.org/wiki/Mehmet_Akif_Ersoy	Patriotism
 Mehmet Ali Kağıtçı Born:1899, Died:1982	Turkish chemist and paper engineer. He assumed the leadership and pioneering role in the establishment of the national pulp and paper industry in Turkey and became the founder of the Turkish paper industry. For detailed information: https://tr.wikipedia.org/wiki/Mehmed_Ali_Kagitci	Diligence
 Mevlâna Celaleddin Rumi Born:1207, Died:1273	His poems have been widely translated into many of the world's languages and transposed into various formats. Rumi has been described as the "most popular poet" and the "best selling poet" in the United States. For detailed information: https://en.wikipedia.org/wiki/Rumi	Tolerance
 Muazzez İlmiye Çığ Born:1914, Died:-	She is a Turkish archaeologist and Assyriologist who specializes in the study of Sumerian civilization. For detailed information: https://en.wikipedia.org/wiki/Muazzez_Ilmiye_Cig	Sensitivity to Historical and Cultural Heritage
 Mustafa Kemal Atatürk Born:1881, Died:1938	He is a Turkish field marshal, revolutionary statesman, author, and the founding father of the Republic of Turkey, serving as its first president from 1923 until his death in 1938. He undertook sweeping progressive reforms, which modernized Turkey into a secular, industrializing nation. For detailed information: https://en.wikipedia.org/wiki/Mustafa_Kemal_Ataturk	Independence and Patriotism

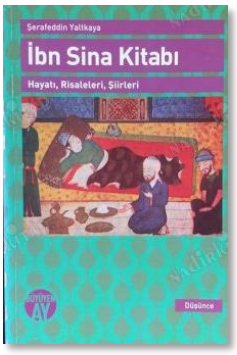
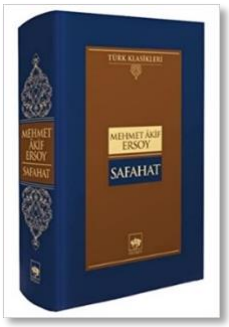
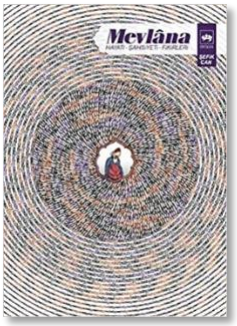
 Osman Hamdi Bey Born:1842, Died:1910	He is an Ottoman administrator, intellectual, art expert and also a prominent and pioneering painter. He was also an accomplished archaeologist, and is regarded as the pioneer of the museum curator's profession in Turkey. He was the founder of Istanbul Archaeology Museums and of the Istanbul Academy of Fine Arts. For detailed information: https://en.wikipedia.org/wiki/Osman_Hamdi_Bey	Aesthetic
 Piri Reis Born:1465 Died:1553	He is an Ottoman admiral, navigator, geographer and cartographer. He is primarily known today for his maps and charts collected in his Kitab-ı Bahriye (Book of Navigation), a book that contains detailed information on early navigational techniques as well as relatively accurate charts for their time, describing the important ports and cities of the Mediterranean Sea. For detailed information: https://en.wikipedia.org/wiki/Piri_Reis	Patience
 Seyit Onbaşı Born:1889, Died:1939	He is usually called Corporal Seyit (Turkish: Seyit Onbaşı) was a First World War gunner in the Ottoman Army. He is famous for having carried three shells to an artillery piece during the Allied attempt to force the Dardanelles on 18 March 1915. For detailed information: https://en.wikipedia.org/wiki/Seyit_Cabuk	Responsibility and Sacrifice
 Yunus Emre Born:1238, Died:1328	He was a Turkish folk poet and Sufi mystic who greatly influenced Turkish culture. He wrote in Old Anatolian Turkish, an early stage of Turkish. The UNESCO General Conference unanimously passed a resolution declaring 1991, the 750th anniversary of the poet's birth, International Yunus Emre Year. For detailed information: https://en.wikipedia.org/wiki/Yunus_Emre	Love, Belief

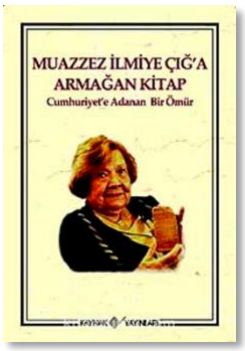
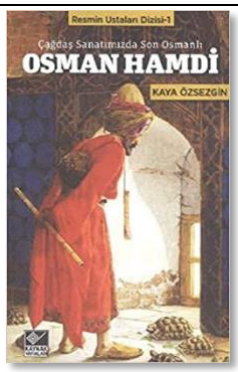
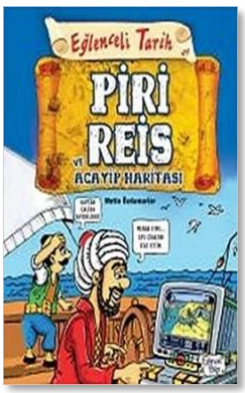
After the pairings in Table 1 were determined, these Turkish talented people were introduced to the students and the implementation process of the activities was explained. The students were reminded that they would research the biographies of the personalities they chose, and that they should pay attention to how we see the values in Table 1 in the lives of the person. It was also reminded that they would make a cartoon about the personalities and values whose biography/biographies were read within the scope of the activities.

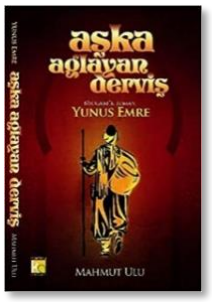
Students were shown how to do research on "Google Scholar", "DergiPark" and "YÖK Thesis" databases in order to research the biographies of personalities from the reliable sources. Students were reminded that they could also do research on various websites and video sharing sites, but it was indicated that they should test the accuracy of the information in these environments. In addition, a book recommendation was made for each person to procure their biography. These book recommendations are as follows:

Table 2.
Book Recommendations

Turkish Talented People		Related Book
Ahmet Yesevi		Gönülleri Fetheden Bilge-Hoca Ahmet Yesevi (Writer: Hakan Keleş) https://www.amazon.com.tr/Hoca-Ahmet-Yesevi-Gonulleri-Fetheden/dp/6054599828
Aşık Veysel Şatıroğlu		Aşık Veysel (Writer: Doğan Kaya)
Aziz Sancar		Adam Olmuş Çocuklar/Ben Aziz Sancar (Writer: Suat Turgut) https://www.amazon.com.tr/Ben-Aziz-Sancar-Cocuklar-Serisi/dp/6059470300
Hacı Bektaş-ı Veli		Hacı Bektaşı Veli'den Bilgelik Hikayeleri (Writer: İbrahim Murat) https://www.amazon.com.tr/Haci -Bektsi-Veliden-Bilgelik-Hikayeleri/dp/6055032376
Hayrettin Karaca		"Hayrettin Karaca Kitabı" Erozyon Dede (Writer: Şengün Kılıç Hristidis) https://www.amazon.com.tr/EROZYON-DEDE-HAYRETTIN_KARACA/dp/9944882976

İbn-i Sina		İbn-i Sina Kitabı Hayatı, Risaleleri, Şiirleri (Writer: Şerafeddin Yaltkaya)
Mustafa İzzet Baysal		Bir Çocuk, Bir Şehir ve Bolu (Writer: İlhan Akın ve Halit Karatay)
Mehmet Akif Ersoy		Safahat (1911) https://www.amazon.com.tr/Safahat-Ciltli-Mehmet-Akif-Ersoy/dp/6254080826
Mehmet Ali Kağıtçı		Bir Cumhuriyet Aydını M. Ali Kağıtçı (Writer: Mehmet Sarıoğlu)
Mevlâna Celaleddin Rumi		Mevlâna-hayatı, Şahsiyeti, Fikirleri (Writer: Şefik Can) https://www.amazon.com.tr/MEVLANA-HAYATI_SAHSIYETI_FIKIRLERI /dp/975437161X

Muazzez İlmiye Çığ		Muazzez İlmiye Çığ'a Armağan Kitap, Cumhuriyete Adanan Bir Ömür
Mustafa Kemal Atatürk		Nutuk https://www.amazon.com.tr/Nutuk-Kutulu-Ciltli-Mustafa-Ataturk /dp/9750820037
Osman Hamdi Bey		Çağdaş Sanatımızda Son Osmanlı, Osman Hamdi (Writer: Kaya Özsezgin) https://www.amazon.com.tr/Cagdas -Sanatimizda -Osmanli-Osman-Hamdi/dp/9753438567
Piri Reis		Piri Reis ve Acayip Haritası (Writer: Metin Özdemirler) https://www.amazon.com.tr/Eglenceli-Tarih-Piri-Acayip-Haritasi/dp/6050828709
Seyit Onbaşı		Seyit Onbaşı (Writer: Haldun Terzioğlu ve Suat Yılmazer)

Yunus Emre		Aşka Ağlayan Dervis Yunus Emre (Writer: Mahmut Ulu) https://www.amazon.com.tr/ASKAAGLAYAN-DERVIS-YUNUS-EMRE/dp/6051130705

The differentiated instructional design was carried out on four different student groups at the 6th grade level. The first group consists of 5 students, the second group consists of 8 students, and the third and fourth groups each consist of 6 students. All of the activities were implemented for 8 weeks (October-December 2021), 2 lesson hours per week via the Zoom program with distance education. The application flow of the activities is as follows:

Example Acitivity: Tell as an Expert

After the students researched the biographies of the Turkish talented people and how they saw the related values in their lives, they met on the Zoom program during the distance education process. A discussion was held with small groups over what they read. It was ensured that each student had information about the biographies and values of the personalities that they did not choose. Afterwards, the "Tell as an Expert" activity was held. This activity is designed as a game in which students can talk in detail about personalities and the values. Free sample activities on the website www.twinkl.com.tr were used in the structuring of this activity.

In this activity, the students were asked to talk about Turkish talented people with their friends for two minutes. Students were scored for each word used correctly while speaking. Points are earned once for each word. However, points are deducted if any word from the prohibited column is used. Students were asked to self-assess their expertise with a thermometer. An example activity is presented in Figure 2.

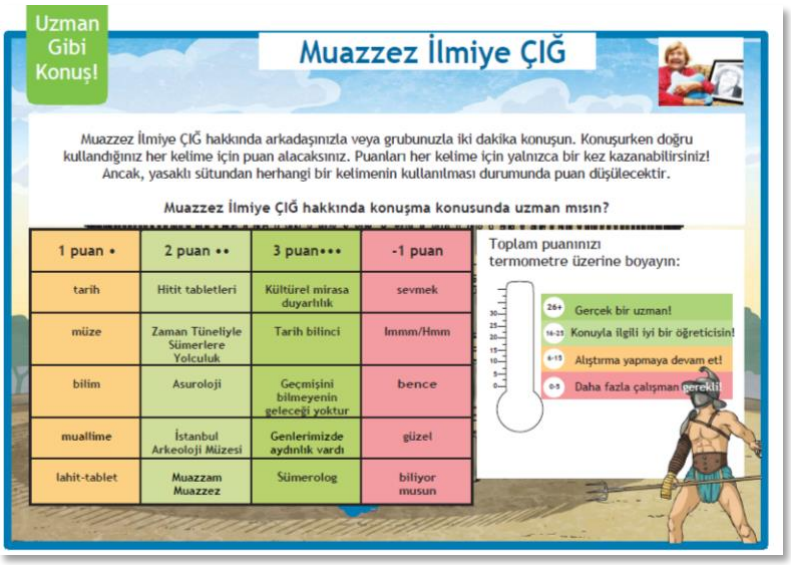
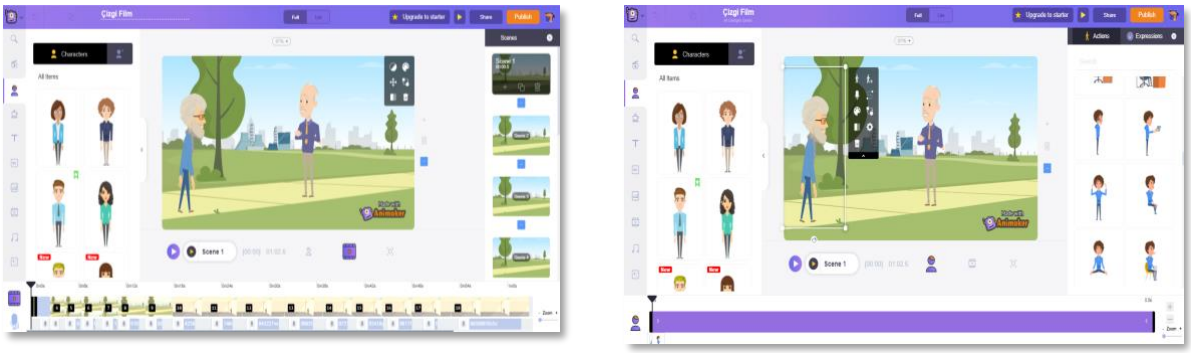


Figure 2.
Tell As An Expert Activity

After the students analyzed and discussed the biographies, activities were carried out to develop stories for cartoons and turn them into scripts, to make cartoons in the Animaker program and to bring the films together with the audience at the gala night.

First of all, the Animaker program, which is free and easy to use, was introduced to the students. In this program, students can design their own characters, add voices, actions and facial expressions to their characters, plan the details (backgrounds, music, sound recordings, transitions, etc.) of cartoons, and in short, turn their scenarios into a cartoon.

While the movies are being created, the time arrangements of the sound, actions and various effects of each scene are carried out through the time panel, which is very easy to use. Cartoons are automatically saved in the "my projects" section of the user account, and students can continue their studies whenever they want from where they left off. There are also features to collaborate remotely, share movies in video format or via links in Animaker. Animaker working environment is presented in Figure 3(a-b).



a b

Figure 3.
Animaker Working Environment

Students were taught how to use the Animaker program in practice. In this process, subjects such as character design, voice recording, voice-character synchronization, adding facial expressions, adding motion/action, time panel management, scene planning and recording the movie were emphasized.

After the training in Animaker, the students wrote cartoon scripts, made scene plans, and structured the details of their cartoons (character design, background selection, sound recording, timing, etc.) using the knowledge they gained from their biography studies and their creative thinking skills. After the cartoons were completed, films were watched at a summative gala night attended by students and parents, and a short discussion was held on the films. Figure 4 contains some screenshots from cartoons.

a b

c d

e f

Figure 4.
Screenshots from Cartoons

In Figure 4-a, by two secondary school students are observing Aziz Sancar and Muazzez İlmiye Çığ. In the cartoon, their experiences, industriousness, sensitivity to historical and cultural heritage are emphasized. In Figure 4-b, there is a cartoon about why patience is important in Aşık Veysel's life on a long, narrow road. In Figure 4-c, there is a cartoon about Yunus Emre's life and his understanding of love with himself and the times in which he lived. In Figure 4-d, there are images from a cartoon about the value of peace between Hacı Bektaş-ı Veli and children. In Figure 4-e, there is a cartoon about how the conflict between Hayrettin Karaca, who wants to develop a forest regıon, and Muazzez İlmiye Çığ, who wants to excavate in that region, was resolved. Finally, in Figure 4-f, there is a cartoon that starts with the disappearance of a valuable oil painting and the cartoon emphasizes its aesthetic value.

Findings

Within the framework of the main problem of the study and the sub-problems emerging from this problem, the findings obtained from the data tool determined for the research are shared in detail below.

The Effect of the Differentiated Instructional Design on the Values Development of Gifted

The first sub-problem of the research was to determine whether the differentiated instructional design for value education affects the values development of gifted students. In this context, the findings of the dependent samples t-test was presented in Table 4.

Table 4.

The Findings of the Dependent Samples t-Test

Scores	N	$\bar{X}$	t	p
Pre test	25	347.72	-3.78	.001
Post test	25	395.20		

According to the dependent sample t-test results given in Table 4, the difference between the pre-test and post-test scores of gifted students' target behavior development levels regarding values is significant ($p<.05$). Post-test mean score ($\bar{X}$=395.20) is higher than pre-test mean score ($\bar{X}$=347.72).

The effect size (Cohen d) of the difference between the pretest and posttest scores of the study group was calculated as 1.047 (high effect size). d=0.2 indicates small effect, d=0.50 medium effect, and d=0.80 large effect. It may be said that the study has a high effect size in terms of target behavior development levels related to values (Lenhard & Lenhard, 2016).

Gifted Students' Views about the Differentiated Instructional Design

The views of gifted students about the differentiated instructional design was analyzed after the implemenation. The findings regarding this are shown below. The words and frequencies of the students' opinions about the experimental process are given in Table 5.

Table 5.

Words Used by Students and Their Frequencies After Experimental Process

Words	Frequencies (f)	Words	Frequencies (f)
Funny	18	Seyit Ali Çabuk	1
Instructive	14	Empathy	1
Our Values	14	Applied	1
Cartoon	4	Love	1
Animation	3	Friendship	1
Technology	2	Mehmet Ali Kâğıtçı	1
Beneficial	2	Book	1
Different/Unusual	2	Patience	1
Friendship	1	Directing	1
Premiere night	1	Interaction	1
Sumerology	1	Character Design	1
Biography	1		
		Total	**75**

In order to better understand the words given in Table 5 and their frequencies, the word cloud given in Figure 5 was created.

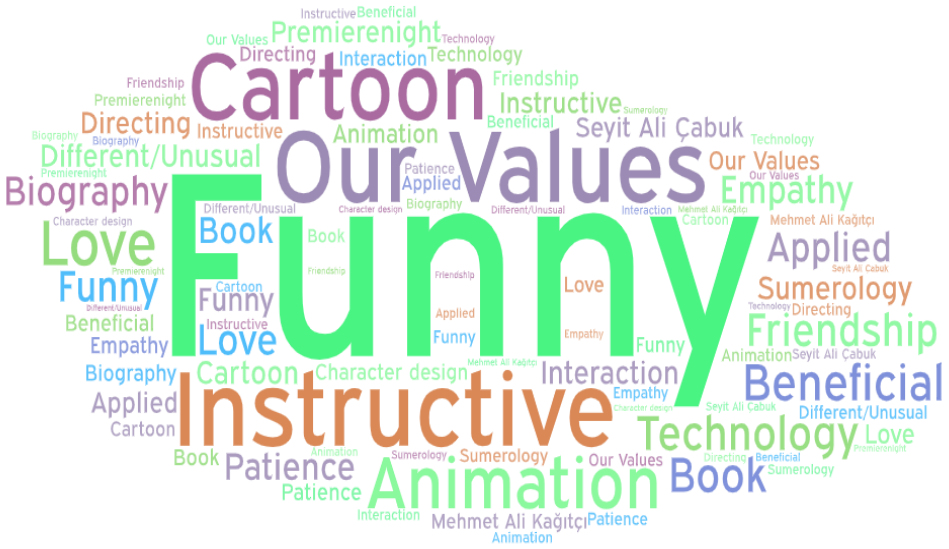


Figure 5.
Word Cloud

When Table 5 and Figure 5 are examined together, it is seen that students mostly use the words fun (f=18), instructive (f=14) and our values (f=14), respectively, for technology enriched values education activities with biographies. In addition, the students also emphasized that the cartoons they created during the application process, the personalities, the values that attracted their attention, the use of applied technology and the activities were different.

Reflections of the Implementation Process of the Instructional Design on Gifted Students' Products

The the cartoon scripts, cartoons and cartoon presentations of the students were evaluated with a checklist. Table 6 presents the analysis performed using the checklist criteria. When Table 6 is examined, it is seen that the students are successful in writing scenarios and transforming the scenario into a cartoon. Students especially had problems with sound synchronization. In addition, it was observed that some students did not comply with the planning (character, background, location, etc.) they had made before while creating the cartoon.

Table 6.
Analysis Results Regarding the Evaluation of Cartoon Scenarios and Cartoons according to the Criterias in the Checklist

No	Criterias	Yes (f)	No (f)
1	The plot in the story has been converted into a script to be used in the cartoon.	25	0
2	The design of the characters is compatible with the characters told in the story.	22	3
3	The location in the story and the shooting plan in the cartoon are in harmony with each other *(The shooting plan is the edited version of a film on paper).*	21	4
4	The time in the story is reflected in the cartoon with visual and auditory elements.	25	0
5	At least one character has been originally designed in Animaker.	25	0
6	The voice of the characters in the cartoon has been recorded or the text has been converted into voice.	24	1
7	Emotional expression and movement have been added to the characters in the cartoon.	25	0
8	Selected personalities and values are reflected in the cartoon.	25	0
9	Since the duration of the elements in the cartoon was successfully arranged on the timeline, there was no synchronization problem.	20	5
10	The cartoon was successfully presented to other students and audiences.	25	0

The Observations of the Researchers about the Implementation Process of the Differentiated Instructional Design

The researchers analyzed the implementation process of the differentiated instructional design by watching the videos recorded through the Zoom program and reached the following results:

The students learned the Animaker program very easily, and the character design, sound recording and animation features attracted their attention the most. It has been observed that the students are quite happy and satisfied with the process and had fun.

All of the students participated in the readings (at home) and the discussions in the classroom. It has been noticed that outside of class hours, students work individually or by using the" work together feature" of Animaker to better understand the technical features. In the design of the cartoons, the students worked individually.

Students included family members in the cartoons they created. In most of the cartoons, the adult characters were voiced by the students' parents, while the children's characters were voiced by themselves, their friends and sisters or brothers.

It was observed that students chose mostly Aziz Sancar, Muaazez İlmiye Çığ, Mustafa Kemal Atatürk Hayrettin Karaca, Mehmet Akif Ersoy and Yunus Emre among other famous Turkish adult personalities. It has also been observed that the students who also receive education in the fields of visual arts and music at SAC chose Osman Hamdi Bey and Aşık Veysel Şatıroğlu.

The students wanted to do the "Tell as an expert" activity for a long time. It was observed that they were highly motivated for this activity. The students wanted to determine the words in the activity content and play the game repeatedly.

In the process of creating cartoons, the students addressed themselves with features such as director, cartoon animation specialist, voiceover specialist, character designer. They stated these in the last scene of their cartoons and added the names of the people they received help from their films.

It was understood that the students had the most problems in the management of the panel during the cartoon process. Here, sound, animation and camera settings for characters and objects are configured simultaneously. Students who had problems received help from their friends.

Conclusion and Discussion

In the current study, the differentiated instructional design for value education was applied to gifted students in an online environment and the efficiency of the differentiated instructional design was investigated. It was observed that the difference between the pre-test and post-test scores of the target behavior development levels of the gifted students regarding the values was significant. This difference is in favor of the post-test and the effect size is high ($d=1.047$, $p<.05$). In other words, the differentiated instructional design for value education increased the values development of gifted studentsand it was effective in this context. Similarly, Dilmaç, Kulaksızoğlu and Ekşi (2007) concluded that the values education program is effective in the development of the value development levels of gifted high school students. The values education carried out on the awareness of gifted secondary school students about tolerance, love and democracy has also been effective (Çetinkaya & Kıncal, 2014). The values education activities carried out with gifted 6th grade students created a significant difference in the students' target behavior development scale scores in favor of the posttest (Ateş, 2014).

The conclusions of Dilmaç, Kulaksızoğlu and Ekşi (2007), Çetinkaya and Kıncal (2014) and Ateş (2014) in their researches coincide with the conclusion of the current research. It is clear that gifted students' values development was increased. However, what is important here is how values education is carried out with gifted students. If the techniques and skills that can activate more than one high-level thinking skill are adapted to the subject covered, great-effective increases occur in the learning of gifted students (VanTassel-Baska & Brown, 2007, cited in Türkman, 2007). Strategies such as inquiry based teaching, adjusting teaching according to students' pace, creative problem solving, bibliotherapy, problem-based and project-based learning provide open-ended, interactive and productive learning opportunities for gifted students (Şahin, 2018; Tortop, 2015).

Within the scope of the current study, gifted students researched the biographies of Turkish talented people mostly from scientific sources and they deepened their reading in the context. They were also busy with enriched content thanks to the tell as an expert activity, they had the chance to choose the content they wanted, and they had deep discussions about the content they read in the classroom. They interacted with each other and the course content, and reflected their learning by transforming them a cartoon using technology. In a sense, differentiated teaching and learning activities made positive contributions to students' learning. It is important to develop the activities for gifted students by taking into account the readiness, interests and needs of the students (Sak, 2014, Şahin, 2018). Content (subject), process (thinking skills, research skills, basic disciplinary skills) and product (communication styles to express learning) should be differentiated according to the aforementioned characteristics of gifted students (Avcı & Bal-Sezerel, 2018). For these reasons, the differentiated instructional design in the current study is considered to be effective.

Gifted students expressed their views on the differentiated instructional design the most with the words "fun, instructive and the values". Along with these, they also mentioned the Turkish talented people whose biographies were examined during the education, along with words such as cartoon, animation, technology, useful, different. As a result of the evaluation of the scripts and cartoons produced by the students, it was seen that the students were successful in writing scripts and developing their cartoons. It was observed that they had some technical difficulties in the cartoon development process and that some students did not fully comply with the plans they made in the cartoon development process.

Gifted students find technology-integrated activities enjoyable and enjoy participating in these activities. While they develop their skills in using technology productively and doing research using technology, they also get the opportunity to learn the course content (Avcu, 2019; Ayverdi, 2018). In the current study, they used technology both to do research and to produce cartoons in the Animaker program in values education activities with biographies. All of the activities were held online via the Zoom program.

During the Covid 19 pandemic, they had the chance to come together online, meet their learning needs, express themselves, interact and produce products. This can be explained by the fact that gifted students find values education with biographies entertaining and instructive and that they are successful in producing cartoons using technology. In addition, gifted students love to produce new products with information technologies and expect to have training on animation, cartoon making, game development and using new technologies (Öngoz & Aksoy, 2015). At the same time, they use technology as a means of learning from others and sharing what they produce with others. Internet is the technology they find most meaningful for them (Siegle, 2005, p. 30). Digital gifted natives, who can use the Internet and mobile technologies as a language, and who participate in the production and sharing of content on the Internet, see virtual environments as a primary source for socializing, having fun and gaining information (Köroğlu, 2015). In this case, it can be said that values education activities with biographies enriched with technology have significant effects on students despite some difficulties and frustrations.

The results of the analysis of the videos and the observations during the implementation of the differentiated instructional design also show that the gifted students successfully use the cartoon making program (Animaker) and are satisfied with the process of producing and sharing their products. Giving them input in the implementation of the activities, choosing the personality and value matching they wanted, enabled them to participate in the process of research and making cartoons, and to work to produce outside of the classroom. The fact that the students include their family members and friends in the cartoons, especially in the voiceovers, can also be considered as a separate achievement of the process. Such that, the adoption of the values of the society by gifted students and the formation of their value judgments depend primarily on the content and quality of the education they will receive in the family and then in the educational institutions. Values brought to students by families and educational institutions can be different from each other with the effect of mass media and social environment (Sezer, 2016). The participation of parents in values education activities with biographies applied within the scope of this study may contribute to their children's awareness of the content and implementation of values education and to reinforce values outside the teaching process.

At the same time, parents can take the values in the lives of famous Turkish personalities as an example and reflect what they have gained in the process of being a model. It was also understood that gifted students chose Aziz Sancar, Muaazez İlmiye Cig, Mustafa Kemal Atatürk, Hayrettin Karaca, Mehmet Akif Ersoy, Yunus Emre, Osman Hamdi Bey and Asik Veysel to study more than other Turkish personalities. It is thought that students' interests (science, art, etc.) are effective on this situation.

Recommendations

Based on the conclusions of the current research, the following recommendations were developed.

Recommendations for Further Research

- The effect of values education activities on certain values can be examined in detail with biographies. Comparative studies can be done by establishing experimental and control groups. The other scales developed in the literature can be used to measure achievements related to values.
- It can be recommended that future researchers ensure the participation of families in values education activities if at all possible.

Recommendations for Applicants

- The links of the the cartoons can be converted into QR code form and shared on digital media or school boards, so that the study can be disseminated. It is possible for different people to benefit from these studies and to raise awareness about the values.
- Activities carried out within the scope of values education with biographies (researching biographies, discussing, speaking like an expert, making cartoons, sharing, etc.) can be applied with different gifted students and the students with normal abilities.
- In the current study, students worked individually. In different studies, group work can be done by taking into account the leadership characteristics of gifted students.
- This study was implemented in the online environment. The effects of the flipped, blending or face-to-face learning options can be compared.

Limitations of Study

It is a limitation that the research was conducted with gifted students in Balıkesir city center. The use of single-group experimental design in the quantitative part of the study is another limitation of the study. In the study, the instructional design was shaped according to the general instructional design model, but one of the instructional design models recommended for gifted students was not used. This situation can be considered as a limitation of the research.

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Research Article

Investigation of the effects of mathematics-centred STEM activities on students 'creative thinking skills and student opinions[1]

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Abstract

The aim of this study is to examine the effect of mathematics-centered STEM activities on students' creative thinking skills and to determine student views on this topic. In the research, quantitative and qualitative methods were used together. The quantitative part of the research consists of two groups of pre-test-post-test, the experimental-control group of quasi-experimental design, and the qualitative part of the case study design. The study, a province in the 2018-2019 academic year in the eastern Black Sea region of Turkiye was carried out with students in two different classes in the first semester of 6th grade who are studying in public schools. Torrance Creative Thinking Test (TCTT) was applied to the experimental and control groups at the beginning of the study. STEM activities prepared by the researcher were applied to the experimental group students for seven weeks, while the control group students were taught a course in accordance with the current curriculum. STEM activities prepared by the researcher were applied to the experimental group students for seven weeks, while the control group students were taught a course in accordance with the current curriculum. At the end of the term, TCTT was applied to the groups as a post-test and eight students who were selected voluntarily from the experimental group were interviewed. The data obtained from the TCTT were analyzed with a statistical program. It was concluded that the change in the pre-tests of the TCTT was found significant in the verbal category, while there was no significance in the change in the figural category. Content analysis was conducted for the interviews with the students and it was concluded that STEM activities contributed to the creative thinking of the students according to the students' opinions.

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Introduction

Due to the changes made in Turkiye and different countries about mathematics education, which is to show the need to have different skills that can be considered qualified individuals with evolving technology. So that the main goal of mathematics education is to help individuals solve problems they encounter in real life. When we consider mathematics as the solver of the problems of other professions (especially engineering), the concept of integration has emerged in order to provide multiple perspectives to problems. Integration has been compared to the formation of compounds in that it expresses the undivided state of a whole (Lederman & Niess, 1997). In this context, mathematics has to be intertwined with other disciplines in terms of problem solving. As a matter of fact, mathematical modeling has an important place in this regard. Mathematical modeling is related to daily life and has an interdisciplinary nature. In mathematical modeling, problems are chosen from daily life, but there is no transition

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between disciplines (Akay, 2018). However, many of the problems encountered in daily life do not consist of problems that can be solved with only one field / discipline knowledge. With the solutions of the methods found for these problems, it will be possible to know the information of different disciplines in order to increase the quality of the products produced more efficiently, and to use and blend this information creatively, with the joint work of experts from different disciplines (Aydeniz, 2017). In this respect, STEM stands out as a teaching approach in which science, technology, engineering and mathematics disciplines are applied together (Honey, Pearson, & Schweingru, 2014). Science, Technology, this approach created with the initials of the sub-disciplines of engineering and mathematics, as means that have been used in Turkiye include the abbreviation STEM. Science, Technology, this approach created with the initials of the sub-disciplines of engineering and mathematics, as means that have been used in Turkiye include the abbreviation STEM. Science, Technology, this approach created with the initials of the sub-disciplines of engineering and mathematics, as means that have been used in Turkiye include the abbreviation STEM. In today's rapidly changing and developing world, it is necessary for individuals to develop their creative thinking skills in order to progress in the fields of science and technology, and to continue people's lives. Mathematics-centered STEM activities prepared in this context consist of interdisciplinary lesson plans in which middle school 6th grade mathematics course outcomes are centered and the outcomes of other sub-disciplines are distributed according to this center. The problems chosen in this educational approach include the achievements of the students in mathematics and other sub-disciplines at the level of education. In the solution phase of the problems, because mathematics achievements were used predominantly, activities were created by placing mathematics discipline at the center. Students' need for logical thinking and problem solving skills has increased as a result of rapid progress in science and technology. It is known that mathematics, which is seen as a tool for thinking, increases the opportunities for individuals to find a job and, more importantly, the rate of enjoying their lives together with the opportunities it provides for their education (Ministry of Education, 2013). From this point of view, STEM can be considered as an educational approach that encourages students to think critically and at a high level, provides quality learning with an interdisciplinary education, provides the opportunity to transfer the learned knowledge to daily life, and supports and increases the skills used in daily life (Yıldırım & Altun, 2015). In this study, STEM activities were prepared by taking mathematics into the center and using mathematical modeling. The effects of the prepared activities on creative thinking skills, which are among the thinking skills that national education wants to gain, have been investigated. The research has been enriched with the opinions of the students. In the studies conducted, it is seen that the activities in the literature do not give intensity to mathematics achievements. The activities prepared are at the 6th grade student level of middle school and the modeling approach is taken as a basis for the mathematics discipline in the center. It has been realized that the discipline of mathematics in STEM education can be enriched by mathematical modeling (Akay, 2018). In addition, students' difficulties in solving daily life problems, introducing students to daily life problems in the 6th grade of secondary school, and contributing to students in this field were seen as a reason for the study. Problem solving, creativity and design skills are defined as basic skills in the STEM education approach of students. Using any of the problem solving methods provides a vital service to student success in the 21st century by contributing to students' critical and creative thinking skills (Cooper & Heaverlo, 2013). In addition, creative problem solving is the process of combining high-level thinking skills such as creative thinking, critical-thinking and analytical thinking (Lumsdaine & Lumsdaine, 1995). There is a transition between disciplines in solving creative problems, and different disciplines are solved by gathering around a problem. There is a transition between disciplines in solving creative problems, and different disciplines are solved by gathering around a problem. There is a transition between disciplines in solving creative problems, and different disciplines are solved by gathering around a problem. There is a transition between disciplines in solving creative problems, and different disciplines are solved by gathering around a problem. The process continues, just like the STEM education approach. The interdisciplinary approach enables students to connect with real life and contribute to problem solving, along with creative and critical thinking skills that are desired in the 21st century (Özkök, 2005). The process continues, just like the STEM education approach. The interdisciplinary approach enables students to connect with real life and contribute to problem solving, along with creative and critical thinking skills that are desired in the 21st century (Özkök, 2005). On the other hand, among the definitions of the term creativity, processes such as multidimensional thinking, testing the thought, and creating a product are mentioned. In this respect, it is understood that it is similar to the engineering design skills in the STEM education approach.

Problem of Study

In this study, the effect of math-centered STEM activities on students' creative thinking skills and student views were investigated. There are two sub problems of this study. These sub problems are as follows:

- Do math-centered STEM activities affect the creative thinking skills of middle school 6th grade students?
- What are the students' views on STEM and creative thinking?

Method

Research Model

In the research, quantitative and qualitative methods were used together. Quantitative findings are presented by enriching them with qualitative findings (Ekşi, Kılıç Memur, Sevgi Yalın, & Dinç, 2020). The quantitative part of the study consists of a semi-experimental design with two groups of pretest-posttest experimental-control groups. The quasi-experimental design should be used when conducting research on the effects of teaching materials in different classes or teaching methods. The quantitative part of the study consists of a semi-experimental design with two groups of pretest-posttest experimental-control groups. The quasi-experimental design should be used when conducting research on the effects of teaching materials in different classes or teaching methods. In this design, classes are not organized for any purpose related to education before the research, but are included in the examination as it is in their own terms. Two groups were formed randomly and activities in accordance with the STEM education approach, which is the independent variable of the study, were applied to one of the groups. Test measurements were made to the groups before and after the experiment. Two groups were formed randomly and activities in accordance with the STEM education approach, which is the independent variable of the study, were applied to one of the groups. Test measurements were made to the groups before and after the experiment. The qualitative part of the research consists of a case study design. The case study handled within the qualitative method is a type of study that allows one or more cases to be investigated in detail. In qualitative studies, all factors belonging to a situation are considered with a holistic approach and the level of influence of the group from the situation given in the research is emphasized (Yıldırım & Şimşek, 2016).

Participants

Research, a province in Turkiye's eastern Black Sea region, in the 2018-2019 academic year studying at the secondary school in the first semester of 6th grade students in public schools was conducted with two different classes. Students in the experimental and control groups that make up the study group study in public institutions. The institutions where students study are located in a medium-socio-economic environment. It was observed that the cognitive levels of the students in the experimental and control groups were different from each other. It was observed that the experimental group students had higher levels of cognitive and academic achievement compared to the control group students. The researcher reached this conclusion due to the fact that he conducted lessons and practices in both classes. Purposeful sampling method was used in the selection of students. The administrators in the institutions were informed about the subject and the necessary permissions were obtained from the Directorate of National Education in the province where the study was conducted.

Data Collection Tools

Torrance Creative Thinking Test was used to collect the data of the quantitative part of the study. In the qualitative part, a semi-structured interview form prepared by the researchers and arranged with expert opinion was used.

Torrance Creative Thinking Test

The creative thinking test developed by Torrance has an important place in the literature in that it can directly measure creativity (Aslan, 2001). In 1966, this test was developed as two basic tests, "verbal" and "figural" forms. TCTT Verbal A form consists of seven activities. These activities are in the form of asking questions, predicting causes, predicting results, product development, unusual uses (cardboard boxes), unusual questions, and suppose that. With the TCTT Verbal A form, the dimensions of fluency, originality and flexibility of creativity are measured. TCTT Figural A form consists of 3 activities. These activities are painting, painting completion and accuracy. TCTT figural form A consists of fluency, originality, enrichment (detailing), abstraction of titles, resistance to early closure sub-dimensions and creative forces list sub-dimensions. These tests, which are developed both figurally and verbally, allow application from preschool to higher education (Sungur, 1997). These forms of TCTT were adapted to Turkish by Aslan in 1999. He conducted linguistic equivalence, reliability and validity studies in order to create the adapted version of the test to Turkish.

Semi-Structured Interview Form

In this study, "Semi-structured Student Interview Form" prepared by the researcher was used in order to learn about the usability of mathematics-centered STEM activities in mathematics lessons and students' thoughts about creative thinking and STEM activities. In some parts of the form, depending on the flow of the interview, the flow of the

interview was determined with the sub-questions and the students detailed their answers. The interview questions were created by taking into account the concepts that constitute the theoretical framework of the research. Expert opinion was consulted for the applicability of the interview questions prepared. Volunteerism requirement was observed among the nineteen students in the sample group, and eight students who were willing to interview were interviewed who differed in their interest in STEM activities and their level of participation. Permission of the students was requested in order to record the interview. Before the interview, each student was informed about the purpose of this interview. The interview questions were asked sequentially as they were prepared in the form, and guidance was avoided in the answers given by the students. Eight of these questions in the interview form are also composed of open-ended questions and questions that will detail the answers to these questions. The first four questions are about views on math-centered STEM activities. The remaining four questions are those in which creative thinking, which forms the basis of the study, and the relationship between creativity and mathematics, and the relationship between mathematics-centered STEM activities and creative thinking are taken.

Data Analysis

In this section, the methods used in the analysis of qualitative and quantitative data are included.

Analysis of Quantitative Data

Testing the Normality Assumptions of Control Group Students' Findings

Torrance Creative Thinking Test Verbal-Figural Form-A normality tests of the data belonging to the control group were conducted in order to test the necessary assumptions before the ANCOVA test to determine whether there was a statistically significant difference between the pre-test and post-test. In addition, the findings of the Shapiro-Wilk test conducted for this purpose are given in Table 1.

Table 1

Results Obtained from Testing the Normality Assumptions of the Findings of the Control Group Students

Control Group Tests	N	Skewness	Kurtosis	Shapiro-Wilks
Verbal pre-test	19	.618	.913	.289
Figural post-test	19	.072	-.646	.865
Verbal pre-test	19	.216	-.342	.566
Figural post-test	19	-.670	.982	.657

In Table 1, it is seen that the significance values of verbal pre-test, verbal post-test, figural pre-test and figural post-tests are higher than ,05 at the end of the Shapiro-Wilks test made on the findings of the experimental group students, that is, the data are distributed normally. In order to check the normality assumption for the items, kurtosis (K) and skewness (S) coefficients were calculated and none of the items were -3 <K. <+3 and -10 < S < +10. It was observed that it did not exceed the values (Kline, 2005). From this point of view, it can be concluded that the pre-test and post-test data of the experimental group show normal distribution. For the data obtained from the TCTT to be scored, each student has a score sheet in verbal and figural sub-dimensions. In accordance with the criteria in this chart, the points obtained by the students from the activities are collected separately and the 3 types of points in the Verbal Form-A, which are the fluency, flexibility and originality scores, are calculated. For the Figural Form-A, there are sub-categories of fluency, originality, abstraction of titles, enrichment (detailing), resistance to early closure and creative forces list. The fluency, flexibility and originality dimensions of the students' responses to the Verbal-A form in the TCTT, benefiting from the principles in the TCTT Verbal-A instruction and assessment booklet, the researcher completed the calculation according to these 3 points type by scoring.

Analysis of Qualitative Data

In this part of research, semi-structured interview as a technique is used for the purpose of examining student opinions. Content analysis was used in the analysis of the data obtained from the interviews to determine the students' views on creative thinking and math-centered STEM activities. A wide variety of data sources, including textual data, visual stimuli (e.g. photographs/videos), and audio data can be involved in content analysis. Besides, the technique is highly flexible in terms of its empirical and theoretic aspect (Stemler, 2015). Content analysis is essentially a coding process. While coding is the process of transforming raw data into a standardized form, coding forces the researcher to make judgments about meanings (Kohlbacher, 2006). Each question asked to the students was collected under a common theme, and the answers given were categorized and divided into sub-categories. The obtained data are presented and interpreted in tables.

Validity and Reliability

The verbal and figural forms of TCTT were adapted to Turkish by Aslan in (1999). He conducted linguistic equivalence, reliability and validity studies, respectively, in order to create the adapted version of the test to Turkish. At all stages of the study, study groups were formed from individuals of different ages and education levels and data were collected randomly. For the adaptation study of the test, as in the original test, data were collected from students at different education levels such as pre-school, primary school (from 1st to 5th grade) high school and university students and individuals from different occupational groups. In order to ensure the reliability of the test, it is necessary to ensure that the information in the instruction is correctly understood by the individuals. For this reason, although the test was previously adapted to Turkish, the translation of the test was restarted with the work of two experts and researchers. Translation done with three different people, this form was translated into English by an English language expert. After the completion of these translations, the suitability of the test was decided with the original form and translation form comparisons. Then, the application of the tests, first in English and in Turkish with 15 days intervals, was carried out to a study group of 30 people who have a command of two languages (Aslan, 2001). In the reliability studies based on the data obtained as a result of these studies, test-retest and internal consistency calculations were made. Cronbach's alpha correlation coefficients varying between .89 and .86 for primary school, between .71 and .62 for secondary education, and between .68 and .81 for adults (Aslan, 1999). The reliability of the study was ensured by giving examples of the answers taken from the interview questions. In the process of developing the interview questions, interview questions were formed by taking into account the subject headings of the research. Expert opinion was sought in the preparation of these interview questions. The meeting was held after the necessary arrangements were made. During the interview, guiding the students was avoided and questions were asked to elaborate the answers given.

Researcher Role

The researcher is the one who implements the mathematics lessons of the control group and the STEM activities of the experimental group. The researcher received STEM training in the STEM workshop organized by Turkiye Ministry of National Education General Directorate of Innovation and Educational Technologies (YEĞİTEK) on STEM education and within the scope of the project named "Innovative Technology Applications in Mathematics Education" 4005 Scientific And Technological Research Institution Of Turkiye (TÜBİTAK) organized during the summer vacation. In the studies, the researcher takes the roles of participant, practitioner and observer. She carried out activities and lessons herself. The researcher was responsible for all the procedures related to the courses and activities for a term.

Practices/Procedure

In the STEM classroom, students develop different perspectives on the solution of daily life problems and provide supporting data. Students must always be active and productive. The study started by dividing the experimental group students into groups of 3-6 people. While forming the groups, student views were taken into account. The class is clustered to allow students to work in groups. Practices were carried out by considering the opinions of all individuals in the group regarding the daily life problem. At the end of the lesson, all groups were asked by their servers to present their products, and the groups were awarded points for each step. The research was conducted with students in two different classes who are studying in the 6th grade of secondary school in public schools in the first semester of the 2018-2019 academic year in a province located in the Eastern Black Sea Region of Turkiye.

Figure 1

An Example of Group Work of Making Juice Boxes with Less Cost

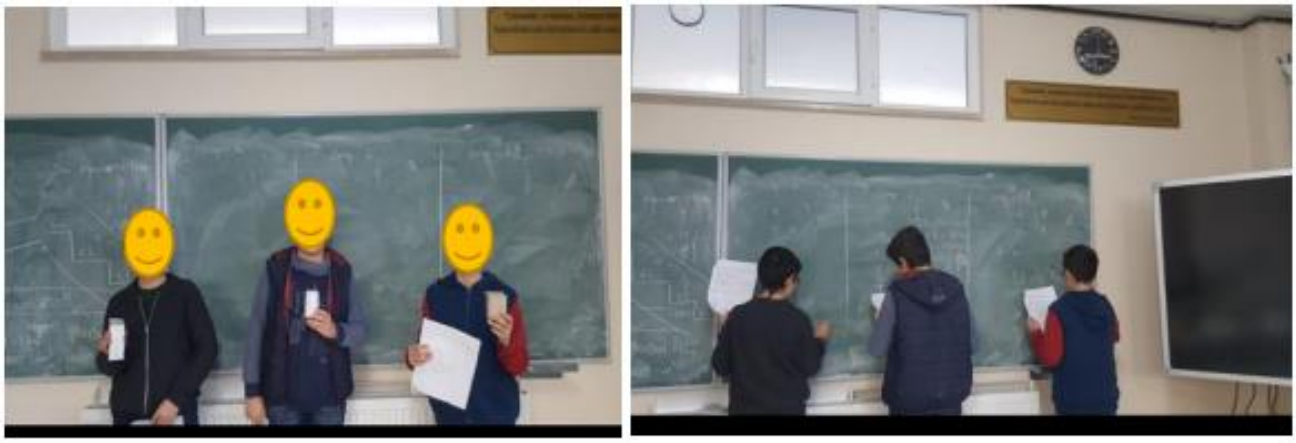


Figure 2
Example of STEM Student Presentation and Products

Findings

In this part, the statistical results and findings obtained from the research on the STEM activities of the experimental group and the pre-test post-tests of the TCTT experiment control groups applied to determine the effect of mathematics-centered STEM activities on the creative thinking skills of 6th grade students are included. In this section, the statistical results and findings obtained from the research on the STEM activities of the experimental group and the pre-test post-tests of the TCTT experiment control groups applied to determine the effect of mathematics-centered STEM activities on the creative thinking skills of 6th grade students are included. In this study conducted with quantitative and qualitative method research, quantitative and qualitative data were collected and interpreted together. First, the quantitative data part of the research was examined.

The Effect of STEM Activities on Students Creative Thinking Skills

In this section, score data of TCTT verbal / figural pre-test and verbal / figural post-test forms are presented.
Quantitative findings of control and experimental group students.
In this part, data regarding the scores of 38 students in the control and experimental groups obtained from the TCTT verbal / figural pre-test and verbal / figural post-test forms are presented.

Table 2
ANCOVA Test Results of the Control and Experimental Group Students' Pre-Test Post-Test Scores of TCTT Verbal-Figural Form A Sub-Dimensions

Tests	Group	N	$\bar{X}$ Pretest	$\bar{X}$ Posttest	$\bar{X}$ Corrected Posttest
Verbal Fluency Test	Control	19	51.89	68.32	70.81
	Experimental		59.00	121.58	118.16
Verbal Flexibility Test	Control	19	24.15	26.05	26.22
	Experimental		24.78	44.58	44.54
Verbal Originality Test	Control	19	25.94	31.42	31.46
	Experimental		26.10	69.11	69.04
Figural Fluency Test	Control	19	27.68	27.58	29.24
	Experimental		39.68	38.53	38.94
Figural Originality	Control	19	17.47	19.32	19.94
	Experimental		21.05	28.89	28.85
Abstraction Test of the Figural Titles	Control	19	5.05	5.11	5.78
	Experimental		10.78	11.37	10.73
Figural Enrichment Test	Control	19	16.26	15.32	15.41
	Experimental		17.10	17.95	17.96
Figural Early Closure Resistance Test	Control	19	6.84	7.47	8.06
	Experimental		9.89	11.58	11.93

As a result of STEM activities applied to develop students' skills related to verbal fluency sub-dimension, which is one of the sub-dimensions of TCTT, it is seen that the change made in relation to pre-test scores is significant ($F_{(1,36)}$= 12.450, p= .007, η2 = .198). With this finding, it can be said that the difference observed between the corrected

average scores of the students in the experimental and control groups is significant and the STEM activities applied in the experimental group are effective in increasing the verbal fluency scores of the students from the sub-dimensions of TCTT.

As a result of STEM activities applied to develop students' skills related to verbal flexibility sub-dimension, which is one of the sub-dimensions of TCTT, it is seen that there is no significant difference in the change in pre-test scores ($F_{(1,36)} = 1.891$, $p = .114$, $\eta 2 = .072$). With this finding, it can be concluded that the difference observed between the corrected average scores of the students in the experimental and control groups is not significant and that the STEM activities applied in the experimental group have no effect on the verbal flexibility scores of the sub-dimensions of the TCTT.

As a result of STEM activities applied to develop students' skills related to verbal originality sub-dimension, which is one of the sub-dimensions of TCTT, it is seen that the change made in relation to the pre-test scores is significant. ($F_{(1,36)} = 16.788$, $p = .019$, $\eta 2 = .151$). With this finding, it can be said that the difference observed between the corrected average scores of the students in the experimental and control groups is significant and the STEM activities applied in the experimental group are effective in increasing the verbal originality scores of the students from the sub-dimensions of TCTT.

As a result of STEM activities applied to develop students' skills related to the figural fluency sub-dimension of TCTT, it is seen that there is no significant difference in the change made in relation to the pre-test scores ($F_{(1,36)} = 14.397$, $p = .897$, $\eta 2 = .001$). With this finding, it can be concluded that the difference observed between the corrected average scores of the students in the experimental and control groups is not significant and that the STEM activities applied in the experimental group have no effect on the figural fluency scores of the sub-dimensions of the TCTT.

As a result of STEM activities applied to develop students' skills related to the figural originality sub-dimension of TCTT, it is seen that there is no significant difference in the change in pre-test scores. ($F_{(1,36)} = .194$, $p = .172$, $\eta 2 = .054$). With this finding, it can be concluded that the difference observed between the corrected average scores of the students in the experimental and control groups is not significant and that the STEM activities applied in the experimental group have no effect on the figural originality scores of the sub-dimensions of the TCTT.

It is seen that there is no significant difference in the change in the pre-test scores as a result of the STEM activities applied to develop the skills of the students related to the abstraction sub-dimension of the figural topics, which is one of the sub-dimensions of the TCTT ($F_{(1,36)} = .495$, $p = .135$, $\eta 2 = .065$). With this finding, it can be concluded that the difference observed between the corrected average scores of the students in the experimental and control groups is not significant, and the STEM activities applied in the experimental group have no effect on the abstraction scores of the figural headings from the sub-dimensions of the TCTT.

As a result of STEM activities applied to develop students' skills related to the figural enrichment sub-dimension, which is one of the sub-dimensions of TCTT, it is seen that there is no significant difference in the change in pre-test scores. ($F_{(1,36)} = 32.810$, $p = .790$, $\eta 2 = .002$). With this finding, it can be concluded that the difference observed between the corrected average scores of the students in the experimental and control groups is not significant, and the STEM activities applied in the experimental group have no effect on the figural enrichment scores of the sub-dimensions of the TCTT.

As a result of STEM activities applied to develop students' skills related to the figural early closure resistance sub-dimension of TCTT, it is seen that there is no significant difference in the change in pre-test scores. ($F_{(1,36)} = .223$, $p = .507$, $\eta 2 = .013$). With this finding, it can be concluded that the difference observed between the corrected average scores of the students in the experimental and control groups is not significant and that the STEM activities applied in the experimental group have no effect on the figural early closure scores of the sub-dimensions of TCTT.

Table 3

ANCOVA Test Results of the Pre-Test Post-Test Average Scores of the Control and Experimental Group Students from TCTT Verbal- Figural Form A

Tests	Group	N	$\bar{X}$ Pretest	$\bar{X}$ Posttest	$\bar{X}$ Corrected Posttest
Verbal Test	Control	19	34.00	41.92	42.81
	Experimental		36.63	78.42	77.08
Figural Test	Control	19	15.51	14.95	16.01
	Experimental		20.58	18.31	22.05

As a result of STEM activities applied to develop students' skills related to the verbal dimension of TCTT, it is seen that the change made in relation to the pre-test scores is significant. ($F_{(1,36)}$ =14.677, p=.007, η2=.192). With this finding, it can be said that the difference observed between the corrected average scores of the students in the experimental and control groups is significant and the STEM activities applied in the experimental group are effective in increasing the verbal dimension of the TCTT of the students.

As a result of the STEM activities applied to develop the skills of the students regarding the figural dimension of TCTT, it is seen that there is no significant difference in the change made in relation to the pre-test scores ($F_{(1,36)}$ 3.448, p=.461, η2=.016). With this finding, it can be concluded that the difference observed between the corrected average scores of the students in the experimental and control groups is not significant and that the STEM activities applied in the experimental group have no effect on increasing the students' scores in the figural dimension of TCTT.

Findings Regarding Students' Opinions on STEM

Below are the findings of the students' answers to the questions asked. First, the students were asked "What do you think about the mathematics-based STEM activities that the researcher used in the lessons throughout the semester? The question was asked. Information on students' views on this question is given in Table 4.

Table 4

Opinions on STEM

Theme	Category	Sub-category	P1	P2	P3	P4	P5	P6	P7	P8
STEM	Self-development	Self-development			+					
	Supporting Education	Educational		+		+		+		
		Increase in course success			+					
		Informative								+
		The suitability of the materials for the lesson	+							
	Developing a Positive Attitude	Fun			+		+			+
		Enjoyable		+						
	Creativity	Creativity in the foreground				+			+	
		The emergence of imagination							+	

From the findings obtained from Table 4, opinions about STEM activities are collected in four different categories: "Self-Development", "Supporting Education", "Developing a Positive Attitude" and "Creativity". The students mentioned that STEM activities improve them and the suitability of the materials used to the subject. Below are examples of these views.

Student view that mentions that STEM activities improve students themselves:

P_3: *"These activities improve me. It also improves my course performance. "*

Student opinion about the suitability of the materials used in STEM activities to the topics:

P_1: *"The materials we used in our activities were prone to the subjects we did. I think well about these*. "

Secondly, students were asked, "Do you think that math-centered STEM activities are useful in teaching mathematics lessons? Can you explain? " questions. Findings of this question are given in Table 5.

Table 5

Thoughts on the Effect of STEM Activities on Lesson Teaching

Theme	Category	Sub-category	P1	P2	P3	P4	P5	P6	P7	P8
Effect of STEM Activities on Lesson Teaching	Positive Attitude Development	Having fun	+							
		Learning with fun	+							
	Effective Learning	Active participation in the lesson							+	
		Accessing the teacher			+					
		Easy execution of the lesson								+
	Academic success	Gaining processing skills				+		+		
		Increasing of knowledgement					+			
	Creativity	Being Mind Opener		+				+		

From the findings obtained from Table 5, the opinions about the effect of STEM activities on teaching lessons are covered under the categories of "Positive Attitude Development", "Effective Learning", "Academic Success" and "Creativity". The students stated that these activities enabled them to participate in the lesson more effectively and that they learned different calculations. Some examples of these views are given below.

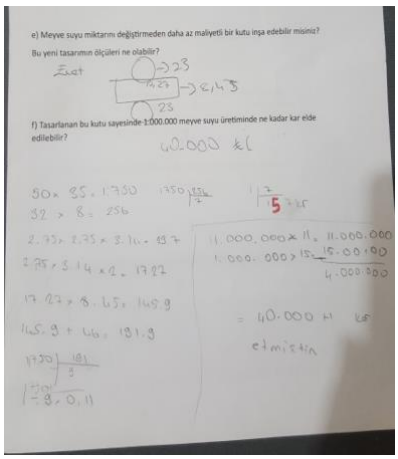
Student opinion stating that STEM activities make the lesson enjoyable:

P_1: *"Yes, I think. Because learning while having fun is a way to learn. That's why I like it. I think it is more beneficial to learn by having fun. "*

Opinion of the student stating that STEM activities provide processing skills:

P_4:*" Yes, I think. Because I'm developing processing skills. "*

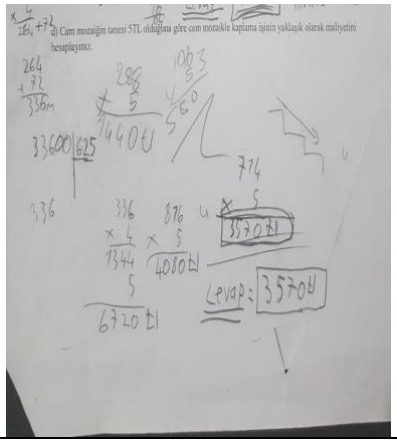
Based on the student views given as examples, it is seen that STEM activities contribute to the students' learning and processing skills by having fun throughout the activity. Figure 1 gives examples of students' processing skills.



e) Can you build a less costly box without changing the amount of juice?
What could be the dimensions of this new design?
-yes.

f) How much profit can be made in the production of 1,000,000 juices thanks to this designed box?

- Answer is 40.000 TL



d) Since the glass mosaic is 5TL each, the glass mosaic coating work is approximately calculate the cost.

- Answer is 3750 TL.

Figure 3

STEM Activities Student Worksheets Examples

As the third question to the students, "Do you think that the math-centered STEM activities used in the lessons during the semester have a positive or negative effect on your math exams? If your answer is positive, can you explain with the reasons? His questions were asked. The data for this question are given in Table 6.

Table 6

Opinions on the Effect of STEM Activities on Mathematics Exams

Theme	Category	Sub-category	P1	P2	P3	P4	P5	P6	P7	P8
Effect on Exam Success	Supporting Success	Making Learning Easy	+							
		Consolidation					+			
		Parallel to the school		+						
	Academic Success	Mark increasing			+	+				
		Gaining processing skills				+				
		Gaining processing speed						+		
	Developing Positive Attitude	Learning with Fun			+					
	Meaningful Learning	Easy understanding							+	
		Understanding the logic of the subject	+							
	Permanence	Ensuring persistence								+

From the findings obtained from Table 6, opinions about the effect of STEM activities on mathematics exams are gathered under the categories of "Supporting Success", "Academic Success", "Developing Positive Attitude", "Meaningful Learning" and " Permanence ". When the opinions of the students are examined, it is seen that STEM activities help to understand the logic of the subjects, and that they positively affect the mathematics exam success by gaining processing skills.

Below is an example of this view.

P_1: *"Yes, teacher. Because I can understand the new information we learn more easily thanks to STEM activities. I can understand its logic thanks to STEM activities. "*

P_4: *"While I had two mistakes, I started not to get any wrong. I gained process skills. "*

Fourth, the students asked, "Did you encounter any difficulties during the implementation of math-centered STEM activities?" "If your answer is yes, can you explain these difficulties?" questions were asked. The results obtained from these questions are given in Table 7 and Table 8.

Table 7

Opinions about Difficulties Encountered in Implementing STEM Activities

Category	Code	Frequency
Difficulties Encountered in STEM Activity Applications	Yes	4
	No	4

From the findings obtained from Table 7, four students stated that they encountered difficulties during the implementation of STEM activities, while four students stated that they did not encounter any difficulties. Views on the difficulties encountered are given in Table 8.

Table 8

Opinions on the Difficulties Encountered in the Implementation of STEM Activities

Theme	Category	Sub-category	P1	P2	P3	P4	P5	P6	P7	P8
Encountered Difficulties	Processing skill	Having difficulties while making operation			+	+				
	Lack of knowledge	Not knowing the subject		+						
	Ability to interpration	Unable to understand the problem								+

From the findings obtained from Table 8, opinions about the difficulties encountered in the implementation of STEM activities are collected under the categories of "Processing Skills", "Lack of Knowledge" and " Ability to interpration ". When the opinions of the students were examined, they stated that they had difficulty in the procedures during the activities, they did not have a command of the subject and they could not understand the problem.

The opinion of one of the students regarding the compensation of the difficulty he/she encountered is given below.

P_3*: "Teacher, I was having problems with the procedures. While operating. Sometimes it happens, but I handle it with the help of my group friends and you. "*

Based on the student opinion given, it can be concluded that group work in STEM activities is beneficial for students.

Fifthly, students were asked "What is creative thinking for you? What does a thought need to be creative? " The opinions obtained from the questions are given in Table 9.

Table 9

Thoughts on the Definition of Creative Thinking

Theme	**Category**	**Sub-category**	**P1**	**P2**	**P3**	**P4**	**P5**	**P6**	**P7**	**P8**
Creative Thinking	Understandability	Being clear							+	
	Productivity	Presenting a product				+		+		
	Originality	Thinking of the non-existent					+	+		
		Independence of information	+							
		Being undiscovered		+	+	+			+	
		Using different logic	+							
	Abstractness	Thinking differently					+			
		Using imagination		+					+	+

From the findings obtained from Table 9, opinions about the definition of creative thinking are grouped under the categories of "Understandability", "Productivity", "Originality" and " Abstractness ". They defined students' creative thinking as being independent of information and creating unexplored products. Examples of these views are given below.

P_1: *"It is necessary that the ways learned are different, for example it should not depend on only one subject. It should have a different logic. "*

P_6: *"To reveal something. It has to be different from the others. "*

P_2: *"The fact that he created it, that he did it, must have found it. Original so. Imagination is needed."*

In Figure 2, visuals of student products obtained with STEM activities are given.

Figure 2

Samples of Products Obtained in STEM Activities

Sixthly, "Do you think there is a relationship between creative thinking and mathematics? "If your answer is yes, can you explain what kind of relationship is between them?" questions were asked to the students. The data obtained from these questions are given in Table 10 and Table 11.

Table 10

Opinions on Creative Thinking and Mathematics Relationship

Category	Code	Frequency
Creative Thinking and Maths Relationship	Yes	5
	No	3

From the findings obtained from Table 10, five of the students stated that creative thinking is related to mathematics, and three of them stated that it is not. Findings about the relationship between creative thinking and mathematics lesson are given in Table 11.

Table 11

Opinions on Creative Thinking Mathematics Relationship

Theme	Category	Sub-category	P1	P2	P3	P4	P5	P6	P7	P8
	Supporting Creativity	Producing through math			+					
		Mathematical thinking				+				
	Multidimensional Thinking	Detailed thinking		+						
		Thinking of different ways	+							
		Thinking more					+			
	Understandability	Easier to understand	+							
	Supporting Teaching	Gaining processing skills			+					

From the findings obtained from Table 11, the opinions on the Relationship between Creative Thinking and Mathematics are grouped under the categories of "Supporting Creativity", "Multidimensional Thinking", "Understandability" and "Supporting Teaching". The students stated the relationship between creative thinking and mathematics as the need for mathematics for the product to be produced and as the mathematics lesson providing creative thinking.

P_4: *"Yes there is. Because mathematics enables creative thinking. "*

P_3: *"The new things we produce and do make it easier for us to do mathematics."*

Seventh, "Do you think there is a relationship between creative thinking and math-centered STEM activities?" And "If your answer is yes, can you explain what kind of a relationship between them? questions were asked to the students. The data obtained for these questions are given in Table 12 and Table 13.

Table 12

Opinions on the Relationship of Creative Thinking STEM Activities

Category	Code	Frequency
Creative Thinking and STEM Activities Relationship	Yes	6
	No	2

From the findings obtained from Table 12, six of the students stated that there was a relationship between Creative thinking and STEM activities, while two of them stated that they did not. Findings about the relationship between creative thinking and STEM activities are given in Table 13.

Table 13

Relationship Between Creative Thinking and STEM Activities

Theme	Category	Sub-category	P1	P2	P3	P4	P5	P6	P7	P8
Relationship Between Creative Thinking and STEM Activities	Product Oriented	Mathematical related product	+							
		Obtaining product			+					
	Originality	Producing non-existing						+		
		Thinking differently	+					+		
	The usefulness of mathematics	Using imagination								+
	Enabling thinking	Detailed thinking		+			+			

From the findings obtained from Table 13, opinions about the relationship between creative thinking and STEM activities are collected under the categories of "Product Oriented", "Originality", "The Usefulness of Mathematics" and "Enabling Thinking". Students stated the relationship between creative thinking and STEM activities as obtaining products through mathematics. Examples of these views are presented below.

P_1: *"We always do things related to mathematics in STEM activities. So because it's about math. Teacher, we are thinking and doing different things. "*

P_6: *"You had something done with fruit juice. There is creative thinking there. Different from others."*

Eighth and lastly, the students were asked, "Do you have any other opinions and suggestions about mathematics-centered STEM activities and creative thinking?" The question was asked. The data obtained from these questions are given in Table 14 and Table 15.

Table 14

Requested Opinions About Mathematics-Based STEM Activities and Creative Thinking

Category	Code	Frequency
Providing Opinion	Yes	2
	No	6

From the findings obtained from Table 14, two students provided additional views on mathematics-centered STEM activities and creative thinking, while six students did not provide any additional opinions. Data for additional opinions are given in Table 15.

Table 15

Additional Opinions Requested About Mathematics Based STEM Activities and Creative Thinking

Theme	Category	Sub-category	P1	P2	P3	P4	P5	P6	P7	P8
Additional Opinions	Generalize	Applying to all subjects	+							
	Focus on thinking	Detailed thinking		+						
	Fun	Being fun		+						

From the findings obtained from Table 15, the additional opinions students want to express about mathematics-centered STEM activities and creative thinking are grouped under the categories of " Generalize", "Focus on Thinking" and "Fun".

Examples of these views are given below.

P_2: *"It's fun and convenient for us to think about."*

P_1: *"It can be applied to other topics."*

Among these obtained findings, in the question asked to the students about the relationship between creative thinking and STEM activities, among the student answers, "producing the non-existent" and "thinking differently" views were combined under the category of originality. In this sub-dimension in the TCTT, the experimental group students made a significant difference in the posttests of both the figural originality and verbal originality dimensions compared to the control group students. It was observed that the answers given to the same question and additional opinions were gathered in the category of "detailed thinking" and led students to think. In the question asking about

the effect of STEM activities on the teaching of the lesson, the opinions of the students' "being mind opener" and "developing different ways" were combined under the creativity category. Similarly, among the responses of the students regarding the opinions about STEM, "creativity being at the forefront" and "emergence of imagination" were gathered under the creativity category. One of the skills expected from students in the literature for the STEM approach was the answer to "presenting a product" from student answers regarding the definition of creative thinking. Similar answers were given in the views on the relationship between STEM and creative thinking. These opinions; "Mathematical related product", "obtaining product", "producing what is not". It shows that the results obtained from the sub-dimensions of the TCTT and the students' views are similar, and that the qualitative and quantitative findings support each other. In the light of these data, it can be concluded that STEM activities encourage students to think creatively.

Conclusion and Discussion

Discussions of the Findings of the Results Obtained from the TCTT

Torrance Creative Thinking Test (TCTT) was applied to the experimental and control group students as a pre-test and post-test to obtain research data. According to the findings obtained from the TCTT Verbal Form-A and Figural Form-A booklets, it was concluded that the differentiation between the groups varies according to the sub-dimensions of the tests, and the change in the pre-test scores improved the verbal dimension of the experimental group students' creative thinking skills. In the figural category, it was concluded that there was no significant difference in the change in pre-test scores.

No significant difference was found in the change in the pre-test scores of the experimental and control groups in the verbal flexibility category within the sub-dimensions of the TCTT Verbal Form-A. A significant difference was found in favor of the experimental group in the change of pre-test scores in the fluency category, which is another related dimension of the verbal form. Similarly, a significant difference was obtained in favor of the experimental group in the change of pre-test scores in the originality category of the verbal form.

No significant difference was found in the change in the pre-test scores of the experimental and control groups in the fluency category, which is one of the sub-dimensions of the TCTT Figural Form-A. In the figural originality sub-dimension, there was no significant difference in the change in the pre-test scores of the experimental and control groups in the category.

No significant difference was found in the change in the pre-test scores of the experimental and control groups in the sub-category of the abstraction of figural titles, another dimension.

No significant difference was found in the change in the pre-test scores of the experimental and control groups in the figural enrichment subcategory.

There was no significant difference in the change in the pre-test scores of the experimental and control groups in the subcategory of resistance to figural early closure.

According to the obtained quantitative findings, it can be concluded that math-centered STEM activities are more effective in providing creative thinking skills, especially in the verbal sub-categories of TCTT, than the lessons taught with the current curriculum. According to Bakırcı and Kutlu (2018), they stated that with the STEM approach, students will learn by doing knowledge and experience, and develop their inquiry and creative skills. In the figural subcategories of the experimental group students, the score increase was higher than the control group students, but it was concluded that it was not enough to make a difference. It is thought that this situation may be due to the fact that providing creative thinking skills requires a long process and the research process is limited to one teaching period. Özerbaş (2011) stated that creativity is not a phenomenon that can change in a very short time.

Students' Views on STEM Education

At the end of the research, interviews were conducted with 8 students from the experimental group on a voluntary basis using a semi-structured interview form. The form of the interview consists of math-centered STEM activities and questions about creative thinking. In the first question, "What do you think about the math-centered STEM activities that the researcher used in lessons throughout the semester?" The question was asked. The students mentioned that STEM activities improve themselves and the suitability of the materials used to the subject. According to Akgündüz and Özçelik (2017), they concluded that students' skills to integrate mathematical operations into the product creation stage and their ability to use materials efficiently increased after such activities. A similar study demonstrated an increase in student scores in the posttests. It also demonstrates that STEM-based modules and activities are effective in increasing STEM understanding and mastery. (Zahidi, ve diğerleri, 2021)

In the second question, do you think that Mathematics-centered STEM activities are beneficial for students in teaching mathematics lessons? Can you explain? "The question has been asked. It was concluded that these activities enabled the students to participate in the lesson more effectively and learned different calculations. As a matter of fact, Gülhan and Şahin (2018) that STEM education approach affected students' attitudes regarding this result; Karakaya and Avgın (2016); Yamak, Bulut and Dündar (2014) reached their conclusion. Uğraş (2018) concluded that STEM activities increase students' motivation.

In the third question to the students, "Do you think that the math-centered STEM activities used in the lessons throughout the semester have a positive or negative effect on your math exams? If your answer is positive, can you explain with the reasons? His questions were asked. When the opinions of the students were examined, it was concluded that STEM activities helped to understand the logic of the subjects, and positively affected the mathematics exam success by gaining processing skills. A similar result to this finding has been obtained with the studies conducted. Gülhan and Şahin (2018) and Yıldırım and Altun (2015) stated that STEM activities increase academic success. Another study tried to determine the effects of the STEM curriculum on middle school students and found that students who received STEM education had significantly higher science and mathematics achievement scores than students who received traditional education. (Anita & Shepherd , 2016)

In the fourth question, "Did you encounter any difficulties during the implementation of math-centered STEM activities?" "If your answer is yes, can you explain these difficulties?" questions were asked. Four students stated that they encountered difficulties during the implementation of STEM activities, while four students stated that they did not encounter any difficulties. It was concluded that these difficulties were difficulty in processing during the activities, not being able to master the subject and not understanding the problem. Alıcı (2018) stated in his study that the difficulties students encounter during the implementation of the activities are lack of knowledge, difficulty using materials, and difficulty in mathematical operations.

The fifth question asked "What is creative thinking for you? What does a thought need to be creative? " questions were asked. It was concluded that students defined creative thinking as being independent of information and creating unexplored products.

In the sixth question, "Do you think there is a relationship between creative thinking and mathematics? "If your answer is yes, can you explain what kind of relationship is between them?" questions were asked. To these questions, six of the students stated that creative thinking was related to mathematics, and two of them stated that it was not. It was concluded that the answers of the students who answered yes to this question stated the relationship between creative thinking and mathematics, the need for mathematics for the product to be produced, and the mathematics lesson as providing creative thinking.

In the seventh question, "Do you think there is a relationship between creative thinking and math-centered STEM activities?" And "If your answer is yes, can you explain what kind of relationship is between them?" questions were asked. Six of the students stated that there was a relationship between creative thinking and STEM activities, and two of them stated that they did not. From the answers of the students who answered yes to this question, it was concluded that the relationship between creative thinking and STEM activities was to obtain products through mathematics. According to Akgündüz and Akpınar (2018), it was determined that STEM applications enable students to acquire 21st century skills such as creativity, critical thinking, collaboration and communication. In parallel with the findings, STEM activities include processes such as prototyping, generating possible solutions, and defining the problem.

Eighth and lastly, the students were asked, "Do you have any other opinions and suggestions about mathematics-centered STEM activities and creative thinking?" The question was asked. Two students suggested and added to this question. In these opinions, it was concluded that the students found STEM activities useful, had fun during the activity and wanted it to be applied in more subjects. Similar to this result, Eroğlu and Bektaş (2016) stated that STEM education should be expanded. It was also revealed in the sources that the students found STEM activities fun and their motivation increased.

As a result of the interviews with the students, it was concluded that math-centered STEM activities were beneficial for them and they were effective in developing their creative aspects. The fact that STEM activities and creative thinking skills have a place in the literature, product creation and product design process, supported the research. In addition, it has been concluded that student views support quantitative data.

According to the findings obtained from the quantitative and qualitative data, it was concluded that math-centered STEM activities contribute to the creative thinking skills of the students.

Recommendations

- It is in the literature that creative thinking skills can be improved. However, since this process is long, more time can be allocated for STEM activities.
- Based on the data obtained from the study, creating an activity for more gains can be presented as a suggestion.

It has been observed that the students' presentation of the product they have created contributed to both their communication skills and their in-depth handling of the problem, and this can be offered as a recommendation for the implementation of STEM activities.

Limitations of the Research

Application in the first semester of the 2018- 2019 academic year in the mathematics course the findings of the study; Secondary School 6th Grade students, The quantitative study group of the research consisted of 19 experimental and 19 control groups.38 students in total, the qualitative study group consisted of 8 volunteer students selected from the experimental group. It is limited to activities performed for 7 weeks and two hours a week.

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Research Article

Are gifted students challenge pursuers?

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Abstract

Challenging education has always been considered a necessity and a presupposition, but it has not been considered whether gifted students also have a challenging nature. This study answers this question and examines whether gifted students have a challenging nature and seek to face the challenge. Our study was conducted with two groups of fifth- and sixth-grade students of the same schools in Istanbul, Turkey: the study group consisted of 52 gifted students, and the control group consisted of 92 undiagnosed students. In about 15 minutes, participants completed the Challenge Performance Test and the Student Information Sheet. Data obtained from participants' responses to the challenge performance test were analyzed using a t-test, and the two study and control groups were compared based on the acceptance or rejection of challenges. As expected, the analysis of participants' responses showed that gifted students in the study group performed better in accepting the challenge than students in the control group and preferred more challenging questions. After the success or failure of the students at the level they had chosen, however, the preferred behaviors in terms of challenges were different. This was thought-provoking regarding the relationship between challenge and the meaning of giftedness.

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Introduction

The image shown in Figure 1 is from one of the post-tests in my doctoral thesis. When I was conducting a quasi-experimental study, he was my student from the study's treatment group. Although he was a successful student, he just changed all the titles on the exam booklet as Beyazıt Ford Otosan guinea pigs (meaning only used for research not for improving studensts' mental, psychological and physical aspects like laboratory rats) … Wear Out the Nerves Lesson… The Monsters Eat You Unit… Dementia Test… Death Form while taking the test and did not show any work inside.

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Figure 1

An Exam Booklet Cover for the Post-test of My doctoral Thesis Scribbled on "Beyazıt Ford Otosan Guinea Pigs/ Wear Out the Nerves Lesson/The Monsters Eat You Unit/Dementia Test/ Death Form" by One of My Gifted Students (It Was Originally Written "6th Grade Science and Technology Lesson/Let's Travel and Get to Know the World of Living World/Academic Achievement Test/H4 Form" on the Paper.

The concept of differentiation might have been used in a wide range of meaning and implementation (Linn-Cohen, & Hertzog, 2007) since teachers first select instructional approaches to maximize students' capacity who show different characteristics according to the norm (Tomlinson, & Strickland, 2005). In the doctoral study, the differentiated instruction was applied in the class to ensure challenge by using depth and complexity (Çalıkoğlu & Kahveci, 2015). Although the properties of depth and complexity to maximize challenge with the aid of utility and enjoyment in that study, a few groups of students with him were uninterested in a differentiated science lesson improved according to their own academic ability. In the differentiation process, he and his friends did not let the author check their academic improvement; they basically rejected challenge. Their attitude as an inconsistent with what is expected of the gifted shaped my next research. The current study's research problem is based on the following question: "Are gifted and talented students really challenge-pursuers?"

Exposition to a challenging learning atmosphere is fundamental even in preschools (Gallagher, 2007) due to their precocious cognitive abilities. While Challenging education has always been considered a necessity and a presupposition for the gifted education, it is absent in most of the schools (Reis et al. 1993; Gentry, Gable, & Springer, P. 2000; "Top Students," 1991).

Clark (2017) has stated that gifted education generally does not have enough support in political, local, or individual settings. The basis of the mentioned lack of assistance is about the challenge. Challenge has been associated with the words of difficulty while implying growth and productivity. Ormrod (2008) uses challenge in an academic context to show the "level" that the student can be sure that he/she will succeed if he/she tries hard enough. In this case, the expression "challenge deficiency for a gifted child" refers to learning at the same pace as others, too many repetitions, not being able to reach the depth of the subject of, being in an atmosphere pretended as cultivating personal attention does not matter, considering the vomiting of information sufficient; throwing away higher-order thinking skills (Gallagher, Harradine, & Coleman, 1997).

When students who need highly intellectual educational services or activities cannot achieve them, boredom-an emotion as the result of such a situation will be inevitable. Gifted students got bored in conventional schools (Feldhusen & Kroll, 1991; Feuchter, & Preckel, 2021). From their own voices, In school is the same odd thing every day, I turn off, school is a waste of time, school is boring, I had a class that I only went to two days a week, and I still got a C" (Hymes & Bullock, 1975).

Although boredom might be seen as superficial and temporal or the emotion of leisure time, it is not an innocent feeling as expected; on the contrary, it gnaws inside. When it happens intensely or frequently, the result can be an academic failure or school dropout. As well as success-oriented misfortunes, physical and psychological health may be compelled by depression or attempting suicide (Goldberg, Eastwood, LaGuardia, & Danckert, 2011; LePera, 2011; Patterson & Pegg, 1999; Wegner & Flisher, 2009). Weissinger, Caldwell and Bandolas (1992) explain this situation given that boredom disrupts the intrinsic motivation, which is the actual thing to satisfy individual life. This is the

reason why explanations for the necessity of gifted education are bifurcated in the literature in two ways, (a) to relieve the feeling of boredom of such students and (b) to help realize themselves.

The most cited reason for the boredom of gifted children in schools in the literature is not to have enough challenge (Feldhusen & Kroll, 1991; Preckel & Frenzel, A., 2010, Kanevsky & Keighley, 2003). As not parallel with this, there is no clear statement defending "challenge-pursuing" is one of the common characteristics of the gifted and talented students. However, those amounts of research mentioned above fairly strengthen the opinion that gifted students must have been natural challenge-seekers. From the side of the author's personal experience, a few groups of gifted students who show no taking fun and challenging activities in science class develop a legitimate doubt about the challenge-oriented behaviors of gifted children.

Problem of Study

In this study, to be able to answer the question of "Are gifted and talented students really challenge-pursuers?", a game like test was conducted for students both diagnosed as gifted and non-diagnosed. According their performances, three research questions are as follows:

- Are there differences in the preferences of level between the two groups?
- Are there differences in the success between the two groups?
- Are there differences in the failure between the two groups?

Method

Research Model

In order to answer the question of "are gifted and talented students really challenge-pursuers?" more effectively and directly, comparative study as a research model is adopted.

Participants

Our study was conducted with two groups of fifth- and sixth-grade students of the same schools in Istanbul, Turkey: the study group consisted of 52 gifted students, and the control group consisted of 92 undiagnosed students.

Data Collection Tools

Challenge Performance Test: In this test, students' mission is to find the correct word by realigning letters. Questions are mixed words from students' own lives. Students had two minutes to form a correct word using letters. The cards were then collected, and students could increase or decrease the test level. This process was repeated three times, and there were seven different levels for each iteration. The easiest word comprised of three letters and the hardest word comprised of nine letters (see Figure 2). In total, 42 words were used for 5th and 6th-grade students (Calikoglu, 2019). When time is up, only the game player knows if he succeeded or failed, results are not announced in the class.

Figure 2

Two Sample Cards of the Play

Data Analysis

Data was scores of students' Challenge Performance Test implemented in the class. There were two scoring systems for this activity: If the student succeeded in the selected level, he/she would receive a score equal to twice (2 x level) the selected level. In case of failure, the student received only a score equal to the preferred level (1 x level). Based on scores students got, t-test was performed on SPSS program in order to compare two groups of diagnosed as gifted and on-diagnosed.

Procedure

In about 15 minutes, participants completed the Challenge-Performance Test and the Student Information Sheet. Data obtained from participants' responses to the challenge performance test were analyzed using a t-test, and the two study and control groups were compared based on the acceptance or rejection of challenges.

For this test and requirements, such observations of sub-research questions were considered:

- Have students diagnosed as gifted significantly higher scores on Challenge-Performance Test than average students who have high grades in school?
- Have gifted students significantly differed in their preferences from students who are undiagnosed?
- Have gifted students significantly differed in their success situations from students who are undiagnosed?
- Have gifted students significantly differed in their preferences when they failed?
- Have gifted students significantly differed in their preferences when they succeeded?
- Do two groups differ in their preference of levels when they succeed or fail in the end? Which one of these behaviors is taken by students?
    a. chooses a higher level than a level which students became successful
    b. chooses the same level which students already became successful
    c. chooses a lower level than a level which students became successful
    d. chooses a higher level than a level which students fail
    e. chooses the same level which students fail
    f. chooses lower level than a level which students fail

Results

Scores on Challenge-Performance Test

There was statistically significant difference in the overall scores for undiagnosed students (M=17.42, SD=7.05) and diagnosed as gifted students (M=20.30, SD=7.19) who both received Challenge Performance Test; $t_{(142)}$ =3.975, p=.000; See Figure 3).

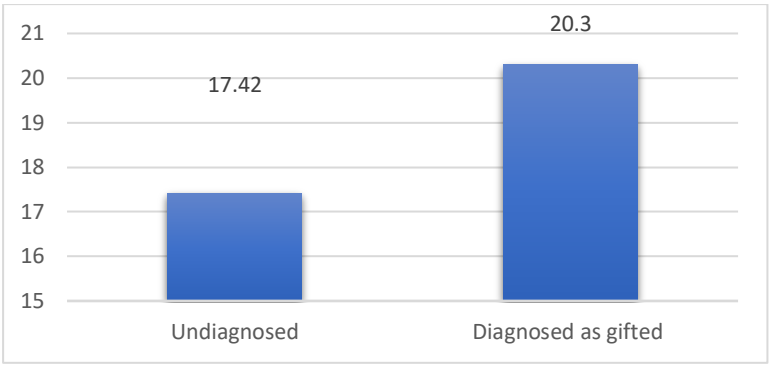

Figure 3

Differences of Preferences for Level between Diagnosed as Gifted/Talented and Undiagnosed

Preferences for Challenge-Performance Test

2.a. For the first preference

There was statistically significant difference in the first preference of levels for undiagnosed students (M=3.83, SD=1.46) and diagnosed as gifted students (M=5.27, SD=1.27) who both received Challenge Performance Test; $t_{(142)}$=, p =.000; (See Figure 4).

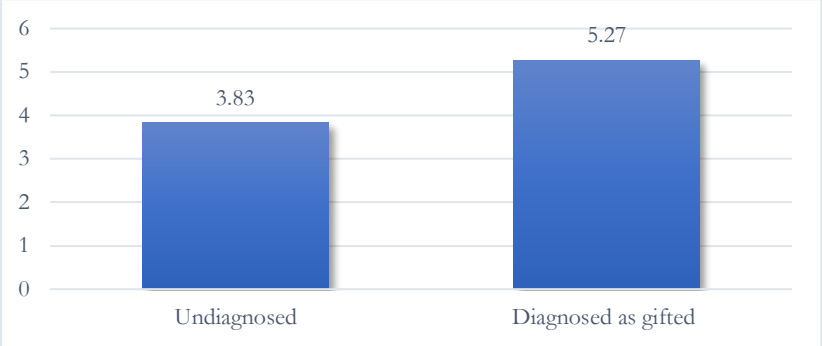

Figure 4

Differences of First Preferences for Level between Diagnosed as Gifted/Talented and Undiagnosed

2.b. For the second preference

There was statistically significant difference in the second preference of levels for undiagnosed students (M=3.83, SD=1.99) and diagnosed as gifted students (M=5.07, SD=1.34) who both received Challenge Performance Test; $t_{(142)}$=, p = .000 (See Figure 5).

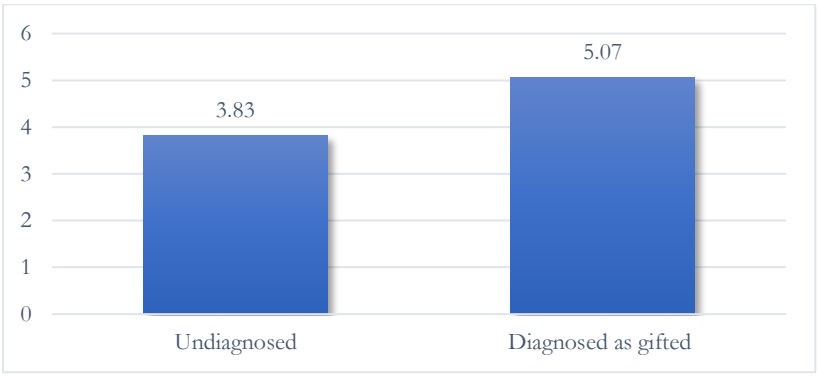

Figure 5

Differences of Second Preferences for Level between Diagnosed as Gifted/Talented and Undiagnosed

Success for the Level Students Preferred

3.a. For the first success

There was not statistically significant difference in the first success for undiagnosed students (M=0.54, SD=0.5) and diagnosed as gifted students (M=0.48, SD=0.5) who both received Challenge Performance Test; $t_{(142)}$ =, p >.05 (See Figure 6).

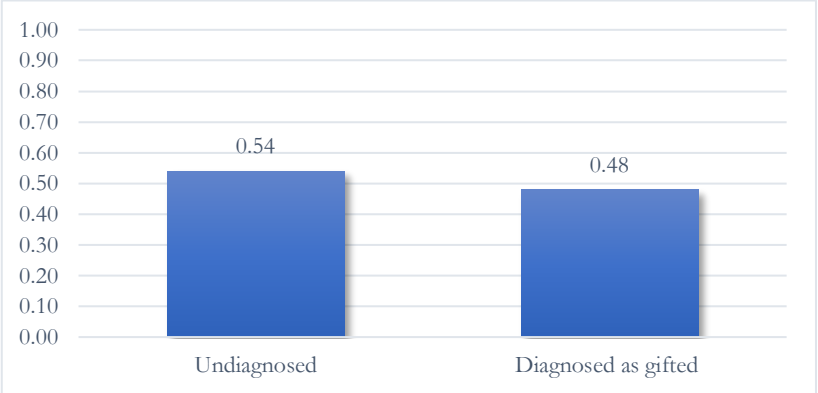

Figure 6

Differences of First Success Between Diagnosed as Gifted/Talented and Undiagnosed

3.b. For the second success

There was not statistically significant difference in the second success for undiagnosed students (M=0.56, SD=0.5) and diagnosed as gifted students (M=0.48, SD=0.50) who both received Challenge Performance Test; $t_{(142)}$ =, p > .05 (See Figure 7).

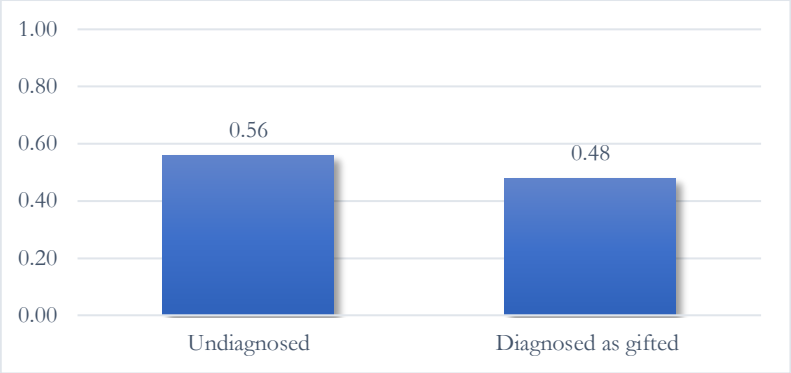

Figure 7

Differences of Second Success between Diagnosed as Gifted/Talented and Undiagnosed

3.c. For the third success

There was not statistically significant difference in the third success for undiagnosed students (M=0.63, SD=0.48) and diagnosed as gifted students (M=0.57, SD=0.5) who both received Challenge Performance Test; $t^{(142)}$ =, p > .05 (See Figure 8).

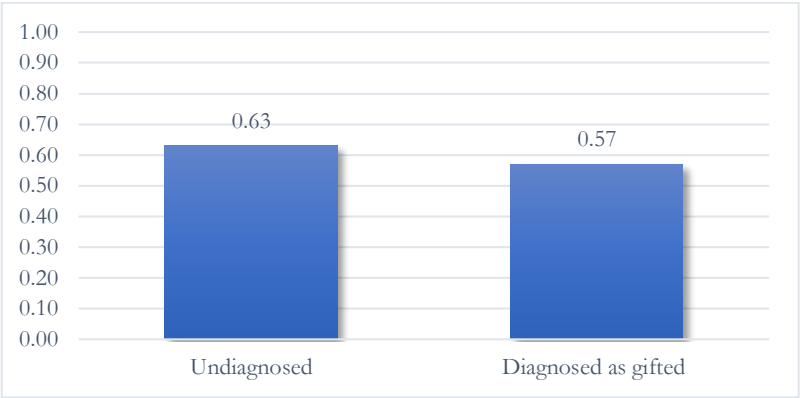

Figure 8

Differences of Third Success between Diagnosed as Gifted/Talented and Undiagnosed

Choices of Behaviors When Students Succeeded

4.a. Preference of Behavior for the Second Activity

There was statistically significant difference in the choices of behavior for the second activity when students succeeded at the level which they previously chose in favor of students diagnosed as gifted students; X2= 8.62, p = .01 (See Figure 9).

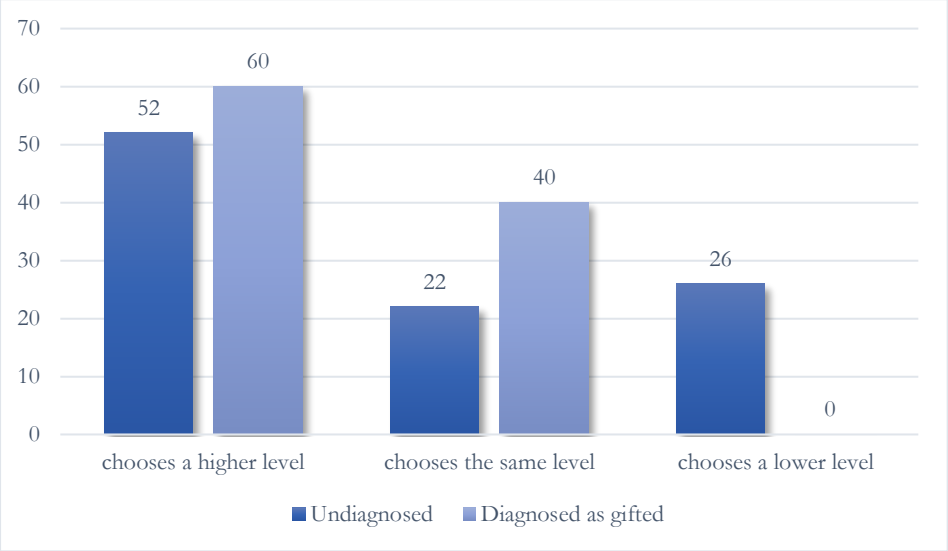

Figure 9

Differences of the Preferences After First Success between Diagnosed as Gifted/Talented and Undiagnosed

4.b. Preference of Behavior for the Third Activity

There was not statistically significant difference in the preference of behavior for the third activity when students succeeded at the level which they previously chose between students undiagnosed and diagnosed as gifted; X^2= 4.137, p>.05 (See Figure 10).

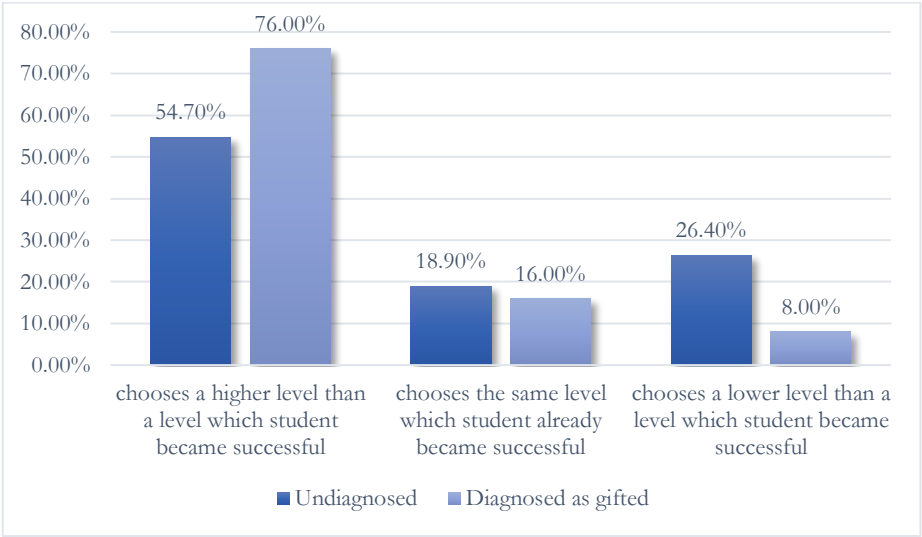

Figure 10

Differences of the Preferences After Second Success between Diagnosed as Gifted/Talented and Undiagnosed

Choices of Behaviors When Students Failed

5.a. Preference of Behavior for the Second Activity

There was not statistically significant difference in the preference of behavior for the second activity when students failed at the level which they previously chose between students undiagnosed and diagnosed as gifted; X^2= 0.412, p > .05 (See Figure 11).

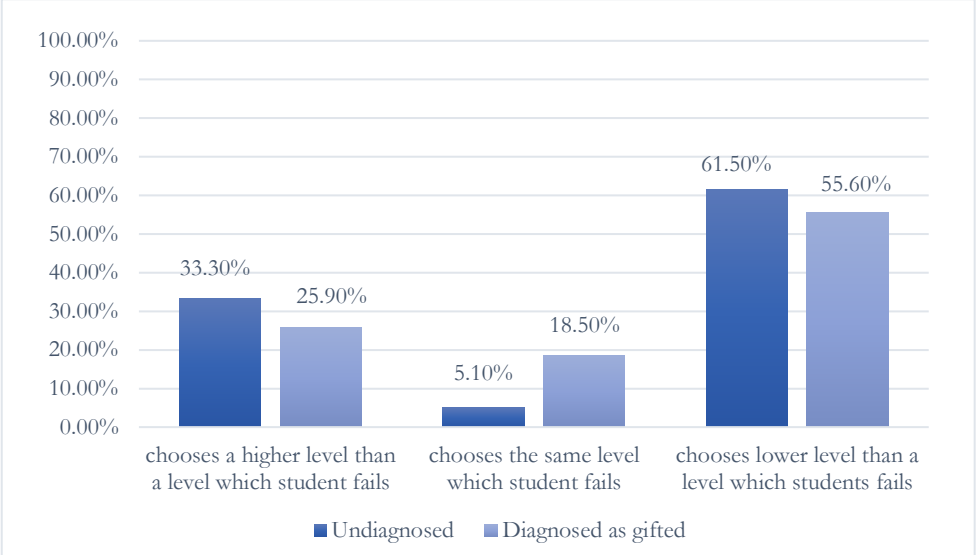

Figure 11

Differences of the Preferences After First Failure between Diagnosed as Gifted/Talented and Undiagnosed

5.b. Preference of Behavior for the Third Activity

There was not statistically significant difference in the preference of behavior for the third activity when students failed at the level which they previously chose between students undiagnosed and diagnosed as gifted; X^2= 3.083, p>.05; See Figure 12).

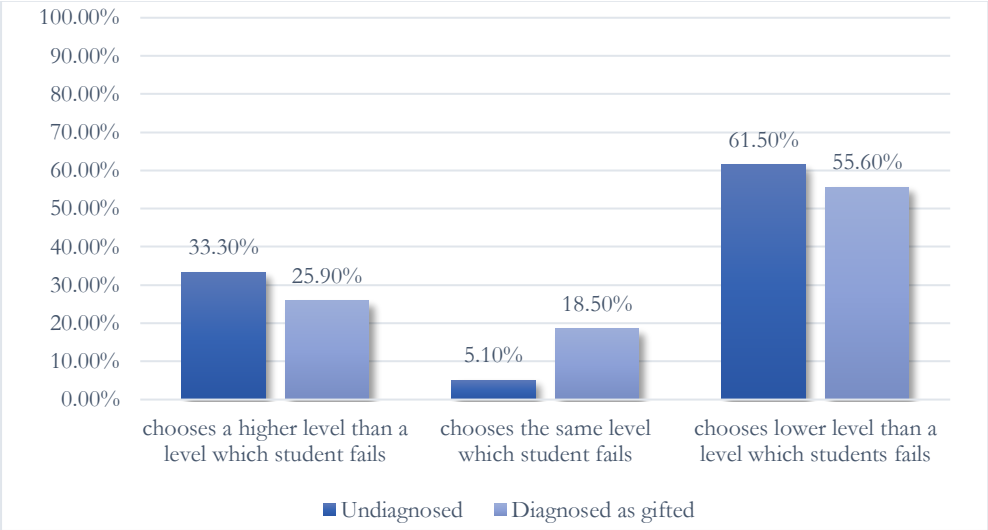

Figure 12.

Differences of the Preferences After Second Failure between Diagnosed as Gifted/Talented and Undiagnosed

Difference in the Differences of Preferences

6.a. While passing from the first to the second activity

While passing from the first to the second activity, it has observed that there was not statistically significant difference in the differences of level choices when students failed at the first activity (t=0.20; p> .05; See Figure 13).

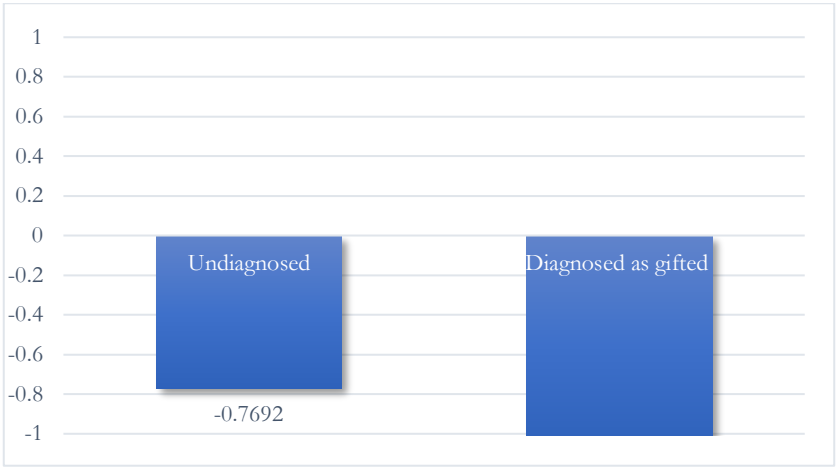

Figure 13

Differences of the Level of Preferences After first Failure between Diagnosed as Gifted/Talented and Undiagnosed

Usually, students who are undiagnosed as gifted choose one degree lower (Percentage $_{undiagnosed}$ 26.2 %; Percentage $_{gifted}$=33.3%) than what they previously choose when they were not successful with the first activity (See Figure 14).

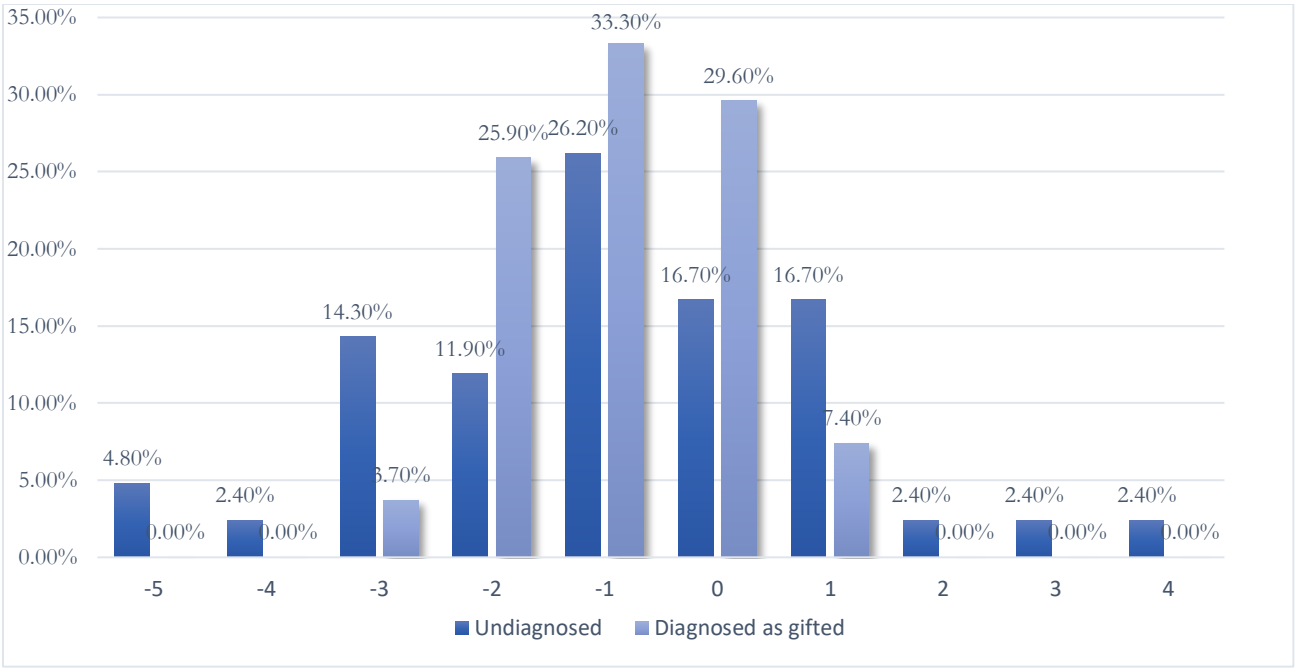

Figure 14

Frequencies of the Level of Preferences After First Failure for Diagnosed as Gifted/Talented and Undiagnosed

6.a. While passing from the second to the third activity

While passing from the second to the third activity, it has observed that there was not statistically significant difference in the differences of level choices when students failed at the second activity (t=0.60; p>.05; See Figure 15)

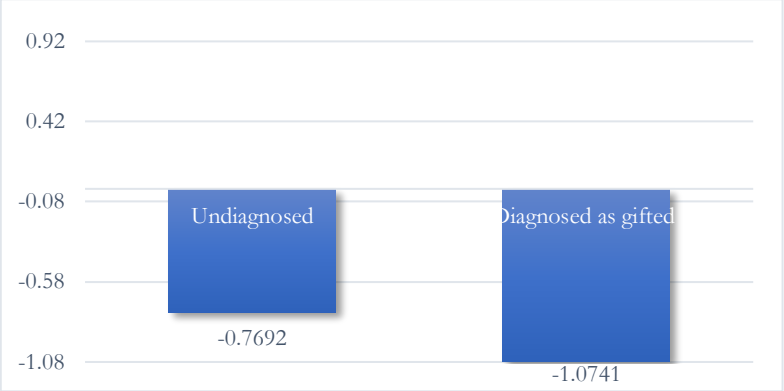

Figure 15

Differences of the Level of Preferences After Second Failure between Diagnosed as Gifted/Talented and Undiagnosed

When we observed the differences of the preference levels between the second and the third activity, while students who are undiagnosed as gifted mostly choose one degree lower (Percentage $_{undiagnosed}$ 30.8 %) than what they previously choose when they were not successful with the second activity, students who are diagnosed as gifted mostly choose the same level as the previous activity (Percentage $_{gifted}$=37%; See Figure 16).

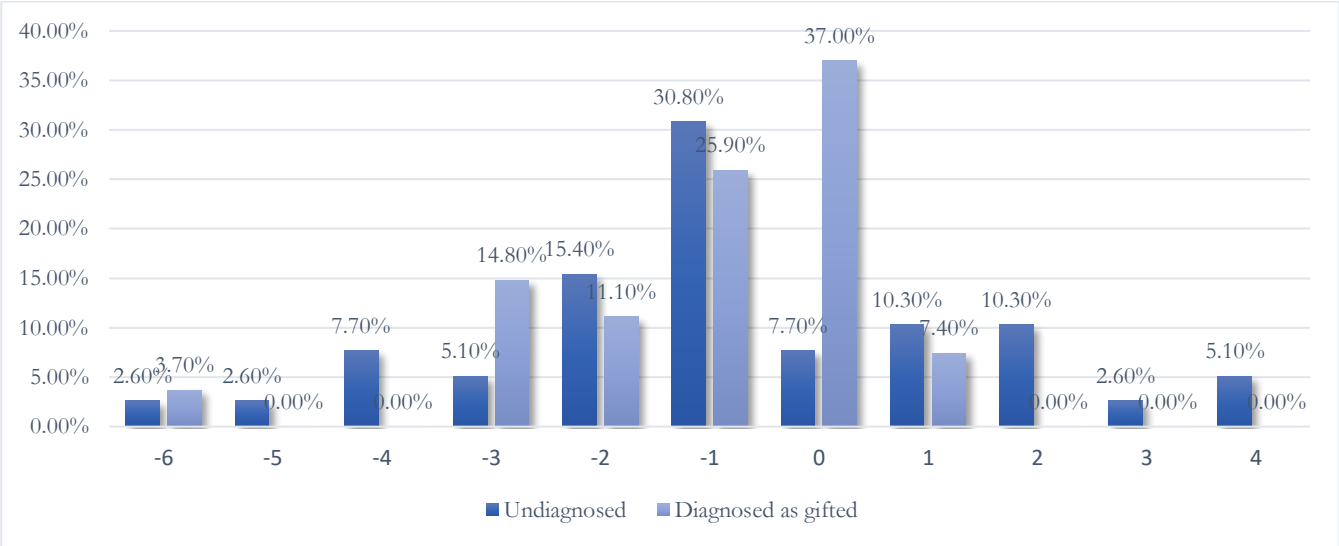

Figure 16

Frequencies of the Level of Preferences After second Failure for Diagnosed as Gifted/Talented and Undiagnosed

Discussion and Conclusion

Students diagnosed as gifted prefer more challenging activities than undiagnosed students. This result itself still does not mean directly they are "challenge-pursuers," just because those participants in this study choose a level in accordance with their ability. The present study also showed that the two groups both succeeded according to their preference. It has clearly been observed that gifted students' challenge-oriented behaviors were rather seemed to be situation-specific. When they succeed, they do not go lower or maintain their level; on the contrary, they chose a higher level. Nevertheless, when they did not succeed, there were dichotomous results. Either they went lower level as students who are undiagnosed, or they maintained their levels as opposed to students who are not diagnosed as gifted.

Another interesting finding, the remaining choice, "choosing higher levels when failed," is made by students who are not diagnosed as gifted, not by gifted and talented.

As shown in Table 1, which summarizes the current study with a comparative perspective, there are important things to consider. Here, the most important issue is that gifted students who experience failure generally prefer lower levels, while undiagnosed students prefer the same and lower levels as well as higher levels when they fail.

Table 1

Summary of the Current Study with a Comparative Perspective

	Gifted	Undiagnosed
Success	▪	
Preference	▪	
Success according to preference		
Behavior of preference after became successful		
Behavior of preference after failed		▪

- ▪ This is the sign if the two groups show differences according to each other. The difference is used in favor of whichever side. The sign was not put if two groups showed similar behaviors.

For making sense of the results of this study, concepts of risk-taking and avoiding failure should be discussed. As seen in challenge-oriented behaviors of gifted children, there is no common conclusive statement about the relationship between risk taking and giftedness in the literature. Although studies about risk taking behaviors largely focus on the harmful potential side (Humphreys, Lee & Tottenham, 2013), a neutral expression of risk taking behavior can be defined as the students' courage and unwillingness to quarrel against difficulties and their learning situations (Korkmaz, 2002). From the positive side, risk taking adds an explorative feature to the individual is undeniable. This is actually what makes risk taking valuable; enhancing new learning. For this experiential study, choosing a lower level can make students successful, but for sure, it does not lead to learning.

These statements below may give a clue for the behavior that gifted students are not playing for higher level when they fail:

- *Preferring to stay in the comfort zone*. Students might not want to be bothered while solving harder questions. The lack of challenge in our schools may make students get used to being successful without effort. For undiagnosed children, the system does not work that way. They are unlikely to experience effortless higher grades. They may have learned that there is no gain without effort.
- *Being accustomed to staying successful with less effort*. Risk taking behavior may not be developed because the requirements of being successful in primary school are lower than their ability level requirements. Thus, they might not have had any chance to be able to enter risk-taking and uncomfortable areas.
- *Being under the influence of external factors.* In the experiment, students are acknowledged to be on their own work, keep what they have done on the paper, show no interest to students near you. The researcher did not let anybody know others' situations. No matter how much this effect is tried to be prevented, they may show off their success to their friends, revealing it by bodily behaviors or using verbal cues.
- *Being unable to cope with stress.* As a consensus reached by brain-behavior researchers, meta-analysis studies have shown that stress modifies decision-making mechanisms (Starcke & Brand, 2012). As a striking example, the stunning results of Pabst, Brand, & Wolf's (2013) study indicate that resting time after stress makes a big difference in decision-making quality. Challenge Performance Test consists of the words we use in our daily lives where students can find fun, and the test was planned to create a flow situation by immersing the students in the game. However, when failed, stress might show up when their quick decision could be affected by it.
- *Not addressing the values template*. Risk taking starts with choosing an activity that allures the person. Simply, a man cannot take risks in everything he thinks. Even if a gifted and talented student finds the activity challenging, he or she may not see it as an activity worth taking the risk.
- *Being extrinsically motivated*. If gifted and talented students are extrinsically motivated, they might lose their interest very easily because they were not graded for the activity they finished. Neither failure nor success was reinforced.
- *The other side of the picture*. Another side of the picture can be explained as follows. If typically developing students have the courage to choose a higher level when they lose, is it risk-taking behavior or metacognitive failure? Here is the part of this study that has not yet been answered due to the limited data in our hands. Suppose that students are undiagnosed taking risks not because they make the right decision but because they did without cognitive control. Is it possible to reach a conclusion that normalizes gifted and talented students avoiding behavior when they fail and interpreted as very precautionary behavior?

Recommendations

Recommendations for Further Research

The relationship between boredom, risk-taking and challenge deserves deeper attention. With this study, it can be addressed the need to produce more versatile frameworks linking challenge and boredom in gifted children. In order to be able to understand more precisely, this research should be conducted with more gifted and talented students and using scales or other qualitative methods related to perfectionism and risk-taking behavior.

Recommendations for Applicants

While challenge is the first necessity in gifted education, there are three essential considerations to put challenge into use. Firstly, in class with mixed type students, challenge might arouse students who are undiagnosed as gifted. Secondly, students who are not diagnosed as gifted may not just getting exited at first, but also pursue on taking challenge. Schools are places where not only the skills are gained but also the responsibilities are learned or reinforced. Understanding students as challenge-orientedness rather than highly or mildly intelligent can be very helpful in developing their potentials. Thirdly, for gifted students who might show low degree of profile for taking challenging action, schools should provide special preventive services.

Limitation of the Study

Research like this should be remodeled in ways which reveal concisely whys of the results. When the results were surprising or unexpected as in this study, they remained as possible explanations. Another limitation was the small-scaleness. Generalizability became questionable unless the study is practiced at ages in different ways, at different places.

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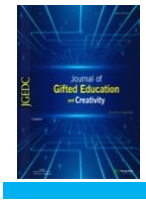

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Research Article

Exploring the supervision of gifted students in open distance e-learning setting in higher education context: University of South Africa

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Abstract

The period in which gifted students will reveal their potential is usually during their university education. That's why universities have to offer opportunities and opportunities for gifted students. With the pandemic period, universities have accelerated their development of distance education opportunities. Gifted university students prefer e-mentoring, e-tutoring and e-supervision aspects of distance education. In this research, the e-supervision services offered to gifted university students by the University of South Africa, a university in South Africa, which is an important location in the world's talent development, were examined in detail. In the research, the university entrance data, the information and data of the relevant units of the university, and the programs were discussed. The review study can be said to be an important and pioneering study in terms of raising awareness about e-mentoring-based support of gifted university students in South Africa. In the future, it is recommended to conduct criterion-based quantitative and qualitative research on e-mentoring, e-tutoring and e-supervision applications in the development of gifted talent at the university level.

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Introduction

After the pandemic, giftedness, talent training and creativity have become the priority of educational institutions. Tortop (2021, pp.73-74) advise that with the pandemic, education must now be focused on the talented. Developing technology shows more clearly what the main purpose of education is. Families are no longer convinced that some institutions use gifted education to demonstrate the quality of their education services. Families are starting to become more conscious about what real gifted education should be. All these reasons may cause a perception that gifted education studies are losing value. Although the academic events related to the education of the gifted are decreasing a little, it can be said that there is an increase in quality Talented mentors and gifted education workers from all over the world can share their work and mentor gifted children and their families. The quality of life of gifted children must be focused on the effective possibilities that gifted students must be provided with, according to this article. Dau (2022, p.2) believe that e-learning makes communication through (ICTs) in providing online learning very resourceful to talented students. In support of Dau (2022) and Evans (1995, p.24) is of the view that supervisor and student can become independent in terms of their physical and temporal spaces with supervision if technology can be used in their communication (Evans, 1995, p. 24). Supervisors must guarantee that brilliant students are treated with respect and patience, and that they are not judged, so that their spiritual beliefs can flourish (Lindsay, 2021). Principals must

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address instructors' lack of enough training and skills to assist gifted pupils (Pham & Akos, 2020). Positive attitudes, values, beliefs, aspirations, and abilities should be nurtured in gifted students so that they can make virtuous occupational choices (Falco & Shaheed, 2021). Teachers, according to Donal (2018), must ensure that gifted students are nurtured through self-disclosure and acknowledgement. All gifted students are expected to have access to supervision from these teachers. (Suherman, et al. 2020) believe that the principle should support instructors in assisting and overseeing gifted students. In order to build programs for brilliant children, creativity and innovation are required (LeBlanc & Borders, 2021). Decolonial curriculum should teach analytical skills such as argumentation to talented students (Mbhele, 2020). Due to a lack of resources, many institutions may be unable to fully realize the potential of gifted children (Kobayashi & Tsuboya, 2021).

The way gifted students are supervised there is scant information on how teachers are prepared to supervise them. Even though there are just a few training programs available to teachers as supervisors. There seems to be limited training available to supervise competent to work of gifted students (Richards & Fletcher, 2019, p. 2). Concerning gifted student's supervision, teachers at times use their past experiences. In the academic field, critical thinking is essential, for example, critically reviewing earlier research to problematize something taken for granted or to identify a gap; critically reading others' work as part of the journal-review process and providing constructive comments. Assist students in developing a critical mindset while studying. They should be able to articulate their philosophical perspective on the following topics: What is research? What exactly is the point of research? What is the nature of understanding? They must be diligent, keeping meticulous records of their reading, research, and other activities (Brennan, 2019, p. 365). Supervisors should assign master's and doctoral students the responsibility of summarizing ten papers in their field of study as their first assignment. It's a useful test to see if a prospective gifted student can pursue a career. The task can show to supervisors whether students are able to write (Brennan, 2019, p. 368). Supervisors should be trained to increase their skills in the use of online communication technologies so that they can provide feedback and assist students with supervision concerns (Dos Santos & Cechinel, 2019, p. 67). Checking that the design is well-explained, that the data is well-presented, that the implications are well-stated, and so on (Connell, 1985, p. 40). Checking technicalities: correct and comprehensive referencing (Connell, 1985, p. 40). Supervisors must monitor official 'progress,' such as how the work is progressing in respect to minimum and maximum deadlines; whether the student should be registered full-time or part-time; and whether the student's candidature should be suspended for a period of time. Supervisors should be aware of what's going on and are frequently able to assist. Regular meetings are the only way to ensure that it happens (Connell, 1985, p. 40). Promote your students' well-being; be flexible with their working choices; and avoid "top-down" tactics, especially when dealing with postgraduate students. This type of approach fosters toxic relationships and hinders students' ability to think critically; do not compare students because this can lead to increased stress and/or worry, lowering their performance and potential. Every student is unique, and as supervisors, we must never forget that our primary responsibility as mentors is to develop each student's abilities and assist them in realizing their full potential and professional goals (Maestre, 2019, pp.3-4).

This article is about supervision of gifted students in a higher education setting using open distance e-learning. Technology in supervision can help supervisors and students save money by lowering supervision expenses and increasing accessibility (Schmidt et al. p. 37). A person's seniority or experience does not always imply that he or she is an appropriate boss. Students may have distinct needs that necessitate different solutions, while supervisors vary in both practice and supervisory skills (Kavanagh, Spence, Wilson & Crow, 2002, p. 249). Using Moore's Theory of Transactional Distance, this research investigates remote supervision of postgraduate students (1997). Although there is no doubt that distance learning provides postgraduate students with independence, flexibility, and choice in how, when, and where they study, it is important to remember that success in distance supervision is dependent on the supervisor-student interaction as well as the pedagogical knowledge [content] that must be conveyed to the student. Supervisors are encouraged to use online forums to help students with supervision concerns, as well as to use online communication tools (Dos Santos & Cechinel, 2019, p. 67).

Flynn and Shelton (2022, p.144) found that gifted and talented education (GATE) exemplifies racial and economic hierarchies that exist in our society, with historically marginalized (HM) students significantly less likely to be identified as gifted, and subsequently receiving gifted services, than their peers. Tests play a critical role in perpetuating, and often amplifying, systemic inequities in education.

e-Mentoring and e-Tutoring for Gifted and Effects of Developing their Talent

Mentoring programs, according to Tortop (2013, p.22), are fairly diverse. He also feels that mentoring, sometimes known as tele-mentoring or e-mentoring, is a rapidly growing sector in gifted education. Tortop (2013, p.22) referred to the mentoring program as e-mentoring or tele-mentoring because it is one of the most effective ways in the education of brilliant students. This method eliminates time and space constraints while also providing access to global resources and tracking student development. According to Tortop (2013), time and location constraints restrict the creation of mentor connections; nevertheless, e-mentoring allows low-income high school or university students to communicate with scientists face to face. The benefits of e-mentoring include: students have the opportunity to communicate with a variety of specialists; there are no geographical restrictions on mentor selection; appropriate consultation between students and mentors is simple; it allows for the continuity of communication between mentors and students and the creation of an archive; mentors and students can communicate at any time via e-mail and do not require an appointment; mentors and students can communicate at any time via e-mail and do not require an appointment.

According to Aboud (2021, p.11), most governments throughout the world are battling to provide ways for students to have free access to educational platforms. Kızıldağ and Tuncer (2022, p.130) believe that, while online learning is not a new concept in the education sector, it has become a priority for decision-making authorities in education around the world (e.g., Departments of Education), as well as agents such as universities, school managers, teachers, students, and their families, since the outbreak in March 2020. With the collapse of institutions and schools, teachers were forced to immediately adopt online teaching, including teacher education. Due to weak online infrastructure, lecturers' and teachers' lack of expertise and limited digital abilities, and an uncomfortable home environment, this rapid and forced transformation posed many problems and limits to normal routines. Mentoring has been shown to boost student success rates, according to Santhanamari, Deepa, Susithra, and Reba (2022, p.304). By removing mental barriers in their students, e-mentoring activities can help businesses achieve greater heights. Mentoring is an important aspect in achieving emotional well-being, as well as personal and professional development. Mentoring is also important for developing practical skills and learning via experience. Mentoring is an excellent technique for supporting under-resourced high school students; nevertheless, there must be considerations for access to mentors, particularly where geographic and temporal restrictions exist, as well as a lower cost. Electronic mentoring (e-mentoring) is a major technique for assisting underrepresented postsecondary students with disabilities in schools in terms of retention, perseverance, and graduation. Several elements influence effective mentoring experiences, including the purpose, the lecturer-student relationship, the consistency of mentoring interactions, and the mentoring objectives. While e-mentoring has its benefits, such as easier access to lecturers and fewer costs, it also has its drawbacks, such as difficulty communicating nonverbally, delayed relationship building, a wide variety of written communication abilities, and technological limitations (Todd, 2022, p.3). According to Tatnall (2022, p.868), education systems in all countries have faced unprecedented obstacles in delivering instruction via remote or online means at all stages of learning.

According to Aboud (2021, p.12), most gifted education institutes in Saudi Arabia have established open-access resources for gifted students and their parents in reaction to the present Covid-19 pandemic. Following the Corona crises and taking into account the educational characteristics of online learning, the following areas were chosen as having the greatest need for public education budgets: reducing educational disparities between learners, encouraging a selection-oriented curriculum, and gifted education. Initially, online learning was seen as a way to supplement the face-to-face education problem that arose as a result of the corona crisis, by providing supplementary educational material that could be learned outside of normal class time, presenting assignments, or facilitating online question and answer sessions. As a result, related initiatives such as online gifted education and an experimental program developed by the Ministry of Education that takes into account the peculiarities of gifted students were formed.

This is a current tool for dealing with difficulties of talented student in higher education. E-learning (Electronic learning) is a new trend in distant education that should be considered a new learning paradigm, especially in the aftermath of the Covid-19 outbreak, when supervisors are encouraged to minimize face-to-face interaction as a preventative tactic by exercising social distancing. E-learning makes communication through (ICTs) in providing online learning very resourceful to gifted students. The term "e-learning" is used in this study to refer to any type of electronically aided learning, whether on the Internet or on television supervisors can convey content regardless of location or time (Dau, 2022, p.2). Because of its benefits in boosting the quality of remote supervision, technology should be a preferred choice among supervisors. For supervisors, technology provides the required infrastructure, software, and storage. IT infrastructure plays a vital part in exchanging and speeding up the generation of new

knowledge. The knowledge repositories is aided by technological infrastructure. IT infrastructure facilities may help academic staff create, transfer, and share knowledge more effectively (Gebreyohans, Croasdell & Meshesha, 2022, p. 5485).

Developing Interpersonal Skills and Emotional Intelligence (EI)

Gómez-Leal et al. (2022, p.358) discovered that emotionally competent lecturers are able to perceive, comprehend, and control their own emotions in the spirit of managing each circumstance efficiently and honestly. They also discovered that instructors' emotional abilities were influenced by their bosses' EI. In Israel, a study of 69 principals and 639 teachers discovered a favorable, indirect association between a leader's ability to recognize emotions and their ability to emotionally reframe. One of the benefits of emotionally reframing, according to this study, is the ability to have a more positive outlook on emotionally provoking bad experiences. This connection may occur because a principal's ability to recognize a teacher's emotions is linked to their ability to form a supportive relationship with those they lead. It's vital to remember that a principal's emotional detection abilities have an indirect impact on their instructors' emotional reframing (and mediated by transformational leadership behaviours). Not only does it necessitate the ability to recognize and manage emotions, but it also necessitates the two more interactive EI abilities of awareness and expression (Gómez-Leal et al. 2022). Emotional intelligence can be seen in five different ways (e.g. intrapersonal skills, interpersonal skills, stress management, adaptability, and general mood). Emotional intelligence is essential for teachers because it allows them to handle emotional information more efficiently for better student care through effective communication and connections. Empathy, self-awareness, encouraging students, and displaying exceptional interpersonal skills are all examples of emotional intelligence skills (Mazen et al. 2022, p.358).

Emotional intelligence (EI) is defined by Alsulami (2022, p.1) as being capable to comprehend and control one's own life. Supervisors' emotional intelligence as educational leaders may have an impact on their instructional practices. As a result, supervisors with high EI scores are more likely to be dedicated to their pupils than supervisors with low EI levels (Alsulami, 2022, p.1). In the supervision of gifted students in distant learning, their well-being is crucial to learning. Given the overlap between relationship quality and attachment, it's natural for both student and teacher to interact in supervision. Good traits that supervisor and student use in interaction influence whether the relationships will be friendly (Walker et al. 2022, p.2). Staniec et al. (2022, pp.2-3) discovered that remotely monitoring brilliant students necessitates interpersonal ties within the organization. Technology is a significant feature of remote supervision. It minimizes challenges connected to distance supervision by enabling the supervisor to supervise regardless of distance and location of students (Staniec et al. 2022, p3).

Developing of Self-Concept in Gifted Students

Dereli (2021, p.96) believes that education institutions should be established to provide support education to students who continue their education in formal education institutions and who have been identified as having special talents in one or more of the fields of general mental ability, visual arts, or music talent, in order to maximize their potential. Bakar (2020, p.116) found that psychologists discovered that gifted and talented students have high cognitive and creative ability with high task commitment, also faced psycho-socio-emotional issues. The psychosocial aspects that affect the development of an individual's self-esteem from childhood to adulthood are the following, namely: (i) self-esteem development that covers the effort to understand and accept one's self efficacy; (ii) personal autonomy, (iii) the process that makes a person becomes independent and able to make decision; (iv) looking for and building close relationship with peers based on trust, openness, and similarities in values; and (v) pengurusan personal sexuality development management, and the need to achieve something and being recognised for it.

Teaching to gifted children is a complex activity and there are teachers who are unable in dealing with giftedness of students (Piske, 2021, p.108). For gifted individuals, university success is a crucial role in developing them. Their ability to comprehend can be cultivated in various ways throughout a student's educational career. Gifted students are inclined to participate and benefit in supervision activities. The type of activities students pick and the level of challenge in each activity are frequently influenced by their perceptions of personal skills (Lindt, Rutherford, & Wagner, 2021, p.2). Therefore, teaching of self-knowledge and knowledge of reality and the world can enhance creativity in gifted students.

Mindfulness is important, according to Alfodhly et al. (2021, p. 34), because it increases self-awareness, acceptance, and improves adaptive choices about responding to one's own experiences, improves the ability to detect and manage unexpected events, and reduces distraction from desired goals. Students' lack of mental attentiveness can lead to a concurrent view of the events that the talented student is experiencing, resulting in intellectual stagnation, a lack of adoption of new ideas, and a student's inability to benefit from supervision in a distance mode. As a result, children with good social skills adapt readily to any form of learning, overcome problems without negative consequences, have

a high sense of self-worth, and are able to easily reach and fulfill their goals. Without prolonged attention, gifted children cannot solve issues or build new paradigms, according to Shaughnessy (2021, p.90). Creative students are thinking about what they've learned in the past, what they've been exposed to in terms of education and models, and what they see as the finished product in all of its grandeur. The concept of resilience can be linked to talented pupils' capacity to cope with crisis situations. When a difficulty with supervision emerges, reactions such as giving up after becoming weary or altering relationships with the environment are linked to the concept of resilience. As a result, the concept of resilience is crucial in how postgraduate students respond to stressors in distant mode supervision (Yılmaz, & Yalçın, 2021, p.121).

Developing of Critical Thinking

Many qualities such as innovativeness, critical thinking, and problem solving, according to Ağağolu and Demir (2020, pp.106-108), have become necessary for an individual's ability to use the rapidly changing technological tools of the twenty-first century, to adapt to these technological environments, and to reach Bloom's taxonomy of individual progress's final step (self-realization). They also argue that while some of these abilities have been used by individuals for a long time, others are regarded vital to obtain through technological advancements. Information literacy and technological literacy are two of these skills. Individuals' freedom of expression and the ability to learn independently by conducting the necessary research (meta-learning), according to them (Ağağolu and Demir, 2020, pp.108), have become some of the most important goals of this period. In the technological era, it is also vital to establish the necessary technological infrastructure in educational environments so that students may access information swiftly and safely. They also recommend that in these targeted classroom contexts, a variety of mobile devices and books be available to enable the essential research for students' meta-learning. At this point, teachers in the classroom should act as guides for the students, assisting them in making proper and effective use of the available technology and materials.

A well-developed vocabulary, according to Shaughnessy (2021, p.90), must indicate a considerable quantity of word knowledge, descriptive ability, both expressive and receptive language skills, as well as written expressive skills. Individuals who perform well on this subtest appear to have a broad understanding and knowledge of the world. Creative students must be able to assimilate what they have learned in the past, what they may have been exposed to-in terms of education and models-and, finally, what they envision as the end product-in all of its grandeur.

Critical thinking skills (CTS) are vital in supervision of students at a distance, according to Chusni, Saputro, Suranto, and Rahardjo (2022, p. 928) Gifted students and supervisors with a high CTS are better at breaking down buildings into its constituent parts, are more engaged and inventive in problem solving, and are fascinated by the phenomena. CTS has an impact on pupils' conceptual system construction. CTS learning is beneficial in many ways, including assisting students in establishing their comprehension and exercising problem-solving abilities. The discovery-based learning method of supervision has been shown to be successful in strengthening students' critical thinking skills (Chusni, Saputro, Suranto & Rahardjo, 2022, p929). Technology is widely recognized as a crucial component of education, allowing students to have access to higher-order competences known as 21st-century skills. Technology-enabled learning settings are innovative and student-centered. The use of ICT tools to supervise learning experiences makes them more engaging and allows for student-driven learning, interactivity and collaboration, personalisation, and flexibility (Veluvali & Surisetti, 2022, p.109).

The supervising position is critical in assisting gifted pupils in learning. The mentoring abilities of university supervisors have a significant impact on postgraduate student training. Mentoring qualities such as coaching students, serving as an exemplary role are important drivers in gifted students' success. The supervisor's capacity to guide, gifted student is critical. As a result, supervisors should have characteristics to improving students' objective evaluation of their work which requires assistance (e.g. telephonically, e-mail). As a result, the supervisor's research experience determines the quality of supervision (Hadi & Muhammad, 2019, pp. 60-61). Long-term harassment of gifted students, such as student mockery, threats, purposely withholding needed information, and quiet treatment during remote supervision, can all be signs of abusive supervision. Abusive supervision is a cause of continuous hindrance stress for abused pupils, which can quickly lead to a variety of undesirable results (Peltokorpi & Ramaswami, 2019, p. 2). Gifted students may face difficulties that make it difficult for them to complete their courses in the time allotted (Cekiso, Tshotsho, Masha & Saziwa, 2019, p. 13). Individuals can assess and select from a variety of coping tactics, including attempting to change the situation, accepting it, or ignoring it. Finally, the student's choice of coping method while dealing with an abusive supervisor should be based on his or her feelings of personal control over the stressful situation (Peltokorpi, 2019, p. 255).

Problem of Study

It is very important to support gifted children at the university level. It is necessary to examine how e-mentoring and e-tutoring practices, which have increased in importance especially during the pandemic period, are at the university level. In this research, it is aimed to examine the e-supervision opportunities offered by the University of South Africa for university students. Accordingly,

- What are the e-supervision opportunities offered by the University of South Africa for outstanding university students?

Method

Research Model

Case study, a South African university is a case, facilities for gifted university students. Document analysis techniques. And interpretive analysis for this case. The facilities are not enough, hence the use of e-learning tools is the answer to the challenges experienced at the university. The extensive use of technology must be accelerated and extended.

Documents

University entering data, web site, university regulations for high ability students.

Results and Discussion

Facilities for the Gifted at University Level at University of South Africa

University of South Africa was founded in 1873 as the University of the Cape of Good Hope, the institution became the first public university in the world to teach exclusively by means of distance education in 1946. Throughout the years, Unisa was perhaps the only university in South Africa to have provided all people with access to education, irrespective of race, colour or creed (https://www.mastersportal.com/universities/10784/university-of-south-africa.html). Each e-tutor is allocated a group of 200 students of the total of the students that are registered each year and communication is with those students allocated to the e-tutor. Students are able to pose questions to the lecturers and vice versa, discuss the content of the module and also interact with the other students in that e-tutor group. Sites are monitored by ASCs and lecturers. Discussion forum tool of group site are done by the lecturer by initiating content related discussions with group of students. All E-tutors and student interactions are done on the module site.

UNISA's Online Accelerated Postgraduate Support Programme is a ground-breaking initiative offering anytime, anywhere access to world-class research skills support to postgraduate student. It is facilitated by the university's College of Graduate Studies (CGS), this Department of Higher Education and Training (DHET)-supported project is a significant contributor in supporting students. Students are encouraged to pursue ground-breaking, high-impact research in their subjects, with a focus on decolonization, Africanisation, and the commercialization of their knowledge as a means of boosting entrepreneurship. This program is groundbreaking because it is entirely online and provides a mix of synchronous and asynchronous opportunities for nearly 60 000 students to receive training in all aspects of research, from the development of their proposal to the completion of their dissertation or thesis, as well as skills in applying for study support grants and "Writing for Publication." More crucially, the curriculum is offered in the evenings to allow many of Unisa's students who are otherwise occupied during the day to benefit from live instruction in the evenings. Students get access to lecture replays 24 hours a day, 7 days a week, "anytime, anywhere," and a dedicated YouTube channel where they may share their work with their classmates. This Department of Higher Education and Training (DHET)-supported project, which is managed by the institution's College of Graduate Studies (CGS), is yet another noteworthy contribution by the university (online accelerated program).

What is the e-tutor's Role in Guiding Students?

The E-tutor must address the specific questions from students pertaining to the assignments. In doing this the E-tutor can refer the students to specific sections or activities in the Study Guide/text book, refer to a specific activity that was discussed on the tutorial discussion forums or explain to the student what the question requires. Students are encouraged to submit their assignments online via *myUnisa* as pdf documents. This will ensure that a student has proof of submission in case of later issues and disputes. Also, module lecturers encourage students to submit their assignments before the due dates to avoid administrative errors and other delays. The role of the E-tutor is not to provide the assignment answers to students. The E-tutor guide the students through the study material, help them to understand it sufficiently in order for them to study and assess themselves independently. This will assist the students to obtain good results for the assignments and a high year mark.

What is the E-tutor's Role After the Assignment has been Marked?

Dinçer (2019, p.168) found that education of gifted children is becoming more and more important in today's world. Gifted students can benefit from their own teachers or other teachers in the school in the Resource Rooms, with the

help of their peers, in addition to their class-level courses. Dinçer (2019, p.168) took the advice of Tortop (2013) that teachers working with these children should be equipped in every sense. In the education of gifted students, it is very important to make early detection and diagnosis of their interests and abilities, but also to provide right mentoring by experts in their field. At the University of South Africa students receive the results for each assignment after the due date. The feedback on the assignments is made available to students on the module site on *myUnisa* after the due date. The feedback is most likely posted under the Additional Resources tool. E-tutors can discuss the assignment answers with students in order to clarify how the answers came about. Students are asked to address queries relating to assignments (i.e. marking, late/missing assignments, unmarked assignments, erroneous marks, etc.) to the module lecturers and/or the Assignment Section.

The Online Environment at the University of South Africa

A rich supply of materials and learning opportunities that overcome spatial-temporal limitations, considered to be the advantages of the online learning system, could match the characteristics of gifted students, which can be particularly suitable for gifted education. Most of the gifted students in a study done by Aboud (2021, pp. 11-15) in Saudi Arabia found to have a positive perception of online learning. Most of them assume that participating styles of learning can be valued higher, indicating that they are able to learn, enjoy sharing with others what they learn, and make continuous efforts to meet the expectations of their teachers.

Photo 1

University of South Africa Campus (https://unisa.figshare.com/)

Photo 2

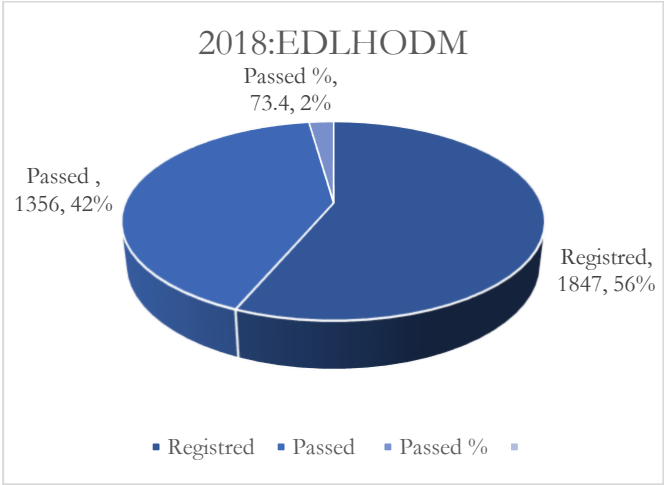
MyUnisa Module Online Environment (MtUnisa, 2022)

At the University of South Africa, e-tutors and lecturers are required to familiarise themselves with the group site on myUnisa and be able to explain to the students exactly how the site operates, i.e. how the different tools cover the information. Lecturers are the people responsible for editing the welcoming message (as students open the group site) before they start accessing the other tools. The Discussion Forum tool on the group site is the main platform where the e-tutor can interact with other group of students. E-tutors are expected to post content related to discussions, be innovative in their teaching so that students can respond and participate in their group site. E-tutors are informed to take note that their tutoring may not fall in with the students' schedule (as provided for under the Learning Units tool). The timetable shows the number of weeks and the study units that the students should study for a semester; it is therefore a reflection of what the Learning Units tool aims to do. In addition, it feeds into e-tutor tutoring sessions

and explains what they should be doing in each week. Although the timetable makes provision for the specific time period, e-tutors are advised to keep in mind that content related to tutoring will probably only be possible once all e-tutors and students are linked to *myUnisa*. The Learning Units tool is only the guideline indicating when the students should study which study units – the actual study units are provided for in their study guides. The beginning of each study unit lists the learning outcomes for that particular study unit. E-tutors must constantly bear these outcomes in mind when dealing with a topic. The object of the course is to ensure that a student has mastered a particular learning outcome. A useful method of assessing the achievement of assessment criteria, is by motivating students to actively complete the Activities in the Study Guide. Students are required to compare their own attempt at completing an Activity against the Feedback provided directly after the Activity. These Activities may also be used for useful discussions between the students and yourself as the e-tutor. Once a student has successfully completed the Activities, he/she is most likely to have mastered the learning outcomes and is therefore ready to proceed to the next topic.
The university is a distance e-learning institution and it does not have summer camps.

What were the Good Practices to Achieve the Pass Rates?

Strategy: E-tutoring; individual student attention; student support through telephone, e-mail; and students visiting lecturers in their offices. The Educator as Leader, Manager and Administrator [EDLHODM] is a module abbreviated on the system as EDLHODM.

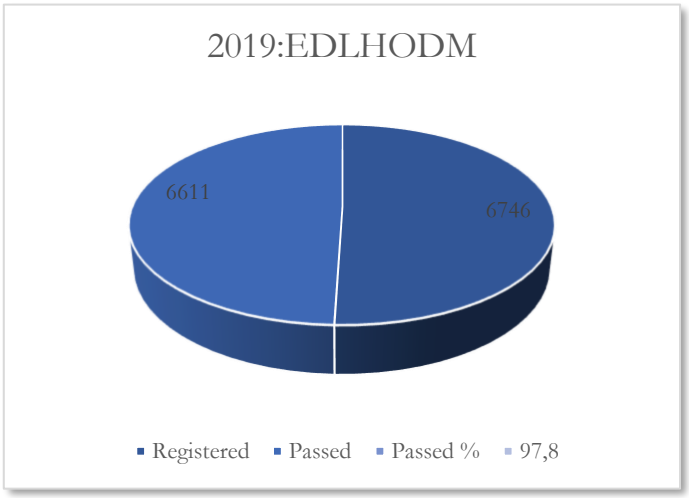


Module name: The Educator as Leader, Manager and Administrator [EDLHODM]	Year 2018	Pass percentage
Registered	1847	
Passed	1356	73,4

Figure 1

2018 EDLHODM Student Performance

***Strategy*:** E-tutoring; individual student attention; student support through telephone, e-mail; and students visiting lecturers in their offices was used as strategies in improving student performance. 1847 students were registered for the module in 2018 and those who passed were 1356 which was pass rate of 73.4%. Students that are unsuccessful are given a second opportunity known as FI Concession where those students who achieved a minimum of 40% are given a second opportunity to write the exam.

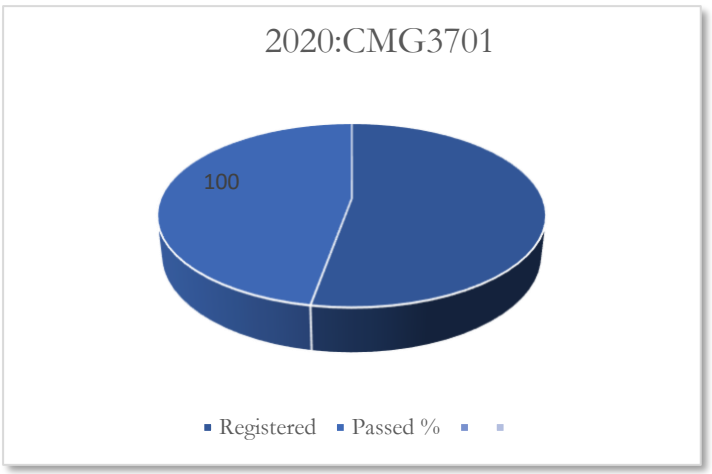


Module name: The Educator as Leader, Manager and Administrator [EDLHODM]	Year 2019	Pass percentage
registered	6746	
passed	6611	97,8

Figure 2

2019 EDLHODM Student Performance

Strategy: E-tutoring; individual student attention; student support through telephone, e-mail; and students visiting lecturers in their offices was used as strategies in improving student performance. In 2019 6746 students registered for the module and 6611 of the same students passed the examination and this was a pass rate of 97.8%. Students that are unsuccessful are given a second opportunity known as FI Concession where those students who achieved a minimum of 40% are given a second opportunity to write the exam.



Module name: Classroom Management [ECMG3701]	Year 2020	Pass percentage
Registered	112	100
Passed	112	100

Figure 3

2020 CMG3701 Student Performance

In 2020 there was a re-curriculation and the EDLHODM module was facing out and the Classroom module [CMG3701) was introduced. The first registration of the module took place in 2020 and the intake was 112 students. In the first examination 112 students wrote and they all passed the module. The strategy used was the e-tutoring of the students by e-tutors who helped the students in their activities. The e-tutors provided quarterly reports on how they assisted the students in working through the module. The pass rate was 100% of the registered students.

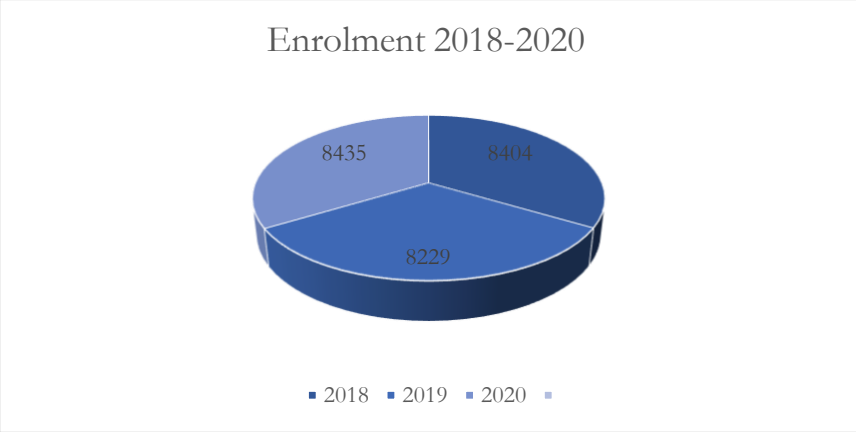


Figure 4

Enrolment at University of Pretoria/Faculty of Education 2018-2020

At the university of Pretoria, the intake of students in the Faculty of Education in 2018-2020 were as follows: In 2018 the enrolment was 8404 students; in 2019 there were 8229 student enrolment and in 20202 there were 8435 students. In 2020 there was an increase by 206 students from the previous year (2019)(https://www.up.ac.za/department-of-institutional-planning/article/2834454/core-students-statistics).

A subminimum of 40% is required for the year and/or semester mark for admission to the examination in each module. A student who obtains a final mark of 40 – 49% in a module qualifies for a supplementary examination. If a pass mark has been obtained in a module, but the required sub-minimum of 40% has not been obtained in the examination, the student will have to write a supplementary examination. A final mark of at least 50% is required to pass a module. Students who are unable to write an examination due to illness qualify for Aegrotat. Aegrotat is a medical certificate testifying that a student is unable to attend lectures or examinations because of illness. This is a special arrangement made to help students to write the examination or test to continue with their studies. Students, who do not write their examinations on the scheduled day, may apply for an aegrotat/extraordinary examination at the Student Administration Offices. Lecturers are not allowed to grant any permission for this category of examination. It is the responsibility of the student to ascertain whether his/her request has been successful. If permission has been granted, the student must write the aegrotat/extraordinary examination during the supplementary examination. Such a student will not qualify for a further supplementary examination (https://www.up.ac.za/faculty-of-education/yearbooks/2018/pdf/faculty/EDU). The meaning of AEGROTAT is a medical certificate testifying that a student is unable to attend lectures or examinations as a result of illness.

UNISA's Preferred Fields for e-Learning by Gifted University Students

At the University of South Africa, innovation and excellence describe the activities, attitudes, and culture necessary to develop new ideas, processes, systems, structures, or artefacts that, when applied, result in a long-term, high-performing institution. They are the core principles that we utilize as change agents to create a difference in how we operate with available resources to achieve specified goals despite contextual and policy constraints. Instead than simply identifying problems, everyone must adopt a problem-solving mindset that stimulates intellectual innovation and new solutions. Student-centered responsiveness: In order to achieve academic access and success in an Open Distance e-Learning context, we must recognize, cultivate, and promote the interests and perspectives of students, particularly their lived experiences and prior learning. (https://www.unisa.ac.za/sites/corporate/default/About/Who-we-are/Our-strategy).

Identifying the ways exceptional students think and learn might help lecturers improve their students' abilities: If you want to help gifted student in your classroom or online, you should strive to understand how they think and learn about the various challenges they confront. Understanding that talented individuals have unique demands, requirements, and behavioral patterns would assist lecturers in meeting those needs and providing better support in the classroom. Students must be given assignments that are graded on a scale of one to ten. Assignments with different levels of difficulty can assist instructors in meeting the needs of all students. To create the middle tier, lecturers should establish a basic standard aim and create an assignment based on that standard. After the middle tier is completed, lecturers can add support for at-risk youngsters and challenge for gifted students to create the other tiers. Lecturers should have a library with a variety of levels in their classroom. They should ensure that their classroom library contains a diverse selection of texts to complement gifted children' reading abilities and interests. They can also encourage students to bring reading materials from home, as long as the items challenge them to learn new words and improve

their reading skills. Lecturers should be able to draw on the talents and interests of their pupils. When gifted students finish projects ahead of their peers, they are frequently requested to undertake busy labor. Rather than following such method, consider harnessing talented students' talents and interests to further investigate a skill. Students could, for example, write or draw something linked to the assignment/skill, or they could play out issue or project solutions.

Lecturers should also look into practical applications for assisting gifted students: Math algorithms, science principles, and grammatical norms are all readily grasped by gifted students. Lecturers can motivate students to apply what they've learned in the classroom to real-world situations.

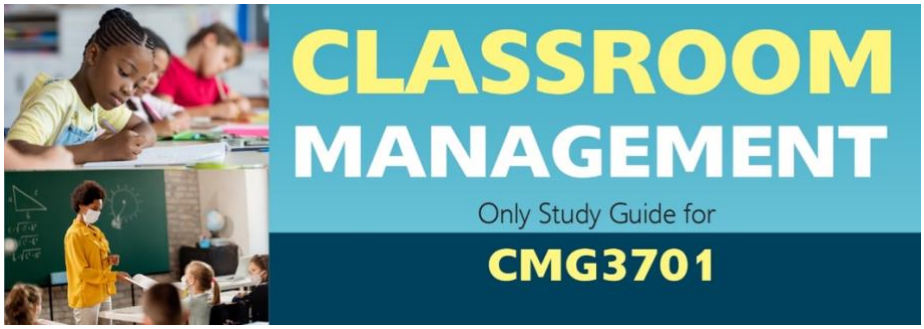


Photo 3

CMG3701 Module- Study Guide Cover Page

For example, they can investigate how area and perimeter influence an architect's design or how scientists utilize animal taxonomy to comprehend animal life and function (https://www.kaplanco.com/ii/gifted-students). A Module site is used by the University of South Africa to communicate with students via virtual e-mentoring. This site also contains links to other useful resources, such as: Announcements: Important notifications are made here by the lecturers from time to time for the attention of the students and tutors. Official Study Guides: In electronic format, all of the study materials for both semesters/years are available here. For both semesters (1 & 2) of the year, this includes the Study Guide and tutorial letter 101. Exam papers from the past can also be found here. FAQ's: The lecturers have given the solutions to these commonly asked questions here. It contains questions on exam preparation, how assignments will be graded, and how the year grade will be determined. The FAQ tool contains answers to the majority of administrative questions that students commonly ask. Units of Study This program gives students a calendar of when they should study which study units, when they should prepare for assignments, when their tutors should provide feedback on their work, and when they should begin studying for tests. This application is useful for tutors because it tells them when they should help students with particular study units. As a result, it is critical that the tutors become acquainted with this instrument.

In the context of higher education, there are various supervision hindrance elements that influence the supervision of gifted students in an open distance e-learning setting. Gifted students' social and emotional qualities may differ from their non-gifted counterparts, according to Durak, Demirhan, and Citil (2022, p5). Gifted students, according to many researchers in the field, have a stronger personality structure and experience fewer psychiatric issues than their classmates. Gifted students like having as much fun as they enjoy learning. Gifted students can choose to channel their energies into outside activities or into computer gaming. As a result, brilliant students can form positive relationships with older children or adults. Another issue is that the brilliant student is often excluded, rejected, mocked, or put under pressure by his or her peers. When all of these characteristics and circumstances are considered together, it is a viable option for gifted students to meet friends and play games online. As a result, technology, the Internet, and computer games play an essential role in gifted children' schooling and daily life. According to Jaenem and Zulkifli (2022, p.191), learning supervision is frequently, if not always, viewed as an unpleasant principal program, even frightening for teachers. The teacher's perception of learning monitoring is that the instructor's deficiencies or flaws in carrying out learning will be exposed, and he will be labeled an unprofessional teacher. Gifted student supervision can help them realize their creative potential and improve their academic achievement. However, several constraints, particularly in online learning, often prohibit them from fully developing their different potentials. The primary goal of supervision is to improve the learning environment. As a result, continual monitoring and a purposeful and methodical program to assist gifted pupils in learning are required. In order to achieve a high-quality online learning process, gifted pupils must be closely supervised. Of course, this might be realized if professors perform well in supervision, as this will assist them in carrying out online supervision (Jaenem & Zulkifli, 2022, p.192).

Some of the factors that affect the gifted students are their job responsibilities; marital conflict; school responsibilities; lack of supervision from dissertation team; not receiving approval letters from organizations or

participants; inability to employ quantitative or qualitative instruments due to a lack of permission; dissatisfaction with dissertation team; and changing living arrangements (Urhuogo-Idierukevbe, Addo, and Anderson, 2019, p. 25). Furthermore, the distant student may struggle to overcome tendencies such as overcommitting, procrastination, and perfectionism. Throughout the dissertation/thesis process, the student must be proactive. Many students may not be able to formulate and follow a work schedule due to competing demands on their time, which can have an impact on the quality of work performed (Urhuogo-Idierukevbe, Ibid, 2019, p. 25). Changes in the approach to the learning process require lecturers to make use of learning strategies from face-to-face learning in class to distance learning that is carried out online.

Universities exist to identify and develop the potential of students. To identify talent in the classroom, teachers must influence students' thinking and provide learning opportunities. The development of giftedness in children must be founded on an ecological system, with a special focus on how students interact with educational systems (Frazier-Goatley, Adelson, & Snyder, 2022, p.116). Giftedness differs by country, according to Mofield & Mofield, because some teachers emphasize on high performance while others focus on successes in each discipline (2022, pp. 80-81). Bright and gifted children outperform classmates of similar age, experience, and environment in a variety of areas. They will need to alter their educational experiences in order to learn and achieve their full potential. Talented students come from all walks of life, representing all racial, ethnic, and cultural groups, as well as all socioeconomic levels. In order to reach their full potential, they must have easy access to relevant learning opportunities. They may also struggle with learning and processing, necessitating particular care and accommodations. As a result, students require guidance and supervision in order to develop socially, emotionally, and academically. The talent development paradigm has gained traction in the field of gifted education as a model for developing the strengths and talents of gifted students and students with high potential, including those who are not formally identified as intellectually gifted but exhibit propensities and high performance in a variety of domains (Mofield & Mofield, 2022, p.81). The first step in creating talent is to evaluate the current situation of Generation Z students at each university, including their personalities and educational backgrounds, as well as any existing talent training concerns related to student skills. The second stage should be to establish training objectives for institutions in order to develop their transdisciplinary and big data thinking abilities. In the third phase, universities should build a new talent development model for their students, which includes encouraging classroom innovation, multidisciplinary education, personality development, and industry-education integration (Mo, 2022, p.4). Spies, Schauer, and Bindel discovered noncognitive personality traits (achievement motivation, striving for cognition, self-concept, and so on), giftedness factors (intelligence, creativity, psychomotor skills, and so on), and environmental characteristics (parents' educational level, number of siblings, and so on) (2022, p2).

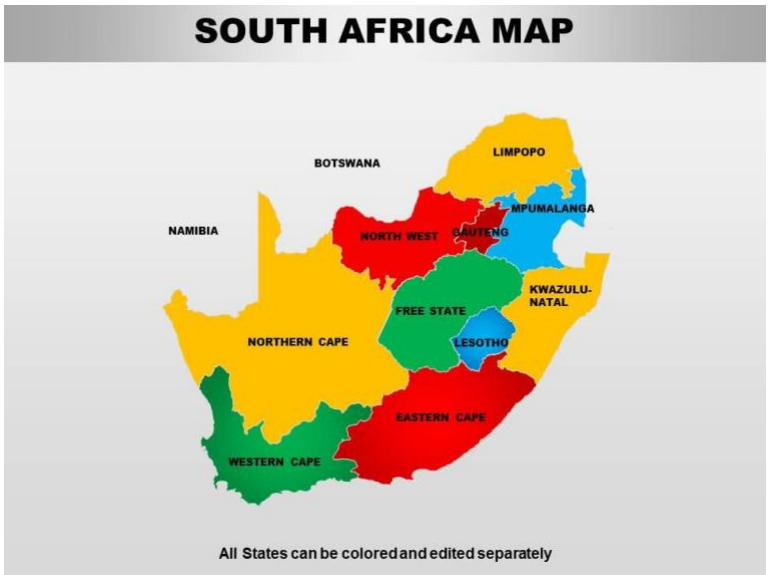


Figure 5

Regional Centres of UNISA

(Source: https://www.slideteam.net/catalog/product/gallery/id/53161/image/355429/)

Students who study via distance learning do it on their own time and in their own location, but this does not mean they are alone. UNISA provides a variety of facilities and services to satisfy the needs of its varied student body. Lecturers, e-tutors, counsellors, and the UNISA Library, as well as the other service providers they encounter along

the way, all help students achieve their goals. The institution maintains the following regional centers to help students develop their abilities: Eastern Cape, Gauteng, KwaZulu-Natal, North Eastern, Midlands (KwaZulu-Natal), and Western Cape, as well as Ethiopia (https://www.unisa.ac.za/sites/corporate/default/Contact-us/Regional-Centres). All the regional service centres provide many key services to students including counselling, library assistance, tutorials, student administration and technology support.

In the regional centres students get the following information to boost their giftedness, namely:

- Advice services
- Meet other students for information sharing purposes
- Make use of Unisa services
- Have conversations with counsellors
- Use of Academic Literacies Services; and the
- Use of a computer (* there are a limited number of computers available at the regional centres) (https://www.unisa.ac.za/sites/corporate/default/Contact-us/Regional-Centres)

Figure 6

Ethiopia Regional Learning Centre- UNISA (Note: This is another regional centre of UNISA in the African continent)

UNISA Entrepreneurship Hub for Gifted University Students

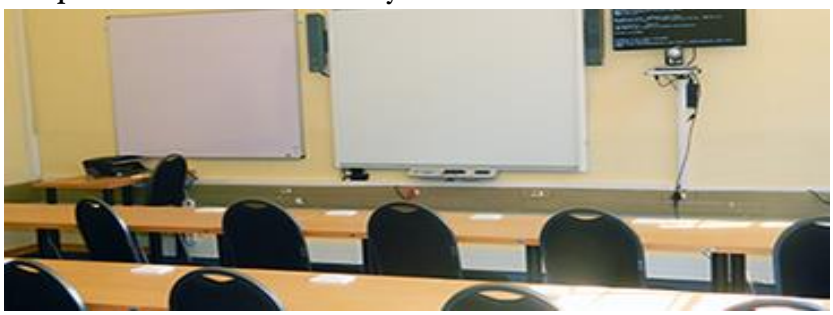


Photo 4

Online Virtual Learning at UNISA Entrepreneurhip Hub (UNISA, 2022)

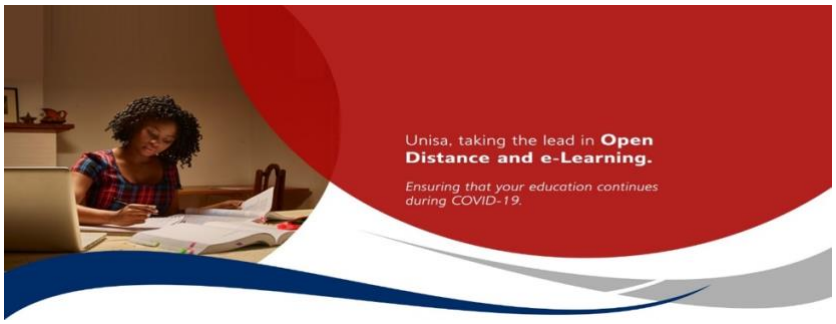


Photo 5

Online e-learning and Creative Centre (UNISA, 2022)

At UNISA, there is a unit called 'Talent Management' which is about analysing, developing and effectively utilising talent to meet institutional needs on an ongoing basis. This involves comparing current talent in a department to the strategic needs of the organisation (https://web.facebook.com/Unisa-Talent-Management-1792882554282688/). The Unisa Talent Management Unit wants to engage and share best practices in the talent management field with Internal and external stakeholders.

Entrepreneurship has been designated as a significant emphasis area for achieving sustainable socio-economic development through assisting aspiring and existing entrepreneurs. The College's flagship endeavor, the Entrepreneurship Hub, connects developmental programs and business services to assist the growth and capacity building of SMMEs and their owners. To address the concerns of inequality, poverty, and unemployment, these programs are a top focus. The College provides interactions and workshops for beneficiaries in a variety of sectors of our society, including the automotive, financial, and hospitality industries, as well as members of a specific community, in conjunction with other stakeholders. This facilitation process aims to encourage the growth of enterprises that will create jobs and close the income gap in our country, as well as the achievement of the National Development Plan's goals (NDP). The College of Economic and Management Sciences (CEMS) wants to build a long-term entrepreneurship and small company development hub in many areas. Its goal of creating local jobs and lowering unemployment necessitates such innovation. The flagship effort will act as a hub for assisting entrepreneurs and small business owners, as well as promoting research and student in-service learning. The Unisa Regional Centre in Daveyton will house the first regional center. The university hosts a "Student Entrepreneurship Week (SEW)" to help students develop their entrepreneurial skills. The growth of SMMEs has the potential to provide long-term solutions to problems that face our businesses and communities. To help with this, the College will devote 2-3 days each August to promoting student entrepreneurs through a series of presentations, training opportunities, and a forum to pitch ideas to a panel of successful entrepreneurs. The SEW will serve as a forum for student entrepreneurs, SMMEs, and other stakeholders to discuss theoretical and practical issues affecting the SMME sector's long-term viability. The SEW is held once a year and includes lectures, seminars, exhibitions, and workshops for current and aspiring student entrepreneurs. We collaborate with important partners to ensure that participants have access to essential information and resources throughout SEW (UNISA, 2022, Entrepreneurship)

Student Funding: Bursaries & Loans [Postgraduate Diploma and Honours Bursary; National Student Financial Aid Scheme (NSFAS)]

The student must have obtained a minimum average of 60% on their entire undergraduate degree to qualify for the Honours bursary. Prioritisation is given to outstanding students *(gifted students)* with a higher average of their entire Unisa undergraduate qualification. The postgraduate diploma and Honours bursary aim to assist South African Unisa alumni students with their Unisa tuition fees, thus enabling them to register and complete their qualifications. Financial support is offered to both postgraduate diploma and Honours students subject to eligibility, academic performance, and availability of funds (UNISA, 2022, Honours)

UNISA NSFAS-funded students are only entitled to a Learning Material Allowance (LMA) and Living Allowance (LA). Based on the 2021 DHET Grant Funding Guidelines, the LMA is calculated based on the number of modules registered: R600 per module for the first four modules and a R5 200 once-off amount for five to ten modules. If the amount of R5 200 LMA is paid for the first five modules, no additional LMA will be paid for additional modules. Based on the 2021 DHET Grant Funding Guidelines, the LA is paid to students registered for ten modules. A student who registers for ten modules and later reduces the number of modules registered will unfortunately forfeit this allowance. Students funded under this bursary scheme must renew their funding with the funder during their applicable application dates. First-time NSFAS applicants**:** Students are temporarily registered during Unisa's registration period while waiting for NSFAS funding confirmation. If a student's NSFAS application is declined or delayed by close of the registration period, a student is expected to find alternative funding before his or her registration will be activated (UNISA, 2022, NSFAS-Bursaries).

Giftedness and university education are that universities are expected to emulate Sudan which initiated some practical scientific efforts to nurture the gifted students like Dr. Omar Haroun Khaleefa, a university professor and expert in the nurture of the gifted and the representative of the International Council for Gifted and Talented Children in Sudan, returned from his work in the State of Bahrain. Dr. Khaleefa, the inventor of the Simber Project to identify the gifted, started it all at Al-Qabas schools. There, the first scientifically-based program for the nurturing of brilliant children was implemented. Workshops for teachers and psychological counselors on giftedness, awareness and family guidance, counseling the gifted, identification of a significant number of talented students using respected scientific methods and tools, and school enrichment programs were among the program's accomplishments. For the first time, thinking skills courses were offered in schools and summer camps. Many of the experts became members of Arab and international councils on giftedness and excellence, and they attended seminars, festivals, and conferences. The Ministry of Science and Technology encouraged researchers and did not overlook scientific research in that program. That approach resonated with the Khartoum State Ministry of Education, which began implementing scientific programs to develop brilliant students in its schools. Dr. Omar Haroun Khaleefa was employed by the Ministry of

Education in Khartoum State, and various workshops and seminars were held among professionals to examine gifted education in a serious scientific manner (Bakhiet & Mohamed, 2022, p.6).

Conclusion

The supervisor's responsibility should be to advise and guide the student while also ensuring that they stay on track. The supervisor is not responsible for conducting research on the student's behalf (Brenman, 2019, p. 367). Supervisors should insist on the gifted student's work being well-structured; that is, a thorough complete direction of the dissertation/thesis, including its timetable and the frequency and format of supervision sessions, should be determined during the initial stage of the supervisory relationship. The imposition of such a framework should be designed to give the supervisor control over the supervising process and to give the student drive (Hockey, 1996, p.484). Between sessions, e-mail can be used to continue a supervisor–supervisee interaction. It can also be employed in a more systematic way by requiring the supervisee to produce information or weekly thoughts, for example. E-mail can improve supervisees' feelings of safety by reducing their perceived exposure and increasing supervisor availability in the case of a critical event. Supervisors, on the other hand, should take caution in their language because what is written has the quality of being embossed on a dialogical surface and is more permanent than spoken interactions (Álvarez & Grazioso, 2019, p. 284). Supervisors may have obstacles in delivering distance monitoring due to technological limitations as well as culture issues. For example, the technology could raise legal and ethical concerns about data security.

Supervisors established an environment in which a student recognized the need for growth through challenge or stimulation, by challenging the learner's existing knowledge and views, or by presenting them with other viewpoints (Macfadyen et al. 2019, pp. 992). Part-time, off-campus students may be able to email, participate in discussions with supervisors, search library catalogues and databases, and retrieve papers if computer communication capabilities are developed. Such computer-based approaches have the potential to build a "virtual" community of gifted students in which the boundaries between supervisor and students are blurred. Both the supervisor and the studentcan be more independent in terms of their physical and temporal spaces with supervision facilitated by email communication (Evans, 1995, p. 24). Similarly, Brennan (2019, p.365) supports the idea that gifted student's supervision, must be based on teachers' past experiences. In the academic field, critical thinking is essential, for example, critically reviewing earlier research to problematize something taken for granted or to identify a gap; critically reading others' work as part of the journal-review process and providing constructive comments. Assist students in developing a critical mindset Students may find learning and development to be intimidating, and supervisors recognized their role in providing a safe environment in which growth may occur by providing support and confidence. This entailed a supervisor appreciating a student's current skills and achievements, recognizing their growth, and assuring them of the long-term benefits and likely success of their studies, at a time when they are faced with the challenge of devoting the time and energy required during their often-hectic lives. The supervisor should encourage talented students to take ownership of their work project, meet academic standards, follow ethical approval procedures, and stick to institutional obligations including timely progress reports and submission deadlines (Macfadyen et al. 2019, pp. 992-994).

Recommendations

To wrap up the study, it should be highlighted that supervising gifted students should be a developmental, empowering, and transformative experience for them in their learning activities. Supervisors must be able to manage postgraduate students' emotions, relationships, and behaviors. There is a need for more research into the tactics that can be employed to oversee non-gifted and impaired students.

In order to determine the schedule and time-frame on behalf of the gifted student, the supervisor should act as a director by supplying information. Assist the student in gaining access to distance supervision resources and knowledge by acting as a facilitator. Assist the student in resolving technical issues that arise during the supervision process. Assist students with research methodologies by acting as a teacher. Provide direction by establishing a writing schedule, providing comments on progress, and defining the important path for data collecting. Be a skeptic of the research design, draft chapters, and data interpretation. Allowing the student to make decisions and supporting those decisions allows you to be a freedom giver. Encourage the student and show interest in his or her work and ideas by being a supporter. Be a friend and show interest in and concern for the student's non-academic life. Check on the student's progress on a regular basis, monitor the study, provide systematic comments, and make plans. In general, the supervisor should act as an internal examiner for the student's work by providing regular and constructive feedback to the student who is being supervised remotely (Filippou, Kallo, & Mikkilä-Erdmann, 2019, p. 2). Identifying and

assessing gifted students is the responsibility of lecturers. These students should be held responsible for their own progress and learning.

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Research Article

Competition Skills and Challenge Level Scale (CCS) in gifted and talented education: development, validity and reliability

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Abstract

Competitiveness is an important factor for giving gifted students a chance to test their abilities and motivates them to bring out the best in their selves. I can say that measuring and assessing competition skills and challenging levels of their potential is very important in gifted and talented education. Therefore, the purpose of this study is to introduce competition skills and challenge level scale (CCS) which is developed for Gifted and Talented secondary school grade students. A draft structure consisting of 31 items was created in the light of expert opinions of the measurement tool to be developed. Explanatory factor analysis was applied for the construct validity of the scale. As a result of the explanatory factor analysis, it was determined that the factor load weights of 3 items were overlapping and low, and it was decided to exclude items 11, 21 and 29 from the scale. As a result of the varimax analysis, it was determined that the scale consisted of two factors. These factors were named as "Perception of Competition" and "Level of Difficulty", respectively. These two factors explain 62.06% of the variance in all scale scores. The internal consistency reliability of the entire scale was calculated as 0.95. In the light of all the analysis results, it can be said that this scale, which aims to evaluate the perceptions of gifted students' level of competition and striving, has reliable results in terms of validity and reliability tests. As such, the scale can be used to evaluate competitive environments in gifted individuals. Thus, measures can be taken to ensure that gifted students do not fail due to the educational atmosphere below their potential.

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Introduction

Competition plays an important role in the lives of gifted students. Some research suggests that schools encourage competition simply by the nature of assigning grades and that students learn very early about the winners and losers (Rizza and Reis, 2001). Gifted children may engage in competition in order to exercise their abilities and gauge, even for themselves, whether they have lived up to their own expectations. Second, it is probable that gifted children have experienced a relatively high degree of academic success in their past and might feel very differently about competition than students with a less successful school history. This relatively positive experience with competitive outcomes (i.e., winning) might lead gifted children to view competitions favorably and may lead them to seek out competitive challenges more than nongifted students (Udvari and Schneider, 2000). Riley (2011:64) indicate that competition can add an important element to gifted children's experiences: Students gain in a multitude of dimensions by participating in contests and competitions. When teams are involved cooperative learning can be strengthened. Although competitiveness is frequently packaged in positive perceptions, some research indicates negative effects of competitiveness. It can be harmful for personality when we can not balance challenge level of group. For example,

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Ryckman, Thornton and Butler (1994) have discovered that hypercompetitive individuals were highly narcissistic and held an exaggerated conception of their own worth, a closer look at their opinions revealed paradoxically low levels of self-esteem in these individuals.

One of the most important goals of the gifted education discipline is to realize their potential and transform these potential to a lifespan success. Research about the issue indicates that: often gifted individuals fail to show the expected permanent success and especially in higher education level and across their lifespan. We constantly hear the complaints of individuals who are seen as gifted because of their laziness and lack of will. Also underachievement after identified as gifted causes low self-esteem, low well-being and unhappiness for gifted individuals (Siegle and Schuler, 2000, Udvari and Schneider, 2010).

It is observed that the parents do not understand that their children who have a high grade point average fall in grades over time and fail to achieve the expected success. Failing the university entrance exams or leaving the school life of a student who started his education life with brilliant success causes great disappointment for both the individual and his environment. This situation can be caused by many individual and environmental factors. Unsuccessful gifted people are a very heterogeneous group, and they may fail due to different external factors and individual characteristics (Reis and McCoach, 2000). However, one of the most important factors causing this situation is; the individual's inability to gain a self-discipline and competitive ability that will force him to transform his potential into success and face the challenges of life (Feldhusen, 2005). Every individual has to have the motivation and the will to work in order to face the difficulties of life and be successful. On the other hand, working discipline should be gained to individuals during their education life, especially in primary and secondary education (Rimm, 2002).

In this context, one of the most important reasons why gifted education is a sub-discipline of special education is that these individuals cannot receive an education at a level that challenges their abilities in the normal education environment. A training program that imposes the same curriculum on every level of intelligence and ability does not need to strive for success because the gifted individuals remain below their level, and this may cause them to lose interest in school and education over time, or to lack the skills of work discipline. At this point, it would be useful to clarify that equal educational opportunities are not the same educational opportunities, because gifted students have different characteristics in terms of education and learning, and they need a differentiated curriculum (Chan, 2000).

Unfortunately, gifted children often lose their motivation due to their needs that are generally not met in schools. As a result, such children may become problematic children in traditional schools and regular classrooms, as they ask a lot of questions, question rules, methods, and finish their studies before anyone else (Yılmaz and Tortop, 2018).

The negative effects of gifted students not having a competitive environment and a compelling education level at primary school level are not visible in the short term and therefore are ignored (Ford, 2003). It is common for parents to justify their gifted children not to challenge as: they reach the goals of lessons at the classroom; so they do not feel necessary to study more. However, standardized educational goals that are very easy to achieve for gifted students cannot predict a real success, even if they are realized. It can be said that: if students' educational competition enviroment below their intelligence and ability potential, they can easily have high academic scores. But these high academic scores can be the biggest obstacle on their talent development. Especially at primary and secondary grades, which are the most critical period for students to earn a working discipline, it may result to a lifelong failure.

In this context we can say that; it will be a critical intervention for gifted individuals to compete and challenge them with their own ability level peers and educate them with an enriched curriculum, to enforce them to high motivation for lifespan success. Otherwise, when these students can't reach competitive educational environment which requires higher performance of study effort and discipline, they are under risk to fail about overcoming the difficulties they faced in their adult life.

Therefore existing various scale that will determine the competition perception at economics and marketing, there are very limited study in educational sciences. Especially for regular classroom environments not existing yet any scale to measure competition and challenge level of gifted students. Due to that necessary it is aimed to contribute an important requirement about gifted education.

The Relationship between Competition, Success and Motivation in Gifted Education

In the literature, the failure of gifted individuals is defined as underachievement. It has been found that approximately 37% to 50% of gifted students show unexpected failures permanently or periodically (Peterson and Colangelo, 1995; Renzulli and Park, 2002). In fact, it can be said that gifted students show unexpected failures more often than normal students (Sak, 2012). The unexpected failure of the gifted briefly; It can be defined as an individual's performance in contradiction with the results of the applied ability and intelligence scales (Baum, Renzulli and Hébert 1995).

According to literature it can be said that one of the most important factor underlying unexpected achievement is low motivation (Yılmaz and Tortop, 2018). For this reason; the triple ring theory (Renzulli, 1986) and successful intelligence theory (Sternberg, 1997) provided. These are among the most important theories defining giftedness which are assuming motivational ability as one of the components of giftedness. Renzulli (1986) sees motivation as an intelligence factor and does not consider individuals whose motivational ability is lower than 85% of their peers as gifted.

Motivation is the power behind the individual's actions, called motive in the language of psychology. It is defined as the forces within the organism and the environment that provide energy to behavior. Motivation is classifying to two parts as: internal and external (Kazdin, 2000).

Most successful gifted students are highly motivated students. According to Siegle (2000), motivation stems from three important factors. These factors are; value, self-efficacy and environmental perceptions. In this context, the school environment; it is an environmental factor that directly affects the student's motivation. We can say that one of the most important factors of extrinsic motivation is that there is a highly competitive and compelling classroom education environment and the student struggles to develop his / her potential.

In this context, the student; It is important to determine the achievement standard that is ideal for him and suitable for his / her potential and that the student gains awareness about it (Feldhusen, 2005). This standard of achievement should be adjusted very well according to the level of the student. A target level that is very difficult to reach has the possibility of decreasing the work appetite and triggering hopelessness (Sak, 2012, p. 344). A target level that is very easy to reach will distract the student from realizing his potential, as stated before. It is very important for individual development that the determined success standard is feasible and worth the effort, and the potential of each student must be correctly identified in order to achieve this setting.

For this reason, determining students' perceptions of the competitive environment and their level of difficulties will give us information about the relationship between the current educational environment and their ability levels. In this way, educational programs can be evaluated and developed in terms of content level according to the competition and strain requirements of the students. Therefore, the Competition Skills and Challenge Level Scale (CCS) is a tool intended to be functional in evaluating gifted students' in-class competition and challenge levels.

Purpose

In this study, it is aimed to carry out the validity and reliability study of the Competition Skills and Challenge Level Scale (CCS), which was developed for gifted students.

Method

Research Model

This research was designed as a survey study. Due to survey the validity and reliability calculations of the Competition Skills and Challenge Level Scale (CCS) were made in this study. In the first stage of the study, the literature review was made on the concept of competition and the concept of competition in the education of gifted students. Scale items were created by the researcher within the framework of scientific theories and research in this context. Then 41-item scale trial form was obtained by taking expert opinions. The trial form was applied to the research participants in order to make validity and reliability studies.

Participants

The criterion sampling method, one of the purposeful sampling methods, was used to determine the study group of the study. Criterion sampling can be formed from people, events, objects or situations with certain qualities. In the study, in the selection of the study group where the application will be carried out, the diagnosis of students as gifted was taken as a criterion.

A total of 375 students, 125 boys and 250 girls, studying at primary school level in Konya and Ankara provinces participated in the study. According to Comrey and Lee (1992), the measures of adequacy of a sample on which factor analysis will be made are roughly; "Very bad = 50", "bad = 100", "medium = 200", "good = 300", "very good = 500", "excellent = 1000 and more". Accordingly, since the sample size in this study is 330, it has a rating between "good / very good" in order to perform factor analysis on it. The approval of each participant was received. The demographic distribution of the students in the study group is shown below.

Table 1

The Distribution of the Students in the Study Group by Some Characteristics

Samples		f	%
Gender	Female	250	66,7
	Male	125	33,3
Grade level	3. grade	180	48
	4. grade	195	52
Total		375	100

Scale Development Process

The work and operations performed during the scale development process can be summarized as follows:

Establishing an Item Pool: Firstly, studies conducted in the literature especially about competition and gifted students reviewed to create an item pool for the scale (Renzulli, 1999; Peterson and Colangelo, 1995; Reis and Mccoach, 2000; Siegle and Schuler, 2000; Renzulli and Park, 2002; Udvari and Schneider, 2010; Sak, 2012; Leana-Taşcılar, Kanlı, 2014; Rizzoli and Reis, 2014; Yılmaz and Tortop, 2018) were examined. Secondly, a group of students (15 people) working in pre-school education institutions were interviewed and their opinions were taken about what kind of educational practices they do within the framework of responsibility education for children. By combining the information obtained from both sources, a list of 48 items was created regarding the educational practices of students in preschool education institutions. Against the items in the list, to get the teacher evaluation regarding the frequency of the stated educational application (1) "Never", (2) "Rarely", (3) "Sometimes", (4) "Most of the time", (5) "Always" options are placed.

Expert Validity: The 48-item pool created was first examined by three pedagogists in terms of purpose and scope, and 12 items that were thought not to be directly related to the issue of competition and challenge in gifted education were removed from the list. The remaining 36-item list was then examined by two linguistics experts in terms of expression, spelling and spelling rules. Necessary corrections were made in line with the recommendations. Thus, the draft scale, which includes the directive with 36 items and named "Competition Skills and Challenge Level Scale (CCS)" due to its content, has been made ready for implementation.

Data Collection: The duplicated draft scale form was collected by the researcher after being applied to the students in the previously determined study group with the necessary permissions from the Provincial Directorate of National Education.

Analyzing the Data: The trial form of the measurement tool, which is arranged according to expert opinions and pre-application results, determines the construct validity of the scale. Therefore it was applied to the sample group to determine its sub-dimensions (explanatory factor analysis) and to determine the level of reliability (Zeller, 1988). The reliability of the scale was calculated by two methods, namely Cronbach Alpha Coefficient and Test-Retest Method (Tavşancıl, 2002). The data collected at the end of the application was analyzed with the SPSS 23 package program. In the analysis; Descriptive and procedural statistical techniques that should be done in scale development studies were used. Within the scope of descriptive analysis; arithmetic mean, standard deviation and percentage values for each question were examined. With the procedural analysis, the reliability level of the measuring tool, factor analysis to determine the sub-dimensions, correlation analysis to determine the relationship between the factors was included.

Findings

The findings obtained as a result of the validity and reliability analysis of the scale are summarized below:

Validity Results

Kaiser-Mayer-Olkin (KMO) and Bartlett's Test of Sphericity (BTS) tests were used to measure the adequacy of the sample used in the study. In KMO statistics; "Between 0.50 and 0.70 = moderate", "Between 0.71 and 0.80 = good", "between 0.81 and 0.90 = very good" and "0.91 and above = excellent" It is called (Field, 2002). The KMO test result of this developed measurement tool was determined to be 0.95. This value corresponds to the "excellent" classification. Thus, it can be said that the factor analysis made on these data gives quite reliable results. The BTS test is highly significant (99% confidence interval) for the data obtained in this study (B = 969.45; $p < 0.01$). From here, it can be said that these data are suitable for factor analysis.

Results of the Non-Rotated Principal Components Analysis

After determining the appropriateness of the data obtained from the sample, the non-rotated principal component

analysis was applied to determine the factor structure of the scale. The results of the applied non-rotated principal components analysis showed that the measuring tool can be built on 2 factors. When the total explained variance and common variance tables were examined, it was determined that the measuring tool was collected under two factors with an eigenvalue greater than 2.00. Common variance is the sum of squares of factor load values in a variable (Büyüköztürk, 2002, 2005).

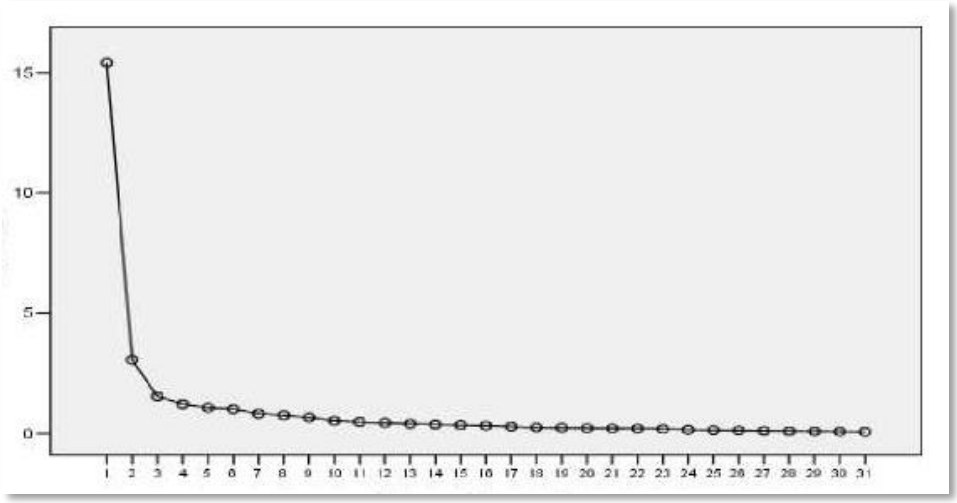

Figure 1

Scree Plot of Competition Perception and Strain Level Scale

The Scree Plot Graph was examined in the analysis of the items of the measurement tool because of the very few items loaded on some factors. As seen in Figure 1, the first sudden change in the Scree Plot curve occurred in the second factor. According to this curve, it was decided that the scale could probably consist of 2 factors (Field, 2002).As in this study, the Scree Plot curve can give very reliable results, especially in studies with more than 200 samples. However, although the Scree Plot curve is very useful, it is not always correct to base factor selections on this criterion alone (Field, 2002). For this, in order to make the factor selection, principal component analysis rotated with Maximum Likelihood and Kaiser Normalization and Varimax methods was performed.

Results of the Rotated Principal Components Analysis

Principal component analysis; It deals with how a private variable contributes to the component and the creation of existing components within the data (Field, 2002). In varimax rotation, items with a factor load of 0.30 are generally considered as the sub-cut of factor loads (Comrey and Lee, 1992). In this study, items with a factor load of 0.40 were processed as the sub-cut of factor loads in varimax rotation, and items with a factor load of less than 0.40 were ignored. It was determined that the common variances of the two factors defined regarding the items ranged from 10.74 to 51.32. According to these findings, it was determined that the two factors emerging at the end of the analysis together explained about 62% of the total variance in the items and the variance related to the scale. This value is at an acceptable level since it is above 40% according to Kline (Cited in: Ceyhan and Namlu, 2000). According to the rotated components matrix table data, it was determined that some items in the scale loaded on more than one factor or their factor loadings were low. These items were removed from the measurement tool in order to limit the number of factors and increase the reliability level. At the end of these regulations, the total number of items was determined as 28. Depending on these processes, it is accepted that the scale consists of two sub-factors.

Table 2

Latest Factor Loads of the Items in the Competition Skills and Challenge Level Scale According to the Rotated Principal Component Analysis Method

No	Items	Factor Loads			
1	I like competition in school because it gives me a chance to test my skills.	.736			
2	I think competition environment in my classroom is perfect	.731			
3	I have very tough competitors in my class as talented and successful as I do.	.713			
4	I always want to get a hundred points in exams because I try to learn all the information in the course.	.664			
5	I always want to get a hundred points in exams because I try to be the best in the class.	.654			
6	I think that my current school achievement is at the highest level of my talent potential.	.635			
7	I don't care about my class success. It doesn't matter to me what rank I am in the class.	.613			
8	Winning a competition makes me feel like a strong person.	.594			
9	I consider my potential rivals my enemy for first place.	.587			
10	I do not think there is anyone in the school to be my rival.	.571			
11	If I can not find a competitor to compete, I will race myself.	.554			
12	Being successful in the competition makes me think that I am superior to others.	.533			
13	I am jealous of my school competitors when they receive an award or success	.530			
14	Even in a friendly gaming environment, I take competition seriously and become ambitious.	.457			
15	The world is a world of war and struggle. I always have to be the best to be successful.		.756		
16	I strive for the failure of my competitors to win in the competition for success.		.721		
17	In the competition I am focusing only on my own success.		.713		
18	When I lose in competition, I get sick.		.623		
19	Losing in competition only hurts me a little.		.511		
20	I find it useless to compete with my friends for success.		.491		
21	When the competition heats up, I immediately accept to lose and withdraw from the race.			.845	
22	I believe I can be both fiercely competitive and a good friend at school.			.801	
23	I admire and respect competitive and challenging people.			.752	
24	Failing to reach an achievement goal I set makes me even more ambitious.			.617	
25	When I fail to reach a goal of success I have set, I fall into despair and leave everything.				.663
26	I find the competitive environment sweet and fun				.635
27	I wish I could be a competitive person but I don't have the strength				.591
28	It is not suitable for me to be hardworking and pushing yourself to compete.				.543

The factor loads obtained at the end of the Varimax rotation are roughly; "Between 0.32-0.44 = bad", "Between 0.45-0.54 = normal, between 0.55-0.62 = good", "Between 0.63-0.70 = very good" and "0.70 and above = excellent" (Comrey and Lee, 1992). According to Table 2, the factor loadings obtained at the end of the varimax rotation were found to be between "0.70 and above = excellent" for 20 items, between 0.63-0.70 = very good for 3 items, and It was determined that "between 0.55-0.62 = good" and "between 0.45-0.54 = normal" within 3 items.

Naming the Factors

The items in Factor 1 (1,2,3,4,5,6,7,8,9,10,12,13,14,16,17,29) are used to evaluate students' perceptions of class-wide competition environment and competitive skills. Therefore the first factor, which includes these 16 items, was named *"Competition Perceptions"*. The items in Factor 2 (18,19,20,22,23,24,25,26,27,28,30,31) is directly related to the level of challenge in classroom. Research about competition indicates that: there is strong correlation between challenge level of individuals and their competitive attitudes (Ryckman, Hammer, Kaczor, and Gold, 1990). In this context, the second factor is named *"Challenge Level Perceptions"*.

Table 3

Variance Results Regarding the Sub-Dimensions of the Competition Skills and Challenge Level Scale (CCS)

Factors	Item Numbers	Variance Ratio
1- Competition Skills	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 12, 13, 14, 15,	51,32
2- Challenge Level	23, 24, 25, 26, 28, 30, 31	10,74
Total	**28**	**62,08**

When Table 3 is examined, it is seen that the two sub-factors that make up the Competition Skills and Challenge Level Scale explain 62.08% of the variance in all scales scores. Factor 1, which constitutes the *"Competition Perceptions"* has the highest number of items and the highest variance value among these two factors, explains 51.32% of the total variance. Factor 2, which constitutes the *"Challenge Level Perceptions"* dimension of the scale, consists of 7 items. The 10.74% variance explained by this factor corresponds to approximately 17% of the total variance value.

Item Discrimination of CCS: The coefficient values (r value) determined as the correlation coefficient within the framework of the Classical Test Theory (CTT) are considered as the discrimination value and can take values between -1 and 1. If the r values are low or higher than .05 significance level, it should be removed from the scale with the assessment that it is not distinctive (DeVellis, 2003; Pallant, 2007). The item-total correlation values calculated for CCS are shown in Table 4:

Table 4

Adjusted Item Total Correlation Values for CCS Items

H-TU Factor		BU Factor		SVU Factor		GbU Factor	
Md.	**r**	**Md.**	**r**	**Md.**	**r**	**Md.**	**r**
1	.620*	**15**	.378*	**21**	.236*	**25**	.614*
2	.490*	**16**	.396*	**22**	.191*	**26**	.618*
3	.496*	**17**	.455*	**23**	.195*	**27**	.351*
4	.520*	**18**	.471*	**24**	.373*	**28**	.501*
5	.507*	**19**	.542*				
6	.471*	**20**	.497*				
7	.525*						
8	.484*						
9	.447*						
10	.424*						
11	.536*						
12	.439*						
13	.543*						
14	.349*						

*: p<,001; N: 193

In Table 3, the item-total correlation values of the items according to the factors in the CCS were between .349 and .620 for the H-TU factor; .378 to .497 for BU factor, .191 to .373 for SVU factor; For the GbU factor, it is seen that the value is between .351 and .618. Each of these correlation values shows that the relationship is significant and positive (p<,001). Accordingly, it can be said that the items in the CCS serve the general purpose of the scale (Pallant, 2007). According to the results of the construct validity and discrimination analyzes based on the data collected with the CCS, it can be said that it is appropriate to qualify the scale as a valid scale.

Descriptive Statistics Results for Factors

In Table 5, the arithmetic mean and variance values of the items collected under two factors are given:

Table 5

Descriptive Statistics Results of the Sub-Factors of the Perception of CCS

	N	$\bar{X}$	Variance
Factor 1	375	3,56	0,77
Factor 2		4,07	0,73

When Table 5 is examined, it has been observed that the mean score of the items in Factor 1, which measures the competition perceptions of gifted students, is lower than the mean of the items in Factor 2, which measures the level

of strain. Based on these findings; it can be said that the perception levels of the gifted students towards the competitive environment and competition abilities of the classroom are more positive than their perceptions of the challenge levels in the competition.

In Table 6, the number of items loaded on two sub-factors and the Cronbach Alpha reliability coefficients of these factors is given.

Table 6

Descriptive Statistics Results on the Sub-Dimensions of the CCS

Factors	Number of Items	InternalConsistency Coefficient (a)
Factor 1	21	0,96
Factor 2	7	0,72
Total	28	0,94

As a result of the reliability studies, it was determined that the Cronbach Alpha internal consistency coefficient of the whole scale was 0.94. In addition, the internal consistency coefficients for each sub-dimension of the measurement tool were also examined. At the end of these analyzes the Cronbach Alpha reliability coefficients of the sub-factors were; It was calculated as 0.96 for Factor1 and 0.72 for Factor 2.

According to these results, it can be said that the reliability level of the data obtained from the scale is quite sufficient (Ozdamar, 2004). In accordance with the test-retest method, the scale was reapplied to 265 of the 375 students in the sample 3 weeks later, and the Cronbach Alpha internal consistency coefficient was found to be 0.94. This data is important in terms of showing the consistency of the scale over time.

Conclusion

In this study, it is aimed to develop a " Competition Skills and Challenge Level Scale" to be used in the education of gifted children in order to determine how competitive they are in the classroom and to what extent the classroom atmosphere forces them to develop their potential. The scale draft prepared for this purpose was applied to 375 gifted students. While developing the scale, the literature on the subject was reviewed as much as possible and seen that existing very limited studies on competition among gifted individuals (Peterson and Colangelo, 1995; Reis and Mccoach, 2000; Siegle and Schuler, 2000; Renzulli and Park, 2002; Udvari and Schneider, 2010; Sak, 2012; Leana-Taşcılar, Kanlı, 2014; Rizzoli and Reis, 2014; Yılmaz and Tortop, 2018).

A draft structure consisting of 31 items was created in the light of expert opinions of the measurement tool to be developed. Explanatory factor analysis was applied for the construct validity of the scale. As a result of the explanatory factor analysis, it was determined that the factor load weights of 3 items were overlapping and low, and it was decided to exclude items 11, 21 and 29 from the scale. As a result of the varimax analysis, it was determined that the scale consisted of two factors. As indicated in Table 2, these factors were named as “perception of competition” and “level of difficulty”, respectively. These two factors explain 62.06% of the variance in all scale scores. The internal consistency reliability (Cronbach Alpha) of the entire scale was calculated as 0.95.

In the light of all the analysis results, it can be said that this scale, which aims to evaluate the perceptions of gifted students' level of competition and striving, has reliable results in terms of validity and reliability tests. As such, the scale can be used to evaluate competitive environments in gifted individuals. Thus, measures can be taken to ensure that gifted students do not fail due to the educational atmosphere below their potential.

Competition plays an important role in the lives of gifted adolescents. Some research suggests that schools encourage competition simply by the nature of assigning grades and that students learn very early about the winners and losers (Rizza and Reis, 2001). For gifted and talented students, one of the most important aim for educators and researchers is handling underachievement situations of these students. Competitiveness is an important factor for giving them a chance to test their abilities and motivates them to bring out the best in their selves. Also, for a lifespan success, education must challenge students’ potentials strongly because; herewith they will be acquired study discipline. If they educate with a low-level curriculum than their potential and not existing competition environment in the classroom, this can because of their lifespan failure. So as; we can say that measuring and assessing competition skills and challenging levels of their potential is very important in gifted and talented education.

At the study, an evidence-based scale was provided by researchers to evaluate competition skills and challenging levels of gifted and talented students. Results indicate that CCS is a valid and reliable scale for measuring competition and challenging perceptions of gifted students.

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Appendix 1

Competition Skills and Challenge Level Scale

Competition Skills and Challenge Level Scale

1	2	3	4	5
Never	Rarely	Sometimes	Most of the time	Always

No	Items	1	2	3	4	5
1	I like competition in school because it gives me a chance to test my skills.					
2	I think competition environment in my classroom is perfect					
3	I have very tough competitors in my class as talented and successful as I do.					
4	I always want to get a hundred points in exams because I try to learn all the information in the course.					
5	I always want to get a hundred points in exams because I try to be the best in the class.					
6	I think that my current school achievement is at the highest level of my talent potential.					
7	I don't care about my class success. It doesn't matter to me what rank I am in the class.					
8	Winning a competition makes me feel like a strong person.					
9	I consider my potential rivals my enemy for first place.					
10	I do not think there is anyone in the school to be my rival.					
11	If I can not find a competitor to compete, I will race myself.					
12	Being successful in the competition makes me think that I am superior to others.					
13	I am jealous of my school competitors when they receive an award or success					
14	Even in a friendly gaming environment, I take competition seriously and become ambitious.					
15	The world is a world of war and struggle. I always have to be the best to be successful.					
16	I strive for the failure of my competitors to win in the competition for success.					
17	In the competition I am focusing only on my own success.					
18	When I lose in competition, I get sick.					
19	Losing in competition only hurts me a little.					
20	I find it useless to compete with my friends for success.					
21	When the competition heats up, I immediately accept to lose and withdraw from the race.					
22	I believe I can be both fiercely competitive and a good friend at school.					
23	I admire and respect competitive and challenging people.					
24	Failing to reach an achievement goal I set makes me even more ambitious.					
25	When I fail to reach a goal of success I have set, I fall into despair and leave everything.					
26	I find the competitive environment sweet and fun					
27	I wish I could be a competitive person but I don't have the strength					
28	It is not suitable for me to be hardworking and pushing yourself to compete.					

Thanks

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Research Article

Assessment of online learning-based module "caring of the gifted child" as perceived by female students at King Khaled University[1]

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Abstract

This study seeks to identify the assessment degree of online-based module of "Caring for the Gifted Child" as perceived by female students at King Khaled University. Participants were (250) female students attending Preschool Child Education Department/Faculty of Education. The sample (n=250) was selected using the simple randomization method. The analytical descriptive statistics approach was used, and data collection was conducted by a questionnaire developed by the researcher. Results indicated that: The online-based module of "Caring for the Gifted Child" was assessed at a high degree by the female students.There were no statistically significant differences at (α≤.05) level attributed to effect of academic achievement on all domains and the overall degree excluding domains of the "teaching process" and "instruction strategies planning", where differences were favoring high-achievers. No statistically significant differences were found at (α≤.05) level attributed to effect of the year of study on all domains and the overall degree.

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Introduction

For decades ago, the university education has been attracting much of the interest of researchers and educators. Obviously, an enriched instruction process has been considered a key factor in accomplishing higher levels of development and progress. The outcomes of this process that runs in line with the recent breakthroughs in IT and Communication technologies will help learners acquire skills and cognitions they need for achievement and creativity.

To keep improving the academic modules, they need to be assessed regularly, particularly in light of the pervasive dependence on the online and hybrid education systems. The assessment of academic modules should comply with the quality criteria and academic accreditation standards.

In this context, the higher education institutions (HEI's) play a significant role in the university education worldwide. They exercise a driving force for the educational development process that builds up students' knowledge, professional, cultural, and social aspects through focusing on the autonomous learning and supporting the creative and critical thinking skills (Scott et al. 2017; Lesjak, 2018).

To maintain a competitive edge, higher education institutions HEI's have to pay greater attention to quality of the educational services they offer. The graduates with employable skills they acquired will reflect good reputation of the institution and will own fine skills they need as future teachers (Alkan, 2017; Akleh et al. 2020).

Al-Shadhly (2017) argued that development of education is the backbone for a community's sustainable development and bringing about change. By developing the educational system elements including instruction

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strategies and methods teachers will be able to direct the teaching-learning process, creative positive learners, and renovate the value of learning through discussion and participation.

Generally, assessment process has been the focal point of interest for higher education institutions considering it as the cornerstone of the educational process. That is so because the outcomes of the assessment process will reveal the strengths and weaknesses in the different academic programs and their component elements including the curriculum, resources, instructors, and learners. In fact, a diversified instruction that employs various teaching strategies plays a significant role in developing a balanced character in students from the psychosomatic, social and mental aspects (al-Holly & al-Rashede 2016).

Abdelmalik (2019) discussed that coursework would include not only a set of practical and theoretical lectures but also form a roadmap for building up learners' identity. On the other hand, students' satisfaction regarding such curricula would be necessary as it reflects certain positive outcomes that require reinforcement or passive outcomes that require improvement. Al-Tal (2011) argued that curriculum planning entails focusing on student needs, interests, capabilities, and talents so as to build their characters. Regular assessment of the curriculum in light of certain criteria in terms of goals, content and prerequisites, relevancy, professional and practical value, raising questions and thinking, teaching methods, and modalities of assessment. The assessment process aims at replacing some instructional elements in a module when student expectations indicate little or no satisfaction.

In addition, studies report that student ratings form a significant source of data that can be used to improve student performance on coursework and to evaluate both student achievement and teacher's performance (Guo, Xu, 2020).

In the context of education quality, assessment is paramount in the teaching-learning process as the outcomes of the assessment process reflect the interaction taking place inside the classroom and during exercising the various teaching activities (Bedregal-Alpaca et al. 2019). In addition, assessment of the teaching is an effective tool to measure learning quality and improve the instruction. With the assessment of instruction, school district administrators can learn about the teaching delivered by teachers and measure the instruction they use. Similarly, assessment assists teachers to identify their strengths and weaknesses, so that they can take corrective action on time to facilitate instruction (Gao and Junli, 2019); and also, to take notes about their strengths and weaknesses, make necessary changes in the teaching methods they use, and assess training courses, if necessary (Siddique & Butt, 2019). In online learning, prompt comments and ratings by students help teachers improve their instructional practices during the term (Byrne & Donlan, 2020).

Say (2018) argued that delivering proficient teaching entails that teacher preparation programs provide them with the cognition and skills in their fields and to apply effective teaching practices in the classroom. The teaching-learning process is highly intricate and mostly individualized with many variables involved (Canedo et al. 2018). So, the teaching processes applied with students need to be revisited through developing in teachers the research skills (Woolf, 2014).

In addition, teachers need to acquire some important qualities like consciousness, the ability to enrich the learning environment, classroom management skills, diversified instructional methods that provide individualized learning, assessment skills to evaluate the teaching and the courses (Alter & Coggshall, 2015).

Dogan (2020) found that university students disparately rated the awareness and knowledge regarding the academic courses due to unequal opportunities they had during previous learning experiences. However, this gap can be filled up by developing their teaching skills.

The literature reviewed supported that students' assessment of the academic programs forms an important source of data for developing the teaching process and improving education quality (Archibon & Nja, 2011; Assaf, 2016). In addition, assessment of coursework enhances learning and sharpens skills (Sansone et al. 2020), develops integrated learning skills (Jogan, 2019), and enhances online learning skills among learners (Al-Shehri, 2016). Studies also indicated that assessment of modules and teacher preparation programs by student teachers improves their pre-service teaching skills basically at the faculties of education (Bulunuz, 2015).

In general, the literature reviewed imply that unidirectional teaching is a prescribe of fail for students in different courses. The assessment of the educational system and its academic programs is paramount because learners are the final outcome who will give momentum to the comprehensive development process in the community.

Similarly, there is a need to develop the content and teaching methods of gifted child education courses in response to academic advancements in the field and related research results. Assessment of the academic programs is very important. For the higher education institutions HEIs, assessment of the academic programs ensures quality of the programs offered and maintains compliance with the accreditation criteria. For learners, assessment of the academic programs helps identify strengths and weaknesses of the programs offered, improve quality of the education outcomes, and selection of the teaching methods most appropriate to learners and to use the feedback to assess the

quality of such courses delivered by the faculty, which will assist identify if there is a need to make changes, measure their contribution to learner's knowledge, and improving the targeted outcomes of the teaching process in light of the established criteria of the academic practices and education quality

Problem of Study

Therefore, this topic has attracted much of research interest. The current study aims at exploring female student's ratings of online Learning-based Module for "Caring of the Gifted Child" Child" as Perceived by Female Students studying the module at King Khaled University, through answering the following two questions:

- What is the assessment degree of the "Caring of the Gifted Child" module based on online learning as perceived by female students at King Khaled University?
- Are there differences in the assessment degree of the "Caring of the Gifted Child" module based on online learning as perceived by female students at King Khaled University by such variables as academic achievement and year of study?

Method

Research Model

The current study adopts the analytical descriptive methodology.

Study Group

The randomly selected sample consisted of female student teachers (n=250) attending the Faculty of Education, Department of Preschool Children Education, King Khaled University.

Data Collection Tools

The current study employed a 32-item questionnaire developed by the researchers as data collection tool and covered four domains measuring the assessment of module "caring of the gifted child": teaching process, learner's roles, instruction strategies planning, rating, and instruction content. The instrument was designed based on 5-item Likert scale [Strongly Agree, Agree, Neutral, Disagree, Strongly Disagree).

Validation

First: Content Validity:

The content validity was secured by sending the instrument to a group of expert specialists in curricula and teaching methods, measurement and assessment, psychology and giftedness, and creativity to elicit their opinions. The scale items were accepted by all judges.

Second: Construct Validity

To compute construct validity coefficients of the instrument, correlation coefficients of the scale items with the overall degree were drawn out for a pilot study sample consisting of (30) female students. The scale items were tabulated, and the correlation coefficient for each item was computed. The correlations of the items with the overall instrument ranged between (.21-.56) and with individual domains (.38-.87). Noteworthy, all correlations were acceptable and statistically significant at (α=.05 and α=.01).

Reliability

The reliability coefficient was computed using Cronbach alpha, where the coefficients for the subscales ranged between (.76-.87), and the reliability coefficient for the overall scale was (.89). However, the reliability coefficients on the retest ranged between (.85-.88) and for the overall scale (.92).

Statistical Criterion:

The likert 5-item scale was applied as a statistical criterion, where each item was assigned one degree (Strongly Agree=1, Agree=2, Neutral=3, Disagree=4, Strongly Disagree=5). Data analysis was conducted with the following scale where the ranges from (1.0-2.33), (2.34-3.67), and (3.68-5.00) represent low, moderate, and high degree respectively.

Data Analysis

Means, standard deviations, and t-tests were employed to find out study results and explanations.

Results

Assessment of the "Caring of the Gifted Child" Online Module

To answer this question, means and standard deviations were computed for student ratings of the (Caring of the Gifted Child) module. The table below shows the results.

Table 1

Means and Standard Deviations of Student Ratings of the Module "Caring for the Gifted Child" in Descending Order by Means

Rank	No.	Domain	M	SD	Level
1	1	Teaching process	4.36	.866	High
2	4	Instructional Content	4.14	.368	High
3	2	Teaching Strategies Planning	4.10	.594	High
4	5	Learner's Roles	4.10	.532	High
5	3	Assessment	3.99	.624	High
-	-	Overall Degree	4.14	.423	High

Table 1 shows that means scores ranged between (3.99-4.36) with the "teaching process" domain was ranked top (M=4.36), and the "assessment" domain was placed in the last place (M=3.99). The overall mean score for the instrument was rated at (M=4.17).

The reason why the teaching process domain was ranked top is that virtual course content delivered during study the module "Caring of the Gifted Child" stimulates learner's attention and curiosity and to interact with the targeted goals. In addition, the effective teaching method applied in the online learning commensurate with the content delivered so encourage female students to get engaged with the online discussions and demonstrate self-motivation for keep tracking with the online learning. In addition, this result can be attributed to the teaching process itself that characterizes with accuracy and adaptability with different learning situations, and determines specific content, strategies, mediums and methods and assist achieving the instructional outcomes of the module and contribute to development of the learning programs.

The reason why the mean scores of student ratings of the module "Caring for the Gifted Child" were high from viewpoints of the female students would be the course prerequisites were so difficult from female student's viewpoints, particularly that the content is delivered virtually, and the course was designed considering education quality criteria for online learning, which contributed to accomplishment of the module learning outcomes. In addition, there has been a perceived development of the module "Caring for Gifted Child" in light of specific criteria reflecting education quality requirements. Further, the varied teaching methods employed to accomplish the learning outcomes including virtual lectures and synchronous activities ensure student interaction and stimulate understanding of the content and provide female students with tasks and activities that associate with daily life of students.

The online learning has become characterized with flexibility and accessibility because it employs the IT & Communication technologies in the electronic learning process such as electronic assessments and tests so that the ratings by female students studying Preschool Childhood were estimated at high for the module "Caring for the Gifted Child", basically in aspects related to assessment of the teaching-learning process and measuring the teaching performance of teachers. Prior studies reported that students' assessment of the academic programs forms a significant source of data for educational development process and education quality (Archibon & Nja, 2011).

This result is consistent with Assaf (2016) that reported high assessment degree by student teachers in Classroom Teacher and Child Education specialties of the effectiveness of the Practical Education Course on all domains; and consistent with Al Shehri (2016) that reported high-level ability of the faculties in managing online courses as perceived by students. Further respondents reported that they acquired the e-learning skills at a high level, and that the course content and activities were activated at high degree. Results also were consistent with Hinnawi (2017) that reported a high degree of the online learning-based module "Learn How to Learn as perceived by students, where the ratings ranged between high and very high degrees. This result is consistent with results from Thiabat (2018) that demonstrated a positive effect of studying the course "Physical Education Teaching Methods" on improving the teaching skills of preservice teachers; and agrees with Abdel Malik (2019) that found higher than average satisfaction level among students regarding "Critical Thinking" course.

However, results from this study disagrees with Al Quran & Ali AL Ghazo (2017) that found the assessment degree of the academic program quality by undergraduate students in the third and fourth year at the Yarmouk University was moderate; but agrees with Ibrahim Al Sayed (2015) that students' assessment of the instructional outcomes was moderate.

Differences of the Assessment of the "Caring of the Gifted Child" Online Module According to Variables

To answer this question, means and standard deviations of student assessment of the module of "Caring of the Gifted Child) were computed by variables of achievement and year of study. To demonstrate statistical differences among mean scores, t-test was applied, and results are shown by the table below.

Academic Achievement

Table 2

Means, Standard Deviations and T-test Results of the Effect of Achievement on Students' Assessment of the Module for "Caring of Gifted Child"

		N	M	SD	T-Value	df	p
Teaching Process	Average	34	4.03	.525	-2.562	131	.012
	High-Achiever	99	4.47	.932			
Teaching Strategies Planning	Average	34	3.93	.540	-1.986		
	High-Achievers	99	4.16	.603			
Assessment	Average	34	3.98	.594	-1.30	131	.896
	High-Achiever	99	4.00	.673	-.483	131	.630
Instructional Content	Average	34	4.11	.389	-.483	131	.630
	High-Achiever	99	4.15	.362			
Learner's Roles	Average	34	4.06	.491	-.494	131	.622
	High-Achiever	99	4.12	.547			
Overall Degree	average	34	4.02	.432	-1.845	131	.067
	High-Achiever	99	4.18	.414			

Table 2 shows no statistically significant differences at (α=0.05) attributed to effect of achievement on all domains and the overall degree, excluding domain of the "teaching process", and "planning instruction strategies", where differences were in favor of the gifted.

To explain the result that there were no statistically significant differences in the overall degree between high achievers and average students, we can attribute the result to nature of the module "Caring of the Gifted Student", where the course content was delivered using teaching strategies that concentrate on higher thinking skills (analysis, synthesis, and organization) within a positive learning environment that reinforces in female students the motivation to achievement through focusing on a set of discussion-based activities.

On another hand, the nature and characteristics of the sample played a significant role in the differences attributed to achievement, especially the juxtaposition of cumulative averages between high-achieve and normal female students. Consequently, the individual differences among students were insignificant. However, incentives offered to female students creates a learning environment fostering creativity through employing such strategies as braining storming and problem solving, taking into account that the module uses such strategies to foster creativity in gifted children.

To explain the statistically significant differences between the female high-achievers and average students within the education environment, planning and teaching strategies domains we can argue that female high-achievers have greater motivation to achieve compared with average students regarding academic achievement. In addition, they possess greater insightfulness regarding the academic programs, make inferences, self-learning skills and the ability to apply such skills problem solving and high order thinking. Female high achievers' possess such personal qualities as higher self-confidence and self-esteem so they take the responsibility of their learning that reflects on mastery of the academic skills and reinforces motivation for learning, evaluate the educational situation with its different elements which finally reflects on the positive continual development of female high achieving students. In this context, Jogan (2019) found that learners acquire knowledge through the course content delivered and training depending on which they sharpen their academic skills with the educational situations and modify the cognition and skills accordingly combined with effective performance.

This result is consistent with Al-Tal (2011) and Ibrahim & Al Sayed (2015) that found not statistically significant differences in course assessment attributed to grade point average GPA and Al Manae (2005) that reported no statistically significant differences attributed to grade point average.

Second: Year of Study

Table 3

Means, Standard deviations and T-test to Measure Effect of Year of Study on Student's Assessment of "Caring of the Gifted Child" Module

		N	M	SD	T Value	df	p
Teaching Process	Third Year	51	4.19	.503	-1.726	131	.087
	Fourth Year	82	4.46	1.019			
Teaching Strategies Planning	Third Year	51	4.01	.599	-1.448	131	.150
	Fourth Year	82	4.16	.587			
Assessment	Third Year	51	3.94	.667	-.794	131	.428
	Fourth Year	82	4.03	.597			
Instructional Content	Third Year	51	4.11	.387	-.691	131	.491
	Fourth Year	82	4.16	.357			
Learner's Roles	Third Year	51	4.08	.524	-.359	131	.720
	Fourth Year	82	4.12	.540			
Overall	Third Year	51	4.07	.434	-1.562	131	.121
	Fourth	82	4.18	.412			

Table 3 shows no statistically significant differences at (α=.05) attributed to the effect of the year of study on all study domains and the overall degree.

To explain this result, the course instructors don't diversify their teaching or individualize learning; instead, they would deliver content irrespective of the academic level of learners or activities related to the content. Further, female students from Preschool Childhood Department at King Khaled University have been recruited from somewhat homogenous socio-economic backgrounds that they would respond with flexibility and consciousness to online academic courses given their academic majors they pursue. On the other hand, the female students experience a healthy environment free from stressors that may foster their study skills of the coursework regardless of the student's year of study.

In addition, this result can be accounted for by the fact that regardless year of study, female students at the Preschool Childhood Department were from similar socio-economic backgrounds, so they have had proximate experiences during their studying life and supposedly to have acquired similar cognitions and such characteristics may not have affected by the differences in year of study variable because the online module content was delivered equally to female learners.

This study is consistent with Al Wesi, Al Okour and Alloubani (2020) and Thiabat (2018) that found no statistically significant differences in the assessment degree of Physical Education Teaching Strategies course attributed to the year of study. Similarly, this study agrees with al-Tal (2011) that found similarity in the assessment degree of the academic course reported by third- and fourth-year students.

In light of the findings from the current study, the author recommends that:

- A comprehensive revision is necessary for goals and content of female students' roles as well as for the module "Caring of the Gifted Child" at the Faculty of Education, King Khaled University.
- The need to develop the methods and activities exercised with the module "Caring for the Gifted Child" so that to reflect the advancements happening in the teaching-learning process.
- The need to apply multiple teaching and assessment strategies in order to develop female students' capabilities and attitudes and to conduct similar studies on other modules covering other aspects and measuring such variables as sex and the university.

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Research Article

The therapeutic value of creative art-making during the Covid-19 pandemic

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Abstract

The Covid-19 pandemic has been a major life stressor and building resilience is integral to coping with it. Creative art-making is one way to address the adversities of the pandemic as it allows creative individuals to experience positive affect, engage in self-reflection, and heal psychological wounds. In this study, 270 participants completed a background survey reflecting upon health and precautionary measures, emotional state felt prior to participating, and trait resilience. Participants also assessed their artistic practices both before and during the pandemic with the focus on change in attitudes. Each described an artwork created during the pandemic and reflected on its value. As expected, participants who followed precautionary measures were in better health, experienced positive affect, and were generally more resilient. Emotional self-care became a primary focus of art-making during the pandemic, whereas getting into a state of flow and having a non-judgmental attitude while creating the artwork were the central focus prior to the pandemic. These findings show that art-making offers therapeutic benefits for an individual's psychological well-being and that there were deleterious impacts of the pandemic on the self-expression process.

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Introduction

In December 2019, a cluster of pneumonic illnesses were originally reported as typical cases that took place in Wuhan, China. On March 11, 2020, The World Health Organization (WHO) declared the Coronavirus disease (Covid-19) outbreak as a global pandemic (Anand et al. 2020). The Covid-19 global health crisis has had a drastic impact on people's lives around the world as the acute respiratory illness continues to rapidly spread. With mass lockdowns and precautionary health measures to follow, while economies are plummeting, the pandemic comes with unmitigated uncertainties, fears, and anxieties (Xiong et al. 2020). It is common for people to experience low affect and exhibit psychiatric symptoms of anxiety, depression, and post-traumatic stress disorder (Liu et al. 2020). Wang and colleagues (2020) found that, among the 1210 self-reported psychological responses to the Covid-19 outbreak in China, 53.8% rated the psychological impact to be moderate or severe, 16.5% reported moderate to severe depressive symptoms, and 28.8% reported moderate to severe anxiety symptoms. Likewise, the Kaiser Family Foundation survey indicated that 45% of adults in the USA reported having worries and stress over the Covid-19 pandemic that adversely affects mental health (Panchal et al. 2020). Additionally, the WHO points out that precautionary health measures, such as self-isolation, may increase loneliness, depression, self-harm, or suicidal behaviour (World Health Organization, 2020).

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The Covid-19 pandemic can be recognized as the cause of individual and collective traumas with a negative psychological toll (Masiero et al. 2020).

Demonstrating resilience in the face of aversity may allow people to cope realistically with these challenges. According to Masten (2014), resilience refers to "the capacity of a dynamic system to adapt successfully to disturbances that threaten its stability, viability, or development." This definition can operate at different interconnected levels from the individual to the community. Although the definitions of resilience may vary across different domains of research, it is important to have a working definition of it during the pandemic (Masten, 2018; Walsh, 2020). With this in mind, it is critical for individuals to demonstrate resilience to adapt to day-to-day stressful circumstances (Dmitry et al. 2010). Having resilience as a tool to combat stress and build mental fitness may buffer against the negative psychological impacts of the Covid-19 pandemic.

Given the challenges facing individuals face worldwide during the pandemic, it is valuable to consider the potential positive emotional impacts that art-making can have to reduce adverse emotional states and a sense of isolation. Research has shown that it is helpful to communicate experiences of mental and physical health challenges using artistic means because it is often difficult to orally express one's own feelings and thoughts surrounding such traumas (Dewey, 1980; Fraser & Sayah, 2011). One suggested way to build resilience in reaction to the ongoing events is to engage in self-care activities so that individuals have the potential to confront their traumas and adapt appropriately. Art-making illustrates an example of how individuals can express themselves and have a therapeutic outlet for coping with mental health challenges posed by the Covid-19 pandemic. In the past decade, the field of art therapy research has been experiencing a push to produce more empirical evidence supporting the claims of its healing properties (Bell & Robbins, 2007).

Art therapy, a form of psychotherapy that uses creative self-expression and therapeutic techniques to promote well-being, has been shown to be effective for treating psychological symptoms of trauma (Slayton et al. 2010). Moreover, there is emerging evidence that art-based interventions lower stress and stimulate mental resilience by activating the reward brain system (Gallo et al. 2021). The activation of reward structures such as the orbitofrontal cortex (OFC), amygdala, and nucleus accumbens during esthetic experiences can induce stress-buffering effects (Gallo et al. 2021). As such, the incorporation of art-making within one's casual routine can help individuals healthily explore their traumas and thereby face challenging experiences resiliently. The simple act of creating art can be viewed as a form of self-care for preserving mental health.

Artistic endeavours during quarantine may enable the person to cope effectively with the stresses of the pandemic by enhancing positive affect. For instance, engaging in creative art-making may encourage the use of cognitive emotion regulation strategies like mindfulness (Gerzina & Porfeli, 2012). In a qualitative study conducted by Coholic (2011), one of the beneficial outcomes of integrating a group mindfulness-based cognitive-behavioural intervention with an art-based approach was the enhancement of resilience. Through teaching young individuals to engage in nonjudgmental self-awareness, the act of focusing on their own thoughts and feelings without evaluating those experiences judgmentally, they became more compassionate toward themselves and others (Coholic, 2011; Stewart, 2004).

Using art to cultivate the non-judgmental component of mindfulness, may go hand-in-hand with improving one's self-regulation of positive affect. Similarly, flow -a state of mental absorption- may also be experienced and thereby enhance levels of positive emotions felt during the process of creating rewarding pieces of art (Csikszentmihalyi, 1990). Many artists, from the amateur to expert levels, are likely to experience flow because they are voluntarily creating art 'for fun' based on their high levels of intrinsic motivation (Csikszentmihalyi, 1990). Being in a state of flow during such a process is associated with enhanced subjective well-being and positive mood (Futterman Collier & Wayment, 2009; Wilkinson & Chilton, 2013). The experience of flow can contribute to harmonious feelings of inner contentedness and satisfaction, even in the face of large-scale adversities, such as the current pandemic. During adversity, individuals may encompass flow to stay away from stressors through active engagement in creative activities (Csikszentmihalyi, 1996). With creativity appearing in the forms of adapting and problem-solving, resilience may arise (Kirton, 1994).

Emotion regulation may be a particularly useful skill to hone when an individual experiences unprecedented challenges posed by the Covid-19 pandemic because it enables him or her "to adjust emotional responses to meet situational demands" (Gross & Thompson, 2007). Engaging in everyday artistic pursuits may be associated with an increased use of approach (e.g., acceptance, reappraisal) and avoidance (e.g., distraction, suppression) strategies (Fancourt et al. 2020). Artistic tasks that involve cognitive flexibility, such as thinking from multiple perspectives, may reinforce reappraisal or the re-evaluation of the emotional meaning of the situation (De Dreu et al. 2008). Art-making

can also provide a period of mindfulness for enhancing distraction or enabling a shift in attention away from the stressful situation (Chiesa et al. 2013). Having a mindful space can also allow catharsis to occur for regulating negative affect (Bushman et al. 2001). Perceiving art-making as a cathartic outlet may be an effective way to cope with these highly stressful times because it can help the artist release tensions and anxieties. Allowing the self to experience catharsis, a discharge of negative feelings, can contribute to a re-balancing of emotion control when adapting to the challenges of the pandemic (Cupchik & Kiosses, 2020; Kramer, 2001).

With the problems posed by the pandemic, using art may be a salient form of coping through emotional processing and expression. By actively processing and expressing emotion in art, it may help individuals adjust to the stressful demands of the pandemic. In a previous study conducted by Stanton et al. (2000), emotional approach coping following treatment for breast cancer was associated with decreased distress and improved self-perceived health status. Thus, in the present study, creative individuals may prioritize making art to regulate their emotions in order to cope with the challenges of the pandemic.

Much of the current empirical evidence points to the general enhancement of positive affect through the production of art. For instance, this finding is implicated in a randomized-controlled trial conducted by Bell & Robbins (2007) in which they compared the mood outcome measures of the art production group to an art viewing group. They found that freely creating art can produce significant reductions in negative mood and anxiety as opposed to viewing art prints. Hence, making art can be a therapeutically valuable experience for mood repair. However, although there has been a rising interest in studying the psychological and emotional health benefits of doing artistic activities in the psychotherapeutic setting, how the art-making experiences improve the wellbeing of the general public during a global pandemic remains to be empirically examined.

On the other side of the coin, the deleterious effects of the Covid-19 pandemic on the overall mental health of individuals, who engage in the creative art-making process, have not yet been adequately examined. Individuals can experience negative emotions in the wake of a crisis, especially when these emotions stem from stressors outside of their control (Zhu et al. 2021). Precautionary measures, like social distancing, during the current pandemic, may cause feelings of alienation that contribute to poor mental health (Zhu et al. 2021). In the context of individuals engaging in art-making, attempting to work out their suffering may not always contribute to favourable mental health outcomes. The reality may be a complicated and emotionally ambivalent process that takes time and effort for psychological wounds to heal. Processing the negative impacts of the Covid-19 pandemic may involve more than just simply being self-aware of and regulating one's emotions throughout the artmaking process.

Because of the sudden onset of the Covid-19 outbreak, it may be difficult for artists to express complex and negative emotions. This may particularly be the case if the artist continues to experience distress while being in physical isolation for the "new normal." The original views individuals held about themselves may be undermined by the challenges that Covid-19 poses. These fragmented perspectives can lead to unstable self-concepts that are difficult to express coherently using artistic artifacts (Janoff-Bulman, 1992). Hence, for creative individuals, the present alienation they feel from the rest of the world may be a mental "blockage" to proper communication of complex emotions or lived experiences in their works of art. In other words, vulnerable individuals, who experience victimization during a traumatizing pandemic, may be challenged to properly express themselves through their artworks. Documenting the negative impacts of the Covid-19 pandemic on creative art-making can provide insight for researchers and clinicians who wish to enhance the effectiveness of trauma prevention programs and psychotherapeutic interventions such as art therapy.

The current study explored the potential therapeutic value of art-making during the pandemic compared to before, as well as the negative impacts of the pandemic on the mental health of creative individuals. An explanatory sequential design was used to provide quantitative and qualitative analyses of the participants' artistic experiences during the Covid-19 pandemic. It was hypothesized that following precautionary actions to maintain physical and mental health would be associated with experiencing positive affect and reflect resilience. The central hypothesis of the study was that the primary role of art-making is to help individuals self-regulate emotion and experience positive affect during compared to before the pandemic when doing art as a practice was important. It was also hypothesized that the Covid-19 pandemic would have a negative effect by hindering the self-expression processes of individuals who engage in art-making.

Methods

Participants

Participants in the study included 191 University of Toronto undergraduate students enrolled in a first-year introductory psychology course who volunteered to participate and 79 additional adult participants who were recruited online through advertisements posted on Facebook, LinkedIn, Instagram, Reddit, Honeybee Hub, Tumblr, and DeviantArt. The study had a total of 270 participants (66 males, 193 females, 11 others) with the age range of 17 to 69 (Mean age = 21.4, SD = 6.94). All participants provided informed consent prior to participating in the study. The inclusion criteria were the following: participants had to be (1) 17 years or older, and (2) send a photo of an artwork completed during the Covid-19 pandemic. There were no exclusion criteria.

Materials

The survey was divided into four sections: *Demographics* (5 items), *Artistic Experiences* section both before and during the pandemic (16 items), the qualitative *Description* section to describe the artwork participants made during the pandemic, and the *Reflection* section in which respondents assessed the experience of making the artwork (8 items) (see Appendix). Firstly, participants were asked to provide their age, sex, and an index of current health and daily precautionary health practices taken during the Covid-19 pandemic. The current health and daily precautionary health practices measures included how participants assessed their current health and personal health risk along with the subjective quality of their precautionary health practices (on 7-point Likert scales). The index also included a ten-item checklist of the health practices they followed during the pandemic which could be summed to objectively measure precautionary activity (Cupchik & Kiosses, 2020). Next, participants rated their emotional state during the two weeks prior to the study focusing on twelve emotions using a 7-point Likert scale from 1 (not at all) to 7 (nearly every day). Individuals also rated themselves on ten statements (Makarious & Cupchik, 2019) related to resilience using a 7-point scale from 1 (strongly disagree) to 7 (strongly agree). Participants then revealed the type of visual arts/craft they enjoyed doing, the degree of art expertise they considered themselves to have, and rated the approximate number of hours a week they spent doing visual arts/craft (see Appendix).

The *Artistic Experiences* questionnaire is a 16-item questionnaire that was used to assess various patterns of artistic experiences before and during the pandemic and its relationships to mental health. Respondents rated the statements on a 7-point Likert scale, ranging from 1 (strongly disagree) to 7 (strongly agree). This questionnaire included items that asked respondents about their behaviours, attitudes, and emotions surrounding their artistic experiences, as well as reasons for doing art before and during the Covid-19 pandemic. Item 9, *Doing art provides feelings of reward and deep satisfaction*, was inspired by the Aesthetic Experience Questionnaire (AEQ) developed by Wanzer and colleagues (2020). After completing *Artistic Experiences*, participants shared a story about the artwork they completed during the Covid-19 pandemic in the *Description* section and, subsequently, rated their artwork in the *Reflection* section using a 7-point Likert scale, ranging from 1 (strongly disagree) to 7 (strongly agree).

Procedure

A Google Forms was created to provide a framework for uploading a photo of the artwork and responding to the survey items. This was placed on the university system and the online social media system. An online visual advertisement poster was then designed with a description of the study along with the direct link to the online survey. Respondents were directed to Google forms and were presented with a Consent Form to read and initial if they chose to participate. A link to upload a photo of an artwork completed during the Covid-19 pandemic was embedded within the *Description* section of the Google forms.

First, participants filled out the *Demographics* section, including information about art background, health and daily precautionary measures, emotional state prior to participating in the study, and the trait resilience measure. Second, participants completed the *Artistic Experiences* questionnaire, comprising 16 items measuring the art related experiences before and during the pandemic using a Likert scale from 1 (strongly disagree) to 7 (strongly agree). Third, respondents completed the *Description* section by providing an image of an artwork created during the pandemic, describing its subject matter and style, as well as the meaning of the work to them and the context in which it was created.

Lastly, participants completed the *Reflection* section in which they looked back on the experience and answered eight questions such as "My identity was expressed in the work," "Creating the work gave me a chance to explore my emotions," and "Creating the artwork was a form of self-care for reducing stress during the pandemic." Using a 7-point scale from 1 (strongly disagree) to 7 (strongly agree). After completing the study, a debriefing form was presented in which respondents were informed about the purpose behind the study. On average, the survey took approximately 20 minutes to complete.

Results

Overview

The data analysis is divided into two major sections. First, we look at background factors that shape responses to the Covid-19 pandemic, including adherence to Precautionary Measures, Emotional state during the two weeks prior to the study, and trait Resilience. A principal components factor analysis was used to group items on each of the three measures followed by correlations among the factors. Second, we looked at attitudes toward artistic activities "before" in comparison with attitudes "during the pandemic" examining changing priorities. Again, factor analysis was used to group items in the measures. Participants were also invited to submit a project done during the pandemic, using rating scales to reflect back upon its meaning and value for them. We factor analyzed their "reflection" ratings and also qualitatively examined the comments of the thirty participants who had the highest loadings on the "reflection" factors with a focus on subject matter, style, meaning, and context of their artworks.

Background Factors

It was hypothesized that following precautionary actions to maintain physical and mental health would be associated with positive affect and reflect the impact of a resilient attitude. Background variables included subjective and objective measures of following precautionary behaviours, a state-based measure of emotions, and a trait-based measure of resilience.

Factor Analyses

Covid-19 Precautionary Measures. Both objective precautionary activity and subjective self-assessment regarding this activity were combined with self-assessments regarding general health and risk of contracting Covid-19. A principal components factor analysis with varimax rotation was performed on the Covid-19 precautionary measures scale (N = 270). One factor was derived with an Eigenvalue greater than 1.00 and the factor, *Health and precautionary activity self-assessment during the Covid-19 pandemic*, accounted for 42.17% of the total variance (see Table 1).

This factor comprised subjective self-rating (.72) and objective precautionary health practices (.66), as well as self-ratings of current health (.62), and risk for contracting Covid-19 (.60).

Table 1

Factor Loadings for Principal Component Analysis of Covid-19 Precautionary Measures

Components	Eigenvalues	Item No	Item Statements	Loadings
Health and Precautionary Measures During the Covid-19 Pandemic	1.69	Item 5	Quality of your daily precautionary health practices and situation during the pandemic	.72
		Item 6	Total number of daily precautionary health practices taken	.66
		Item 3	Rate your current health	.62
		Item 4	Personal health risk for contracting Covid-19	.60

Emotional State Self-Rating. A principal components factor analysis, with varimax rotation, was performed on the Emotional state measure comprising self-ratings of emotions during the two weeks prior to participating in the study. Two factors were derived accounting for 54.70% of the total variance that encompassed: (1) Negative and (2) Positive emotions (see Table 2).

Factor 1. Negative emotions, accounted for 32.47% of the variance and included items in order of importance: sad (.84), anxious (.81), depressed (.76), fearful (.69), angry (.65), guilty (.62), and lonely (.60).

Factor 2. Positive emotions, accounted for 22.23% and included items in order of importance: hopeful (.81), interested (.74), grateful (.71), happy (.64), and surprised (.58).

Table 2

Factor Loadings for Principal Component Analysis of the Emotions Scale

Components	Eigenvalues	Item No	Item	Loadings
Negative Emotions	4.47	Item 4	Sad	.84
		Item 5	Anxious	.81
		Item 7	Depressed	.76
		Item 3	Fearful	.69
		Item 1	Angry	.65
		Item 10	Guilty	.62
		Item 9	Lonely	.60
Positive Emotions	2.11	Item 6	Hopeful	.81
		Item 8	Interested	.74
		Item 12	Grateful	.71
		Item 2	Happy	.64
		Item 11	Surprised	.58

Trait Resilience. The resilience measure captured a trait-like disposition to engage in coping activity during crises. A principal components factor analysis with varimax rotation was performed on the Resilience measure and revealed two aspects of this disposition. After the first iteration, two items were removed due to cross-loading on more than one factor: *I know how to behave in different social situations* and *My life is determined by my own actions*. In the second and final iteration, two factors with Eigenvalues of 1.00 or greater were derived and factor labels were based on items with loadings of .50 or greater (+ or –). The factors accounted for 50.10% of the variance and were labelled: (1) *Learning from adversity* and (2) *Healthy relationship with self and others* (see Table 3).

Factor 1. *Learning from adversity*, accounted for 32.16% of the variance and was based on learning valuable lessons from others (.79), reflecting on one's own reasons for doing things (.79), being made stronger by personal difficult experiences (.67), putting a high value on promoting equality (.63), and generally feeling resilient when one has recovered from traumas (.52).

Factor 2. *Healthy relationships with self and others*, accounted for 17.94% of the variance. This factor focused on feeling self-confident (.72), being fairly treated in one's own community (.62) and having close interpersonal relationships (-.58).

Table 3

Factor Loadings for Principal Component Analysis of the Resilience Scale

Components	Eigenvalues	Item No	Item Statements	Loadings
Learning from Adversity	2.84	Item 9	I learn valuable lessons from the experiences of others	.79
		Item 8	I often reflect on my reasons for doing things	.79
		Item 1	I've been made stronger and better by difficult experiences	.67
		Item 2	I put a high value on promoting equality and reducing poverty and hunger	.63
		Item 7	I am resilient/recovered from traumas	.52
Healthy Relationships with the Self and Others	1.16	Item 4	I feel self-confident, appreciate myself, and have a healthy concept of who I am	.72
		Item 6	I am treated fairly in my community	.62
		Item 5	I don't keep people at a distance and have close interpersonal relationships	-.58

Relations among the Background Variables

Results supported the hypothesis that following precautionary actions to maintain physical and mental health would be associated with positive affect and reflect the impact of resilience attitudes. The *Covid-19 precautionary measures* factor was positively corelated with *Emotions* Factor 2, *positive emotions*, $r(268) = .31$, $p < .001$, as well as *Resilience* Factors 2, *Healthy relationships with self and others*, $r(268) = .34$, $p < .001$ and Factor1, *Learning from adversities,* $r(268) = .19$, $p = .001$. Experiencing positive affect during the pandemic went hand in hand with following precautionary actions and perceiving oneself to be in good physical and mental health. Being concerned about the self and the community meant that one was more likely to adhere to daily precautionary measures. Moreover, individuals who described themselves as learning from their failings and mistakes also perceived themselves to be in good health while following precautionary health practices.

In contrast, the *Covid-19 precautionary measures* Factor, *Health and precautionary measures during the Covid-19 pandemic*, was negatively associated with *Emotions* Factor 1, *negative emotions*, $r(268) = -.38$, $p < .001$. Individuals who experienced negative affect during the pandemic were less likely to follow precautionary measures, were aware of not doing so, and felt more at risk. In summary, being resilient and experiencing positive affect meant that participants were more likely to adhere to precautionary measures and perceive themselves to be in good health. On the other hand, participants who experienced negative affect tended to follow fewer precautionary measures and perceived themselves to be in poorer health.

Artistic Experiences Overview

The Artistic Experiences questionnaire explored behaviours, attitudes, and emotions surrounding artistic experiences, as well as reasons for doing art both before and during the Covid-19 pandemic. It was hypothesized that art-making before the pandemic would focus on aesthetic processes and engagement in the creative process, whereas, during the pandemic, the self-care and emotional aspects of art-making would become more important. First, a factor analysis was done on the Artistic Experiences (before) scores. Next, the Artistic Experiences (during) scores were subtracted from the Artistic Experiences (before) scores to get an index of change from experiences before to during the pandemic and a factor analysis was performed.

Artistic Experiences (before). A principal components analysis with varimax rotation was performed on the Artistic Experiences questionnaire regarding their artistic hobby before the pandemic. Across two iterations, items were removed that fell below the .50 criterion for inclusion or cross-loaded on more than one factor. In the final iteration, three factors were derived with Eigenvalues greater than 1.00, accounting for 59.26% of the variance.

Factor 1. *Harmonious art-making experience*, accounted for 28.98% of the variance. Factor 1 reflected the compatibility between the artist and the art-making process as well as the emotional valence that the participants expressed in their artworks before the pandemic. In the order of importance, Factor 1 included the following items: getting into a state of flow (.82), feeling calm and relaxed (.78), having a creative outlet for self-expression (.76), releasing tension (.69), feeling whole about the self (.68), art improving one's mood (.60), and being encouraged to slow down (.54).

Consistent with our hypothesis, this factor emphasizes flow during art-making as a means of self-expression and emotion regulation. Artists embodied a cohesive and unfragmented self-concept and experienced an uplift in mood and mindfulness of the moment when engaged in the art-making.

Factor 2. *Identity and community*, accounted for 19.24% of the variance and included the following items: sharing gives a sense of community (.75), process of making art is an important part of who the individual is (.69), being open to changing one's art style (.65), and being encouraged to engage in problem-solving (.61). A feeling for community identity was combined with a strategic and open approach to art-making.

Factor 3. *Non-judgmental attitude*, accounted for 11.04% of the variance and encompassed the following items: not letting the ego get in the way by comparing oneself with other artists (.79) and trying not to be judgmental (.75). Artists should be intrinsically motivated and not compare themselves with others while avoiding self-criticism during the creative process.

Changes in Experiences During Compared with Before the Pandemic

Is there a changed role for art-making during the pandemic? It was hypothesized that emotional regulation and self-care would play a more prominent role during the pandemic compared with matters related to aesthetic process. A principal components analysis with varimax rotation was performed on the Artistic Experiences questionnaire comparing the participants' attitudes during the pandemic with those held beforehand. A change score was computed for each item by subtracting the rating "during" minus the rating "before." A positive change score meant that the participants' ratings before the pandemic were lower in comparison to their higher ratings during the pandemic and, vice-versa, a negative change score indicated that the participants' ratings before the pandemic were higher in comparison to their ratings during the pandemic. Across a series of iterations, four items were removed that cross-loaded on more than one factor and three factors with Eigenvalues of 1.00 or greater were derived accounting for 57.22% of the variance: (1) *Self-regulation of emotions*, (2) *Creative self-expression*, and (3) *Non-judgmental attitude* (see Table 5).

Results supported the hypothesis of an enhanced concern for self-care and emotion regulation during the pandemic. The emotional value of art-making assumes primary importance during a health crisis and is dissociated or separated from the rewarding creative process itself.

Factor 1. *Self-regulation of emotions*, accounting for 24.30% of the variance, incorporated the following items: feeling calm and relaxed (.77), releasing tension (.69), improving mood (.67), feeling whole (.62), and letting go of fears,

doubts, and feelings of anxiety (.62). Consistent with our hypothesis, the "change" results show that the primary function of art-making during the pandemic involves emotional self-care and is differentiated from the creative process as such.

Factor 2. *Creative self-expression*, accounted for 20.65% of the variance and included the following items: having a creative outlet for self-expression (.72), the process of making art is important (.69), art provides feelings of reward (.68), getting into a state of flow (.62), and being encouraged to slow down (.56). This factor described the intrinsic motivations and reasons behind engaging in art-making to express the self creatively, experience feelings of reward, slowing down, and feeling the state of flow.

Factor 3. *Non-judgmental attitude*, accounted for 12.28% of the variance and comprised the following items: not letting the ego get in the way (.86) and trying not to be judgmental about how one's art-making is going (.74).

Table 4

Factor Loadings for Principal Component Analysis of Artistic Experiences Before the Pandemic

Components	Eigen values	Item No	Item Statements	Loadings
Harmonious Art-making Experience	5.44	Item 4	I get into a state of flow when I immerse myself in artistic activities	.82
		Item 2	I feel calm and relaxed when I am creating art	.78
		Item 3	It's a creative outlet for self-expression	.76
		Item 13	Helps me release tension	.69
		Item 7	Helps me feel whole about myself	.68
		Item 15	It improves my mood	.60
		Item 5	Encourages me to slow down and observe life/nature more closely	.54
Identity and Community	1.21	Item 12	Sharing my art give me a sense of community and I feel less isolated	.75
		Item 10	The process of making art is an important part of who I am	.69
		Item 16	It is important for me to be open to changing my art style	.65
		Item 8	Doing art encourages me to engage in problem-solving	.61
Non-judgmental Attitude	1.06	Item 6	I try not to let my ego get in the way by comparing myself with other artists	.79
		Item 14	I try not to be judgmental about how my art-making is going	.75

Changes in Experiences During Compared with Before the Pandemic

Is there a changed role for art-making during the pandemic? It was hypothesized that emotional regulation and self-care would play a more prominent role during the pandemic compared with matters related to aesthetic process. A principal components analysis with varimax rotation was performed on the Artistic Experiences questionnaire comparing the participants' attitudes during the pandemic with those held beforehand. A change score was computed for each item by subtracting the rating "during" minus the rating "before." A positive change score meant that the participants' ratings before the pandemic were lower in comparison to their higher ratings during the pandemic and, vice-versa, a negative change score indicated that the participants' ratings before the pandemic were higher in comparison to their ratings during the pandemic. Across a series of iterations, four items were removed that cross-loaded on more than one factor and three factors with Eigenvalues of 1.00 or greater were derived accounting for 57.22% of the variance: (1) *Self-regulation of emotions*, (2) *Creative self-expression*, and (3) *Non-judgmental attitude* (see Table 5).

Results supported the hypothesis of an enhanced concern for self-care and emotion regulation during the pandemic. The emotional value of art-making assumes primary importance during a health crisis and is dissociated or separated from the rewarding creative process itself.

Factor 1. *Self-regulation of emotions*, accounting for 24.30% of the variance, incorporated the following items: feeling calm and relaxed (.77), releasing tension (.69), improving mood (.67), feeling whole (.62), and letting go of fears, doubts, and feelings of anxiety (.62). Consistent with our hypothesis, the "change" results show that the primary function of art-making during the pandemic involves emotional self-care and is differentiated from the creative process as such.

Factor 2. *Creative self-expression*, accounted for 20.65% of the variance and included the following items: having a creative outlet for self-expression (.72), the process of making art is important (.69), art provides feelings of reward (.68), getting into a state of flow (.62), and being encouraged to slow down (.56). This factor described the intrinsic

motivations and reasons behind engaging in art-making to express the self creatively, experience feelings of reward, slowing down, and feeling the state of flow.

Factor 3. *Non-judgmental attitude*, accounted for 12.28% of the variance and comprised the following items: not letting the ego get in the way (.86) and trying not to be judgmental about how one's art-making is going (.74).

Table 5

Factor Loadings for Principal Component Analysis of Artistic Experiences (During-Before)

Components	Eigenvalues	Item No	Item Statements	Loadings
Self-regulation of Emotions	4.60	Item 2	I feel calm and relaxed while I am creating art	.77
		Item 13	Helps me release tension	.69
		Item 15	Helps me improve my mood	.67
		Item 7	Helps me feel whole about myself	.62
		Item 11	Helps me let go of my underlying fears, doubts, and feelings of anxiety	.62
Creative Self-expression	1.24	Item 3	It's a creative outlet for self-expression	.72
		Item 10	The process of making art is an important part of who I am	.69
		Item 9	Provides feelings of reward and deep satisfaction	.68
		Item 4	I get into a state of flow when I immerse myself in artistic activities	.62
		Item 5	Encourages me to slow down and observe life/nature more closely	.56
Non-judgmental Attitude	1.05	Item 6	I try not to let my ego get in the way by comparing myself with other artists	.86
		Item 14	I try not to be judgmental about how my art-making is going	.74

Changing Priorities and Negative Impacts During the Pandemic

The pandemic allowed artists to reassess the relative importance of different aspects of the art-making process. The following results are consistent with our hypothesis of the pandemic having a negative impact on the individuals' self-expression processes. *Artistic experience* (*before*) Factor 1, *harmonious art-making experience*, was negatively correlated with *Artistic experience* (*during-before*) Factor 1, *self-regulation of emotions*, $r(268) = -.30$, $p < .001$. This implied that placing a strong importance on flow before the pandemic was later perceived as a less essential part of one's art-making process during the COVID-19 crisis. Maintaining a positive emotional experience became of primary importance.

Artistic experience (*before*) Factor 3, *non-judgmental attitude*, was negatively related with *Artistic experience* (*during-before*) Factor 3, *non-judgmental attitude*, $r(268) = -.30$, $p < .001$. This implies that participants who were less judgmental before the pandemic became more so during the pandemic thereby showing the negative impact of heightened tension during the pandemic on art-making. *Artistic experience* (*before*) Factor 1, *harmonious art-making experience*, was negatively correlated with *Artistic experience* (*during-before*) Factor 2, *creative self-expression*, $r(268) = -.19$, $p = .001$. This reflected a blockage in the process of active self-expression; creative self-expression dropped during the pandemic relative to before when individuals experienced greater flow in their pre-pandemic art-making processes.

Reflecting on a Particular Artwork Created During the Pandemic

Each participant sent a photo of an artwork and shared a story about the process of creating it during the pandemic. They also responded to eight questions dealing with whether, for example, creating the artwork reduced the sense of isolation, as well as the relative importance of subject matter or style in the work itself. The stories or descriptions of their artworks were later qualitatively examined. A principal components analysis with varimax rotation was performed on the eight Reflection statements ($N = 270$) and two factors were extracted accounting for 58.75% of the variance: (1) Communicating experience and identity and (2) Emotional self-care.

Factor 1, *Communicating experience and identity*, accounted for 31.64% of the variance, and touched upon the artist's expression of personal identity (.76), trying to communicate one's experience of the world to others (.73), embodying one's culture and personal background in this work (.72), and placing an importance on the subject matter (.71) and style of one's artwork (.54).

Factor 2, *Emotional self-care*, accounted for 27.11% of the variance, and emphasized the participants treating art as a form of self-care for reducing stress during the pandemic (.87), seeing art as a way to help reduce their sense of isolation (.84), and having a chance to explore their emotions (.76).

These data suggest an inconsistency, given that the self-care factor is secondary to communicating experience and identity in the work. However, artists do not self-consciously engage in creative activities with the express purpose of emotion regulation. They invest meaning in their work and emotional expression or self-regulation is a by-product of their activities. This meaning-making embodies their experience of the situation within which they find themselves, a pandemic.

Table 6

Factor Loadings for Principal Component Analysis of the Reflection Statements

Components	Eigen values	Item No	Item Statements	Loadings
Communicating experience and identity	3.09	Item 1	Personal identity was expressed in this work	.76
		Item 2	I was trying to communicate my experience of the world to others	.73
		Item 3	I embodied my culture and personal background in this work	.72
		Item 7	Importance of the subject matter of my artwork	.71
		Item 8	Importance of the style of my artwork	.54
Emotional Self-care	1.61	Item 4	Was a form of self-care for reducing stress during the pandemic	.87
		Item 6	Helped me reduce my sense of isolation	.84
		Item 5	Gave me a chance to explore my emotions	.76

Relations Between Art-making Reflections and the Background Factors

Making art is found to be a form of self-care during the pandemic. In general, *Reflection* Factor 2, *emotional self-care*, was positively associated with *Resilience* Factor 1, *learning from adversity,* $r(268) = .30$, $p < .001$. Being generally resilient, by reflecting on past adversities, was associated with passionately engaging in emotional self-care through artistic endeavours during the Covid-19 pandemic. *Reflection* Factor 2, *emotional self-care*, was also positively associated with *Artistic experience* (*before*) Factor 1, *harmonious art-making experience*, $r(268) = .25$, $p < .001$. This implied a link between flow and behaviour; when creative hobbyists are fully immersed in their pre-pandemic art creation processes, this carried over to self-care during the Covid-19 pandemic. In other words, having flow before the pandemic meant that one was more likely able to cope with feelings of stress and loneliness later by doing art therapeutically during challenging times.

Reflection Factor 1, *communicating experience and* identity, was positively correlated with Artistic experience (*before*) Factor 2, *identity and community*, $r(268) = .26$, $p < .001$. Individuals who explored their identities and gained a sense of community before the pandemic used their artworks to share experiences during the pandemic.

Qualitative Findings

The Covid-19 artwork descriptions (subject matter, style, meaning, and context) for the top thirty participants on *Reflection* Factor 1, *communicating experience and identity*, and the top thirty participants on *Reflection* Factor 2, *emotional self-care*, were extracted from the data for the qualitative analysis using subject regression scores indicating the sensitivity of the respondent to that factor. These participants were chosen to examine descriptions of their experiences and related identity, as well as self-care when they engaged in art-making. The accounts of three participants on these two reflection factors are now introduced to make the factors more concrete.

Reflection Factor 1

For *Reflection* Factor 1, *communicating experience and identity*, communicating one's own personal or cultural identity to others was strongly illustrated in the themes of their artworks. The first description touched upon a disconnection between embodying two cultural identities in the West and how the participant expressed feelings of sorrow and loneliness regarding the cultural clash in her artwork.

> *To me the piece represents the feeling of loneliness being a South Asian female living in a western society. The clash between two cultures has made it hard to fit in school. I am more cultural than others. It means sadness, feeling lost but not knowing what to do (Female, 18 years old).*

The second quote pertains to the participant expressing her own emotions, personal identity, and personality in the artwork. Her art hints at emotions such as sadness and loneliness. Despite the social challenges the participant faced, she recognized herself as a strong and resilient woman.

> *All of my portraits are a reflection of me. I put all of my emotions and thoughts into them. A friend of mine mentioned that all of my girls have a certain misty eye look, as if they had just finished crying. Perhaps in some ways, they were and my friend could see it. It is my way of expressing myself openly without being too obvious. 'Amaterasu', represents the warrior inside every woman. Having faced the demands of society and the constraints of cultural dogma with the discrimination faced from the transparent prison of gender equality, women are a resilient lot. I made her overlay Samurai helmet to represent the inner warrior that is only visible to the people who really see her. The tattoos symbolize her care-free spirit and colourful soul. Her eyes shows a look of tiredness but she is still standing tall in all her glory to soldier on another day as she has to pick herself up and she has children who depend on her (Female, 48 years old).*

Reflection Factor 2

For *Reflection* Factor 2, *emotional self-care*, participants often explored their anxieties, stresses, and depressive feelings during the pandemic using artistic means. The first description elucidated the participant's self-care process when she was drawing the cartoon characters. By "projecting" herself onto the relatable characters, it was therapeutically healing because doing art helped her address her negative emotions of sadness, stress, and anxiety.

> *While on the one hand it's obviously just me fangirling over DBZ, I actually use Gohan as my comfort character (our personalities are similar...I relate to him a lot) and I draw him whenever I'm feeling sad or stressed or anxious or whatever… In a way I guess you could say I'm projecting myself onto the characters? I'm both the one being hugged and the one who is doing the hugging. I don't have anyone in my life that would listen to my problems so intently and give comfort in a way that shows unconditional love (I had a rough childhood), so in making the characters do it, it's healing for me. (Female, 22 years old)*

The second quote involves the participant relating her emotions back to memories of the COVID-19 pandemic. Despite the negative impacts of the pandemic at the time, painting allowed her to feel calm and relaxed—it was a cathartic outlet for relieving her anxieties.

> *This piece will forever remind me of COVID-19 and the high restrictions we had during that time. It helped me feel so relaxed, as I felt I had no motivation or purpose to do anything at the time. The painting helped me to feel a little less anxious with everything going around. (Female, 20 years old).*

Discussion

The purpose of the mixed methods study was to examine relations between art-making and mental health outcomes, and to explore the possible negative effects of the Covid-19 pandemic. All three hypotheses were supported in the present study. First, individuals who follow precautionary measures and judge themselves to be in good physical and mental health during the pandemic felt more positive affect and embodied a more resilient character. Health practices could have contributed to resilience through an association with a high internal locus of control (Luthar, 1991). Individuals who felt like active agents having power over their environments felt more optimistic about their health during the pandemic. Optimistic individuals were resilient enough to adapt to adversity by taking healthy precautionary actions.

Second, the overall results support our third hypothesis showing that artistic expression during the pandemic was particularly important for regulating one's emotions compared to prioritizing aesthetic processes before the pandemic. The factor analysis that shows change during the pandemic highlights the separation of self-regulation of emotions from creative self-expression. This finding reveals that emotion self-regulation became the primary function while art-making was secondary. In the factor analysis for art engagement before the pandemic, harmonious art-making experiences involved a combination of both emotion regulation and mental absorption for focusing on art-making.

Before the pandemic, artists had a tendency to make art to distract themselves from their busy lifestyles and thereby experienced greater flow compared to individuals who engaged in art-making during the pandemic (Genuth & Drake, 2019). It has been shown that those who drew pictures to distract themselves were more immersed in a state of flow compared to others who used art to express negative thoughts and feelings (Genuth & Drake, 2019). Furthermore, Artistic experiences (before) Factor 1, *harmonious art-making experience*, includes mindfulness (i.e., feeling encouraged to slow down and observe life/nature more closely) and catharsis (i.e., a release of tension). Having a mindful space before the pandemic could have also served as an outlet for a discharge of negative emotions. With the balance among

flow, mindfulness, and emotion regulation using distraction as an avoidance strategy, artists may have felt a strong sense of purpose in making art and experienced more enjoyment (Fancourt et al. 2020).

On the contrary, in the wake of the Covid-19 crisis that was associated with isolation, depression, and stress, individuals likely found themselves using different emotion regulation strategies. Instead of distraction being applied as an emotion regulation strategy, it may have been used as a long-term coping style to deal with negative experiences. Participants may also have attempted to use more adaptive approach strategies including cognitive reappraisal and acceptance in order to benefit from self-care and regulate emotional responses to their sadness, anxieties, and fears (Fancourt et al. 2020). Moreover, individuals may have used catharsis as a way to vent anger or 'let go' of underlying fears, doubts, and feelings of anxiety. This aggressive purge of negative emotions was one possible way to improve participants' emotional states during the pandemic. Thus, with an emphasis on using emotion regulation strategies to protect the self from being negatively impacted by the stressful demands of the pandemic, doing art for enjoyment became a secondary priority. In this study, the qualitative findings illustrate a strong focus on self-care as part of art-making during the pandemic which fits well with the correlational data.

Finally, the findings supported our third hypothesis: the negative impacts of the pandemic would affect the ways in which individuals expressed themselves in their art-making processes. The results found that flow and presenting a non-judgmental attitude decreased during the pandemic compared to before. According to various researchers, mental health risks exist during these time periods because of its association with Covid-19 (Liu et al. 2020; PeConga et al. 2020). With that said, individuals who experienced poor mental health during the pandemic may have prioritized self-regulation of emotions. Hence, it is not surprising to find that positive experiences of flow and having a nonjudgmental mindset turned out to be less important aspects of the individuals' artistic work process during the pandemic. The effects of the Covid-19, crisis such as the lockdown measures, may have interfered with their mental processes by producing heightened tension. Creative insights may not have emerged as easily when artists were suffering in isolation and battling their own fears, anxieties, and uncertainties. Thus, by feeling vulnerable in the face of adversities, the artists may have experienced a sudden disruption to their worldviews (Janoff-Bulman, 1992). With shattered basic assumptions about their experiences during the Covid-19 crisis, they felt less stable, more judgmental, and less in-tune with their art-making processes.

Other results showed that highly resilient individuals engaged in self-care, and thereby experienced a reduction of stress. The findings were consistent with a previous study which found that individuals who had a positive focus on growth experienced mood repair when they were strongly immersed in the art-making process itself (Futterman Collier & Wayment, 2019). In the present study, it may be the case that resilient individuals managed to reduce their stress due to enhanced mood and flow. There may also have been neurological links among mental resilience, the reward system, and the stress system. Art-making stimulates the reward system (such as the OFC and the amygdala) which in turn, was linked to the regulation of stress response that induces stress-buffering effects (Gallo et al. 2021). In one fMRI study, resilience was correlated with increased dopaminergic activity in the ventral tegmental area (VTA) and hippocampus (Richter et al. 2019). Thus, an association between the reward and stress systems may have been related to artists showing mental resilience to adversity (e.g., isolation).

In one of our findings, Resilience Factor 1, *learning from adversity*, was strongly correlated with Reflection Factor 2, *emotional self-care*. Since participants already exhibited general resilience, the neurological association between the reward and stress systems may have been further strengthened by doing art for self-care. In the outcome, the resilient participants experienced a reduction in stress levels and felt less isolated. In other words, making art to cope with negative emotions during the pandemic may be associated with enhanced functional connectivity between the reward and stress systems.

There were several limitations of the study that should be addressed. Since this was a cross-sectional study, causal inferences could not have been drawn from the findings. It is possible that the opposite causal direction could have taken place in which people with higher levels of resilience or emotion regulation, or a higher capacity and time for self-care, chose to spend their time doing art. Alternative explanatory variables such as time, money, and other resources were not accounted for in the present study. It should also be noted that we retrospectively assessed the ratings of participants' artistic experiences before and during the pandemic at one single timepoint. With retrospective ratings, participants may be prone to recall bias. This study also only represented the experience of individuals in the fall of 2020. It is possible that some of the findings may have differed if the survey were sent out earlier in the first wave of the pandemic or presently during the second winter wave of 2021. Finally, most of the participants in the study were recruited from either a university or a Western social media platform so the sample does not reflect the global population during the Covid-19 pandemic.

Future studies should seek to replicate and validate the measure cross-culturally to see whether people across cultures experience similar positive effects of art-making and similar negative consequences stemming from the Covid-19 pandemic. If the findings are replicated successfully, perhaps this can lead scientists and clinicians to a convergent understanding of what the therapeutic benefits of art-making are in the clinical context. Clinicians can promote the efficacy of art therapy in cross-cultural settings in order to develop appropriate interventions for promoting mental wellness.

In conclusion, the current study provides insightful examination of the artistic experiences of adults and how unique creative endeavours during the Covid-19 crisis translates to positive or negative mental health outcomes. It is beneficial to investigate the therapeutic values of art-making so we can understand how to use the tools of art therapy to heal the general public that has suffered greatly from the pandemic. Through creating and connecting art with the wider community, we can regulate our emotions in healthy ways and build resilience to proactively mitigate feelings of isolation.

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Appendix 1

Evaluations of Artistic Experiences Survey Before and During the Covid-19 Pandemic

Demographics

1. **Gender:** ❍ Male ❍ Female ❍ Other
2. **Age:** _____
3. In general, please rate your current health.

❍ 1	❍ 2	❍ 3	❍ 4	❍ 5	❍ 6	❍ 7
Extremely poor			Neither poor nor good			Excellent

4. What do you consider your personal health risk is for contracting COVID-19?

❍ 1	❍ 2	❍ 3	❍ 4	❍ 5	❍ 6	❍ 7
Extremely high			Neither low nor high			Very low

5. In general, please rate the quality of your daily precautionary health practices and situation during the pandemic.

❍ 1	❍ 2	❍ 3	❍ 4	❍ 5	❍ 6	❍ 7
Extremely poor			Neither poor nor good			Excellent

6. Check off any of the following that describe your daily precautionary health practices and situation during the pandemic:

❍ Physical distancing (2 meters apart)

❍ Following public health rules while lining up for stores and services

❍ Healthy sleeping habits so I feel rested when waking up

❍ Healthy eating habits related to food choices, amounts, and weight management

❍ Connecting with friends, family, and colleagues regularly

❍ Maintaining hobbies such as art, writing, collecting, baking, cooking, etc.

❍ Exercising at home

❍ Attending to responsibilities such as pets, plants, work, dependents, etc.

❍ Able to live in a stable and safe environment (i.e., without fear of abuse or violence)

❍ Volunteering to help others

7. To what extent do each of the following emotions apply to you over the last two weeks? (1 = not at all, 4 = more than half the days, 7 = nearly every day)

_____ Angry
_____ Happy
_____ Fearful
_____ Sad
_____ Anxious
_____ Hopeful
_____ Depressed
_____ Interested
_____ Lonely
_____ Guilty
_____ Surprised
_____ Grateful

8. Generally speaking, please rate yourself on the following statements (1 = strongly disagree, 7 = strongly agree).

_____ I've been made stronger and better by difficult experiences.
_____ I put a high value on promoting equality and reducing poverty and hunger.

_____ I know how to behave in different social situations.
_____ I feel self-confident, appreciate myself, and have a healthy concept of who I am.
_____ I keep people at a distance and avoid close interpersonal relationships.
_____ I am treated fairly in my community.
_____ I am resilient/recovered from traumas.
_____ I often reflect on my reasons for doing things.
_____ I learn valuable lessons from the experiences of others.
_____ My life is determined by my own actions.

9. What type of visual arts/craft do you enjoy doing?

❍ Painting ❍ Sketching ❍ Photography ❍ Light art
❍ Digital art ❍ Street art ❍ Crafts ❍ Woodwork
❍ Textiles ❍ Sculptures ❍ Other: _____

10. What degree of expertise do you consider yourself to have?

❍ Beginner
❍ Intermediate
❍ Advanced
❍ Expert

11. How many hours, on average, have you spent each week doing visual arts/craft:
Before the pandemic? _____
After the pandemic? _____

Your Artistic Experiences

I'm going to ask you questions comparing your artistic experiences before the COVID-19 pandemic started and since it began in January 2020. Indicate the extent to which each of the statements below applies to you.

1. Have your reasons for doing art during the pandemic changed compared to your reasons before the pandemic started?

❍ 1	❍ 2	❍ 3	❍ 4	❍ 5	❍ 6	❍ 7
Not at all			Somewhat			Totally

2. I feel calm and relaxed while I am creating art.
Before:

❍ 1	❍ 2	❍ 3	❍ 4	❍ 5	❍ 6	❍ 7
Strongly disagree			Neither agree nor disagree			Strongly agree

During:

❍ 1	❍ 2	❍ 3	❍ 4	❍ 5	❍ 6	❍ 7
Strongly disagree			Neither agree nor disagree			Strongly agree

3. I make art because it's a creative outlet for self-expression.
Before:

❍ 1	❍ 2	❍ 3	❍ 4	❍ 5	❍ 6	❍ 7
Strongly disagree			Neither agree nor disagree			Strongly agree

During:

❍ 1	❍ 2	❍ 3	❍ 4	❍ 5	❍ 6	❍ 7
Strongly disagree			Neither agree nor disagree			Strongly agree

4. I get into a state of flow when I immerse myself in artistic activities.

Before:

❍ 1	❍ 2	❍ 3	❍ 4	❍ 5	❍ 6	❍ 7
Strongly disagree			Neither agree nor disagree			Strongly agree

During:

❍ 1	❍ 2	❍ 3	❍ 4	❍ 5	❍ 6	❍ 7
Strongly disagree			Neither agree nor disagree			Strongly agree

5. Doing art encourages me to slow down and observe life/nature more closely.

Before:

❍ 1	❍ 2	❍ 3	❍ 4	❍ 5	❍ 6	❍ 7
Strongly disagree			Neither agree nor disagree			Strongly agree

During:

❍ 1	❍ 2	❍ 3	❍ 4	❍ 5	❍ 6	❍ 7
Strongly disagree			Neither agree nor disagree			Strongly agree

6. I try not to let my ego get in the way by comparing myself with other artists.

Before:

❍ 1	❍ 2	❍ 3	❍ 4	❍ 5	❍ 6	❍ 7
Strongly disagree			Neither agree nor disagree			Strongly agree

During:

❍ 1	❍ 2	❍ 3	❍ 4	❍ 5	❍ 6	❍ 7
Strongly disagree			Neither agree nor disagree			Strongly agree

7. When I feel fragmented, doing art helps me feel whole about myself.

Before:

❍ 1	❍ 2	❍ 3	❍ 4	❍ 5	❍ 6	❍ 7
Strongly disagree			Neither agree nor disagree			Strongly agree

During:

❍ 1	❍ 2	❍ 3	❍ 4	❍ 5	❍ 6	❍ 7
Strongly disagree			Neither agree nor disagree			Strongly agree

8. Doing art encourages me to engage in problem-solving.

Before:

❍ 1	❍ 2	❍ 3	❍ 4	❍ 5	❍ 6	❍ 7
Strongly disagree			Neither agree nor disagree			Strongly agree

During:

❍ 1	❍ 2	❍ 3	❍ 4	❍ 5	❍ 6	❍ 7
Strongly disagree			Neither agree nor disagree			Strongly agree

9. Doing art provides feelings of reward and deep satisfaction.

Before:

❍ 1	❍ 2	❍ 3	❍ 4	❍ 5	❍ 6	❍ 7
Strongly disagree			Neither agree nor disagree			Strongly agree

During:

❍ 1	❍ 2	❍ 3	❍ 4	❍ 5	❍ 6	❍ 7
Strongly disagree			Neither agree nor disagree			Strongly agree

10. The process of making art is an important part of who I am.

Before:

❍ 1	❍ 2	❍ 3	❍ 4	❍ 5	❍ 6	❍ 7
Strongly disagree			Neither agree nor disagree			Strongly agree

During:

❍ 1	❍ 2	❍ 3	❍ 4	❍ 5	❍ 6	❍ 7
Strongly disagree			Neither agree nor disagree			Strongly agree

11. Doing art helps me let go of my underlying fears, doubts, and feelings of anxiety.

Before:

❍ 1	❍ 2	❍ 3	❍ 4	❍ 5	❍ 6	❍ 7
Strongly disagree			Neither agree nor disagree			Strongly agree

During:

❍ 1	❍ 2	❍ 3	❍ 4	❍ 5	❍ 6	❍ 7
Strongly disagree			Neither agree nor disagree			Strongly agree

12. Sharing my art give me a sense of community and I feel less isolated.

Before:

❍ 1	❍ 2	❍ 3	❍ 4	❍ 5	❍ 6	❍ 7
Strongly disagree			Neither agree nor disagree			Strongly agree

During:

❍ 1	❍ 2	❍ 3	❍ 4	❍ 5	❍ 6	❍ 7
Strongly disagree			Neither agree nor disagree			Strongly agree

13. Doing art helps me release tension.

Before:

❍ 1	❍ 2	❍ 3	❍ 4	❍ 5	❍ 6	❍ 7
Strongly disagree			Neither agree nor disagree			Strongly agree

During:

❍ 1	❍ 2	❍ 3	❍ 4	❍ 5	❍ 6	❍ 7
Strongly disagree						Neither agree nor disagree Strongly agree

14. I try not to be judgmental about how my art-making is going.

Before:

❍ 1	❍ 2	❍ 3	❍ 4	❍ 5	❍ 6	❍ 7
Strongly disagree			Neither agree nor disagree			Strongly agree

During:

❍ 1	❍ 2	❍ 3	❍ 4	❍ 5	❍ 6	❍ 7
Strongly disagree			Neither agree nor disagree			Strongly agree

15. I do art because it improves my mood.

Before:

❍ 1	❍ 2	❍ 3	❍ 4	❍ 5	❍ 6	❍ 7
Strongly disagree			Neither agree nor disagree			Strongly agree

During:

❍ 1	❍ 2	❍ 3	❍ 4	❍ 5	❍ 6	❍ 7
Strongly disagree			Neither agree nor disagree			Strongly agree

16. It is important for me to be open to changing my art style.

Before:

❍ 1	❍ 2	❍ 3	❍ 4	❍ 5	❍ 6	❍ 7
Strongly disagree			Neither agree nor disagree			Strongly agree

During:

❍ 1	❍ 2	❍ 3	❍ 4	❍ 5	❍ 6	❍ 7
Strongly disagree			Neither agree nor disagree			Strongly agree

Opening Instruction

Description

Pick a piece of art you created during the pandemic that felt therapeutic. If you can, 1) provide an image of your artwork, 2) talk about the subject matter, 3) talk about the style, 4) describe what the piece means to you, and 5) describe the context in which you created it.

2) Subject Matter

3) Style

4) Meaning of the artwork

5) The background context

Reflection

Looking back at the experience you just described, please rate how much you agree or disagree with the following statements.

1. My personal identity was expressed in this work.

❍ 1	❍ 2	❍ 3	❍ 4	❍ 5	❍ 6	❍ 7
Strongly disagree			Neither agree nor disagree			Strongly agree

2. In this work, I was trying to communicate my experience of the world to others.

❍ 1	❍ 2	❍ 3	❍ 4	❍ 5	❍ 6	❍ 7
Strongly disagree			Neither agree nor disagree			Strongly agree

3. I embodied my culture and personal background in this work.

❍ 1	❍ 2	❍ 3	❍ 4	❍ 5	❍ 6	❍ 7
Strongly disagree			Neither agree nor disagree			Strongly agree

4. Creating the artwork was a form of self-care for reducing stress during the pandemic.

❍ 1	❍ 2	❍ 3	❍ 4	❍ 5	❍ 6	❍ 7
Strongly disagree			Neither agree nor disagree			Strongly agree

5. Creating the artwork gave me a chance to explore my emotions.

❍ 1	❍ 2	❍ 3	❍ 4	❍ 5	❍ 6	❍ 7
Strongly disagree			Neither agree nor disagree			Strongly agree

6. Creating the artwork helped me reduce my sense of isolation.

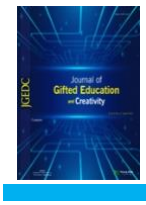
❍ 1	❍ 2	❍ 3	❍ 4	❍ 5	❍ 6	❍ 7
Strongly disagree			Neither agree nor disagree			Strongly agree

7. How important is the subject matter in my artwork?

❍ 1	❍ 2	❍ 3	❍ 4	❍ 5	❍ 6	❍ 7
Not important at all			Somewhat important			Very important

8. How important is the style of my artwork?

❍ 1	❍ 2	❍ 3	❍ 4	❍ 5	❍ 6	❍ 7
Not important at all			Somewhat important			Very important



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Interview Article

An interview with Hanna David: reflections on counselling gifted children

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Abstract

Professor Hanna David has a lot of work in the field of gifted guidance and counseling, both practically and academically. The interview with her will provide a broad perspective to practitioners and researchers. In this interview; counseling settings for the gifted, important tips on individual and family counseling for the gifted, how to provide emotional support for the gifted child, the use of humor as a door opener in counseling for the gifted, the difference of online and face-to-face consultation for the gifted, changes for the gifted in the counseling paradigm compared to the past, future predictions in counseling, ways to preserve the counselors' emotional integrity, advice to gifted consolers, currently focused on consultancy fields, social and emotional needs of gifted, competencies of our gifted teachers, pursuing Interviews were conducted on the issues of gifted children' interests, role of the mentor in gifted education, teachers to follow the academic journals and conferences about the gifted issues.

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Interviewers: What prompted you – drove you initially to work with able children in a counselling setting?
Hanna David: My interest in giftedness in general and in working with able children in a counseling setting in particular goes back to the 60ies, shortly after my youngest brother was born. When he was one-year old, and I turned 12, my mother started working as the post-office mistress in the new neighborhood we moved to. Four days a week, when the post office had afternoon opening hours, it was my task to take care of Shmulik.

I was too young to hang around with other mothers of nannies, so I took him with me everywhere, such as to the grocery store, or to watch TV with our neighbors: my parents could afford to buy a television for the first time only a decade later. But my favorite choice for spending my babysitting hours was at Lily's, my friend's. While I came from a 4-child family, Lily had just one sister. Her frequent begging to add another sibling to the family did not help, even when she promised to take care of the baby "even if it is a boy". Slowly climbing the 3 floors to Lity's with my baby brother rewarded us when halfway up the stairs we already smelled her mother's cookies, but the person who made me understand that my brother was gifted was her father. Mr. Cohen was an excellent teacher who really loved children. He was always at home in the afternoon, preparing for the next day's classes or correcting exams. But he loved to play with Shmulik, explaining scientific phenomena, such as boiling water, or white clouds that that do not produce rain. He was also the first to ask the 2-year-old Shmulik numerical questions, and somewhat later taught him to recognize numbers.

When Shmulik was three-year old he started going to the Cheder, a religious kindergarten for Ultra-Orthodox Jewish children. I still spent most afternoons with him, but as he was a fluent reader at 4, from that age he would/could

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already spend long hours reading his own books, while I was studying, doing my homework, reading, or writing for the youth magazine I had been publishing since I was 15.

But it was not until I turned 14 when I first heard the term "IQ". My grade 9 physics teacher, a new immigrant from the US, said after the first examination, that two-thirds of the class failed, that he could not understand why it happened as "the average IQ of this class is about 130". He did not use the word "gifted", I am sure he did not know it in Hebrew, but I found its meaning in an old English dictionary my father had bought while serving in the British army in World War II. At that time "an average IQ of 130" did not make any sense to me, as I did not feel the girls around me were exceptionally smart. But 30 years later, when I taught the course "the gifted child in the general classroom" to in-service teachers, I met the didactic instructor of the college who had been one of my peers who had been expelled from school at the end of grade 10 because of her poor grades. Only then did I realize that if only 48 girls were accepted to my high school from the whole country, it must have been highly selective and many or my school mated could have been labeled "gifted".

Being surrounded by gifted people, both in my family (see, for example, David, 2019a; n.d.) and my community – was a trigger for being more and more interested in high ability, creativity and talent. But being a mother was the last brick in my decision to be a counselor for the gifted and talented. Almost 40 years ago, when my first-born son was just 2:8 years old, we were walking on the side-road with his younger, 4-month-old brother, trying to roll the baby-carriage from the diagonal curbstone to the zebra crossing. He stopped me then, asking: what is written on the curbstone? I answered: "for mother and baby".

In Hebrew, "for" is just one letter combined with the nouns "mother" and baby"; "mother" is a 2-letter one-syllable word, "Em"; "baby" is a 5-letter two-syllable word: "Ti-Nok", so my son asked: how come mother is big and she 'has' such a short word, while 'baby' is short and 'has' a long word? I then told him that each word is a combination of syllables, the minimum one, and each syllable is composed by one, two or three letters [that is the maximum in Hebrew]. He then pointed at the common letter, "lamed", which means "for"; and asked about the names of the letters composing both words. On that day he learnt 8 of 22 Hebrew alphabet letters, one of which is an ending-letter.[2]

Since that day I looked for information, literature, and actual advice whenever possible because my son's curiosity grew rapidly, and there was no one who could answer my questions. Yinon's mathematical understanding was something I had never experienced before; I answered his questions and participated when he wanted to involve me in his mathematical "games". It started at about age 2, with counting the floors while the elevator of our building was going up and sown, and went on as at age 4 he asked me: is zero the average of plus infinity and minus infinity"? (for more examples see, for example, David, 2012). As to Yinon's verbal interest and curiosity – I had some help from my next-door neighbor, an experienced elementary-school teacher, who gave me some first- and second grade booklets, and encouraged me to give them to my son even though the kindergarten teacher had a negative attitude towards "premature teaching" (e.g. David, 2011, 2014a). But at the back of my mind there was always a constant fear: I did not want my son to become a younger version of my older brother, whose development was very uneven. For example: because he started learning at the preparatory class at age 4, he missed two years of kindergarten. Not being very interested in painting and other arts and not being exposed to these areas he never knew the differences between green, blue and turquoise.

Looking back at Moshe's educational track it could be easily concluded that he had been robbed of acquiring central milestones, such as color-names, let alone painting ability, because of two-year deficit in fine- and gross motor-skills practicing. This was done for the sake of advanced theoretical learning, but while cognitive learning could have been offered to him later, he had never closed the gaps in basic skills he had been deprived of.

Being a mother had been the most enjoyable thing in my life. It made me confront my own past as a child who – until age 12 – did not have any girlfriends but rather spent all her out-of-school time with her older brother and his much older friends. I could also look back at myself as a teenager who went to a school where, for the first time, other girls had the same interests, were thinking as quickly and could express themselves – both in writing and orally – as precisely and fluently as myself. High school was also the place where some of the teachers opened new worlds for me: the world of mathematics and sciences, that of languages, religious thought, fashion and art. Also realized then that I had been a young adult struggling to find her place in the world that seemed to pass in slow motion while I was sprinting, running towards the next aim. But being the mother of three gifted children had also been the most

[2] Five of the Hebrew letters have a different version when appearing at the end of a word; they are called final letters. One of them is "mem", the last one in the word "Em", "mother".

challenging thing I had come across, and I felt it was my mission to be there for families encountering similar challenges.

Interviewers: How does your client group identify themselves to you?
Hanna David: My client group consist mainly of two groups: the majority are parents of gifted children and youths, and the minority are 18-20+-year olds who "found themselves in my writings". There are two more, numerically negligible groups: other-than-parents-family-members of gifted and talented children and youths, and school counselors, social workers and psychologists who seek advice either for themselves or for their clients.

The parents of the first group usually contact me after being referred to by someone who knows me or a family whom I had met professionally; some come across my name when reading "your book" or "your article".[3] Some of the parents tell me that their child is gifted; they mean that she or he had "passed" the "stage 2" identification-for-giftedness test offered to all grade 2 or 3 Israeli children who had been referred to it by their teachers after taking the "first stage" giftedness examination (David, 2014b). Other parents tell me that "they are sure the child is gifted, was successful in the first examination,[4] but "did not pass the second".

A minority of the parents "get immediately to the point": some tell me they need a proof that their child is gifted, and some others want me to contact the child's teacher, believing that if the teacher knows that the child is gifted, she or he will treat them accordingly. In these cases, I try to explain that my work is not labeling any child but rather helping solve their problems. I also explain, that in most cases telling a teacher that a certain child is gifted would not do them any good, as the teacher has not been trained either for teaching gifted children or helping them emotionally or socially. If the parents agree to open up and tell me about the child's or their own difficulties, problems or dilemmas, I suggest that they set a meeting with me. It is quite interesting, that when the mother is calling, she usually says she would call again after speaking with the father, but when the father calls, we set a date for the meeting right away.

The counseling session is carefully prepared both by me and by the parents: I read ALL materials sent to me prior to it, such as psychological assessments, compositions, math problems of science projects, various art works – recordings of music, theater performances or dancing, audio-recordings of all kinds, as well as descriptions of the child or adolescent, written by both parents. Quite often adolescents send me various materials directly and participate in counseling sessions with their parents. After that meeting it is up to the family and me whether to continue meeting with the child and the parents, set a plan just for parents' instruction meetings, usually when the child is still in pre-school, or "leave the door open" for future meetings when the parents feel it is necessary.

Interviewers: Is it fair to suggest that sometimes it must be difficult to tell when you meet a family group as to who is the person requiring the counselling? Do you for example work with family groups as well as with individual children?

Hanna David: Indeed, it is quite accurate that in many cases it is difficult to tell who is the person requiring counseling, but it is even more difficult to differentiate between the one mostly in NEED for counseling rather than the one requiring it (e.g. David, 2013a). It is not rare that the child identified as gifted is chosen as the "identified patient" (e.g. Hagan, 2018; Yermish, 2010), or the "symptom bearer"; in more severe cases, they are the family's scapegoat (e.g. Nelson Grau, 1985).

I never try to the setting of the family during the first counseling meeting, as in most cases the family's resistance should not allow them to acknowledge the situation. If the family chooses to start a long intervention with me this issue is also dealt with. But quite often even when the parents want me to meet the child on a regular basis, they are not committed to participate in the parents' instruction meetings, which is a "deal breaker" for me, and I refuse to start the process without the parents' full involvement. In some cases, the parents assure me they are committed to the process but shortly after I meet with their child for the first time either one- or both of them cancel their parents' instruction meetings time and again. In such cases I face a dilemma that I have not sufficiently solved yet: on the one hand, I can easily "get out of the contract", as it is not respected by one side. But on the other hand, the child who needs me should not be punished for their parents' behavior. Thus, if the child has not yet been attached to me, I tell the parents that it was not going to work. But in most cases the child wants to meet me again right after our first session, so I bite my lip and do my best to help the child.

There are, of course, many cases where the parents do understand that another sibling needs help more than the gifted one and seek help for them too. I never meet with two siblings at the same time, and very rarely – actually twice

[3] In most cases they all refer to my Hebrew publications in the "Hebrew Psychology" web where I have been published massively during the last 15 years.
[4] Screening the top 15-20% of the class population.

during the last 30 years – agreed to meet with a sibling years after their sibling's treatment was terminated. I n all these cases I do my best to help the parents find a suitable therapist for the sibling. But when the main problem is the parents' relationship I warmly recommend, sometimes even push towards couple therapy. A comparatively easy-to-handle situation is when one of the parents has a learning disability that causes a lot of tension. In such cases I ask the parent to be diagnosed, and in most cases the parents are cooperative.

Interviewers: Working through the many layers of emotional trauma and distress must be very challenging in your journey to the heart of the child. Do you occasionally work in triage manner?

Hanna David: In my line of work, I must make quick decisions whether to meet the family or refer them to someone else. I also must be very quick in some cases that involve violence, usually school related. So though I prefer to start my journey to the heart of the child or the adolescent after deciding that they are capable of deriving the greatest benefit from it, actual life is quite often stronger than the best well-meaning intentions. For example: a father of a 15-year old girl called me saying: "my child had taken 10 paracetamol pills last week. She is at home now, with me, but I want to bring her to you". I urged the father to take his daughter to the closest mental health clinic. Had the father suggested that I worked with the psychiatrist, his highly gifted girl could have derived a great benefit; but as the father wanted an "immediate solution" my only option was to refer him to the place where they were to make a risk assessment and take full responsibility for her life.

When a child had been a victim of violence, but it is not a life-threatening situation, I meet the family immediately and do my best to help. One such case was of 5-year-old girl who had been tied by her kindergarten teacher: during our third meeting she was already acting out – showing me what the teacher had done to her using dolls, modelling material and painting. During this time, I helped the parents find another kindergarten for her, so she did not have to see the abusive teacher again. Another case was of a grade 1 student who was abused by his classmates who kicked him in the school yard while one of the teachers was watching, doing nothing. In that case it took a few weeks till the child started learning in a new school. During this time period he stayed at home and met me regularly. After transferring to the new class, he was happy, he still wanted to continue meeting me for many months…

But quite often things do not turn out the way I had thought they would, in spite of my best intentions. For example: a 12-year old boy whose parents started meeting me because of his runaway problem. Very soon he came by himself, and when asking how he arrived – there was no public transportation from his hometown to mine – he told me that he took a taxi because his parents "were too busy to drive me". During the first month we already started establishing a therapeutic alliance, but then I got a telephone from the parents informing me that they were going to spend the next 8 weeks in Switzerland and were looking forward to re-setting their son's meetings with me next September.

I was angry, disappointed, felt even cheated, but soon realized that the victim of this behavior was the child. Though I acted good willingly, and prioritized him in the selection process, being sure I could help him, it did not prevent the time-and energy waste I had invested. It is inevitable that from time to time things like that happen, namely, making a decision as to who is to be treated and sooner or later realizing that I had been mistakenly allocated my efforts in the wrong direction.

Interviewers: You work, if I may observe, in a particularly challenging and sometimes very dangerous environment – even before you meet a child. Do you find humour a 'door opener' in your work?

Hanna David: Humor is at least a "door opener" in my work; it is, in many cases, the main tool for penetrating into the brain, even to the soul of many parents who come to me as to their last hope, the last resource they can think of after many failed interventions with their troubled children (about an adolescent girl who first met me after several interventions see David, 2013c). During my career I had met some parents whose profession had to do with humor, such as a caricaturist in a main Israeli daily paper, or a well-known comic books writer. Speaking "their" language helped to make the initial connection, "breaking the ice" and establishing a therapeutic alliance, necessary when having to speak openly about the problems of their gifted child.

But not of less importance is the use of humor during therapeutic meetings with children and adolescents. As had already been mentioned, humor is a characteristic of many gifted children and adolescents (e.g. Holt, Willard-Holt, 1995; Shade, 1991; Ziv & Gadish, 1990). Almost all children I meet are verbally gifted, namely, they like word games, double meaning expressions, a good laugh about political characters who behave ridiculously, or schoolteachers who reveal their weaknesses by using certain words, expressions, forms of a sentence, high, poetic language in inappropriate class-situations. Teachers who blame students for being "disrespectful" when refusing to cover "vulgar" words with

"polite" euphemisms are usually laughed at by gifted students. Quite often the humor of the gifted is considered "unacceptable" in their class, and they are punished because of it.

In my clinic humor serves mainly as means to establish a therapeutic alliance between the already-disappointed-from-the-system child, and me, the older adult who can not only understand them but also sympathize with them. Furthermore, quite often I encourage children to laugh at their superiors, as being able to see the ridiculous side of a principal or a teacher helps tolerate school boredom, lack of challenge or even unjust behaviors.

Interviewers: Do you observe a difference in whether you face to face counsel or counsel through virtual meetings? Is one more effective than another and if so, how would you characterise the differences?

Hanna David: Face to face counseling is by no means preferred to virtual meetings, but cancellations of meetings, or delaying a meeting until "things settle down and I can actually see the counselor" might be not just worse than online meeting, but even dangerous.

When the first lockdown started in Israel, I was lucky; I first started working with skype in 2015, when my appointment at the European Commission in Brussels, as an Expert & Rapporteur for an evaluation of the Economic and Human Sciences panel switched to online work because of the November 2015 Paris attacks. It was immediately clear that the work had to be done, as too many individuals and research groups were waiting for our decisions about grants the were waiting for. So, for the first time we managed to complete the evaluation successfully without actual meetings. Thus, in March 2020, when the Israeli government had forbidden any out of the house activity, I was already experienced with online meetings by zoom, FaceTime or skype. I started regular therapeutic meetings right away (David, 2020a) and also online dynamic assessments (see the description of a 40-minute skype meeting with a 3-year-old girl, David, 2020b). Sometimes one of the participants was sitting in their living room and the other – in the study; in one case a couple with 4 little children preferred meeting me online while sitting in their car, as their house was too noisy and allowed no privacy… Most of the families preferred online meeting also during the military May 2021 operation: "Guardian of the walls" [Arabic: معركة سيف القدس; meaning: "operation Jerusalem's sword"].

Even when online meetings are much lesser effective than face to face meetings, which is the case, for example, with children who struggle to concentrate while sitting in front of a screen, this option is usually better than canceled meetings. I have observed it mainly in families where the parents had first objected to online counseling meetings, because of their bad experience with online learning in school, saying: "the child does not learn anything by zoom in school". My suggestion has been "just give it a try with me; we can set for a 25-minute meeting if 50-minute period is too much". This suggestion had turned out very successful – in all meetings the child did not need to stop the meeting after the first 25 minutes… another idea that has been working very well is let the child what wants to show me various object from their everyday lives, including their room, their yard, their toys, and tell me anything they wish about them. Though in all classical therapy methods the process takes place at the therapist's clinic, and the patient does not expose the counselor to their physical life, being flexible about the location and allowing the child to direct the conversation through objects that have not been prepared in the turns out to be quite successful in many cases. When the traditional frame of the clinic is not there anymore, the child "re-creates the clinic" and shares it with the counselor, and new options, new possibilities are made, which are to be warmly embraced by the counselor.

In order to be able to feel free, potent and comfortable, the therapist needs to be very flexible and creative during online sessions, especially with younger children. During the covid-19 pandemic many children at all ages have been used to spend many hours in front of screens; among their various activities was learning on one side and watching porno on the other. The therapist who sets a meeting with a child needs many a time "tear" them from their game or their video. In some cases, the child or adolescent, whose regular life had been turned upside down, fails to get up for the meeting, and the therapist has to wake them. Even when the child had managed to be in front of the screen on time – it happens quite often that the child is still half asleep, wearing pajamas, their hair uncombed.

Quite often with ADHD children the counselor discovers that they also had neither eaten not taken their medication, and thus struggle to concentrate or even behave properly. The therapist must tolerate such conditions quite often. Another problem stems from the fact that many parents are not around or are just busy doing their own things and are not available to sort computer-related problems, such as the bad sound of a camera that needs to be replaced. All these problems are unique to online meetings, and thus the counselor must be both flexible and creative and also confident enough to solve not just their own computer-related problems but also those of their patients.

Some of the main problems of online parents' instructions meetings adults are quite similar, but others are not. For example: silence is a tool therapists use quite often when dealing with a difficult subject; in some cases, the therapist waits a while until the patient speaks; in others – the patient chooses to close their eyes while the therapist

watches them sitting, walking, or lying on a sofa. When one needs to sit in front of a screen most of such actions or behaviors are not possible. For example: silence is interpreted in most cases as a frozen picture rather than as reflection-time…

Technical interruptions are quite common during online meetings both with children and their parents. They usually break the sequence of the conversation, in many cases when they occur in the middle of a painful, or even difficult conversation the preference is not to return to them, and the "magical moment" of discovery, the revealing of an important issue, fact, or thought is gone. Other interruptions occur from time to time during online sessions, such as the entrance of a family member into the room, shouts or cries heard from another part of the house, or a telephone ringing sound. The clinic which had "moved" to the client's house cannot be sterile, and thus the meetings are prone to a variety of disturbances.

I have found that being equipped with three possible means for online meetings – zoom, FaceTime and skype minimizes the possibility of serious interruption of any meeting. It also minimizes the pre-mature termination of interventions during a time when emotional support is most necessary.

Interviewers: During the time you have been working with able young children what changes in the issues you and the young learner working together have had to focus on?

Hanna David: During the last 35 years that I have been working with able students, major changes have occurred in all issues relevant to the lives of these children and adolescents. Some of these changes have been a part of global changes in relationships between the individual and society, changes in the world political situation, in family structure, globalization of economics and its influence on relocation, women's participation in the workforce in general and in high prestige, highly-paid positions in particular, and many more. Other change had to do with the social, economic, political, religious-related and population-changes in Israel. Here are some of the main domains where major changes have occurred.

- Social supportive environment. When I started working as a tutor of gifted students, back in the 60ies, the social environment towards giftedness was very supportive and excellence was encouraged. The title: "the best student" was an honorary one. Gifted students were not yet labelled – public giftedness tests started in Israel in the 70ies, and thus more talented children and adolescents were not entitled to special learning settings. Nevertheless, man high-ability children skipped a class, even two, and some others found areas of interest on their own. A positive aspect of this situation was that social problems of the gifted were not perceived as an educational or psychological issue; no "educational assumptions" about difficulties that might had been connected to giftedness or a result of it were presumed, the gifted were not bullied or even called by insulting names, as had the case been later. As a result, a substantial part of my work had to do with intellectual and professional issue, most social problems were solved when the child or the adolescent started participating in a course, or a professional track even when the other participants were older, and the only main issue of my work had to help the gifted overcome their sensitivities.
- The exclusion of many sub-populations was a negative result of the fact that the gifted were identified only among children from higher SE status, children of educated parents, mostly born in Israel or descendants of European countries. Most Israeli children were excluded, among them: children living in the economic and geographic periphery of Israel; Arab children, particularly Druze; Ultra-Orthodox children, especially girls, children of immigrants, especially of those arriving form Arab countries, and ALL children with disabilities. My work in this area was 100% educational. At both roles – as teacher and college instructor I pushed towards better understanding the essence of giftedness and helping the in- a well as pre-service teacher understand that the gifted children nurturing. Teaching in a peripheral college confronted me with a special challenge: persuading my students that giftedness could have been found in all places, and it was their task to reveal its existence, to help the parent understand that their child needed special education, and in some cases to help them uncover their own giftedness.
- The gender aspect. Back in the 60, almost only boys participated in the "race towards excellence". That included the choices that talented girls made for their school track, during their compulsory army service, and in the job market. This situation had gradually changed, and girls' aspirations, along with those of their parents, have been now similar those of boys'. But in "real life" there are still very large gender differences in materializing ones' talents; the gender issue bothers all the girls I meet at my clinic. It starts while still very young: I recall a grade 1 girl who worried about being "too fat"; a16-year old who was the only one in her gifted class participating in the most prestigious Israeli acceleration program, and the girl who was just to get

drafted and was about to refuse volunteering to the piloting track, considered the most challenging in Israeli army, especially for girls, as she did not want a 10-year obligation, saying "It is too long for a girl who needs to think about starting a family". While in last two decades of the 20ieth century I had to encourage girl in school- and academia-related matters, these doors have widely opened since. The main problem of the gifted girl is social connections, conventions, and prejudices. My key role is helping her a strong enough spine in order to make it possible to follow her own heart.

- The level of religiosity. Back in the 60ies, many Orthodox, and even Ultra-Orthodox children who showed high ability in many areas, not only in religious subjects, had an opportunity for good education. For example: Since I was 15, I had been preparing many dozens of Ultra-Orthodox school-age boys, who had but limited secular education in their Ultra-Orthodox Cheders and elementary schools, for high school entrance examinations. The parent of these boys wanted them to get a good matriculation certificate, in order to be able to be entitled to higher education and later integrate successfully in the work force. Since the 80ies this tendency had made a substantial turn: Ultra-Orthodox schools stopped teaching even basic arithmetic and elementary English at about grade 5, and thus nearly blocked the possibility even of gifted students to fill their educational gaps later.

Some changes occurred in the beginning of the 20ies century, but they were relevant mainly for girls in the Ultra-Orthodox sector. Single-sex tracks opened in Academic colleges – not just in teachers' colleges, as had been before. Ultra-Orthodox educated women started filling positions in public-service institutions, which could have motivated many younger females in this sector. The door for gifted girls had opened slightly, but not so much for boys.

No wonder that except for one case, the opening of a gifted class in the Ultra-Orthodox sector (see David, 2013b), where I was in charge of the selection of boys to this class, in the last 20 years I met a family for a counselling session only once.

- Areas of interest have substantially changed among the gifted in the last 50 years. Until the 80ies, there were some "classical" professions that gifted children and adolescents had shown deep interest in. While most boys wanted to know more, to become professional, or practice in areas mainly connected to science, medicine, mathematics and engineering. Gifted girls showed interest, in many cases, in social sciences, especially psychology and sociology, as well in the humanities and languages. But there were also quite a number of girls that wanted to "make it" in areas perceived as masculine, and vice versa. Some of the gifted of both genders wanted to become lawyers; quite a number had later admitted that studying the law was very boring and not creative but almost everybody who had been admitted a law faculty had successfully graduated; many had become great lawyers and noticeable judges.

Since the 90ies the study of computer science had become very popular, and its popularity had been increasing since. Many gifted children of both genders have also been interested in brain sciences, but not just in its scientific aspect – their aspiration is also "to make money of it". In the last decade there has been a growing tendency – more frequent but not solely among girls – to "make it" in [social] medias. Some, the more artistic ones, present their work, e.g. songs, melodies, funny or other videos in order to get more and more views, likes, and recommendations; others learn "to be there" in social media events, to publish a lot whenever possible, to edit written texts, videos and photos, etc., activities they find more rewarding than arduous work even if they are fully capable of doing it very well. The parents of such children and adults, who quite often complain that the adolescent "wishes to give away their giftedness for the sake of nothing", consist of a very large percentage of those approaching me. In many cases when they do, it is already too late as the child or the adolescent gets much more self- and social satisfaction from the web than they could have received by being an "exemplary student.

- The issue of immigration from Israel has gradually become one of the main ones among almost all adolescents I have recently met. 40 and even 30 years ago it was quite clear for almost all the gifted I met and their families that they did not even think of the option of immigration. Indeed, leaving for post-doc was popular, a necessary step needed in order to get a position in Israel when returning to it, after two years. Since about the beginning of the 21st century gifted adolescents and young adults do not necessarily see their future in Israel. This started with Israelis in the silicon-valley in the last decade of the 20ieth century and continues until now. In addition, many young PhD's, who had moved their families to the US for a post-doc position have not returned to Israel due to lack of academic positions, the political unstable position, dissatisfaction with the

social-economical system, and the extremely high living expenses in Israel in comparison to the salaries[5]. In addition, public education system in Israel is not satisfactory for the gifted, while private gifted education does not exist.

These two phenomena have influenced my work with many individuals and families. On one side, When I counsel a family with a teenager who is about to get a university while still in high school or a young adult who is about to get their degree, I talk with them about their future and many a time prepare them for the opportunity to move to Europe or to the US for the PhD rather than wait and plan the move for the post doc. As for the Israelis who wish to return to Israel – until the covid-19 pandemic they used to meet me during the summer vacation in order to learn more about the academic opportunities of the gifted children once they are back. Since the pandemic all these counselling sessions have been online.

- Parents' involvement in the identification of giftedness process has become much more intensive, and the preparation for the "giftedness tests" have turned to be a business that involves a huge amount of money. On the other hand, there has been a decrease in parents' wish to push towards excellence, which had been much more common back in the 70ies, 80ies, and at some degree even during the 90ies. It looks as if the main aim of many parents has gradually increased in the giftedness label of their children, rather than in supplying them with good, suitable education that will answer both their academic and emotional needs. Counselling to such families is sometimes quite frustrating, as I do my best to persuade the parents that knowledge is important per se, that being good at literature is not of less importance than becoming an investment counsellor, and even if their daughter can be accepted to a faculty of medicine, they should hear her when she says she wants to be a writer. Needless to say I am not always successful, and many gifted youngsters still decide for the "most well-paid profession" rather than to the one their heart seeks.

Interviewers: In an increasingly challenging world environment how do you imagine the future for supporting the well-being and mental health of able children?

Hanna David: In my future view, supporting the well-being and mental health of able children will be a concept familiar in all schools, municipalities, mental health centers for children and adolescents and the ministry of health of the country of state. Licensed counselors will be knowledgeable in psychology of the gifted as well as in teaching strategies for gifted students – at list in one area of knowledge, so they would be able to help the gifted in psychological and educational issues. Gifted children will not be identified by one single exam but rather by a variety of ways: it will include the opinion of at least one educator and one psychologist who know the child, a portfolio of the child's work, medals or other honorable mentions the child had won, an estimation of the child's creativity, the demonstration of characteristics typical of the gifted, such as persistence, being able to rise after failing, mature behavior, attitude towards others, self-inspection ability, etc.

Gifted disabled children should be treated by professional experts of both giftedness and disabilities. It is highly recommended that these professionals be knowledgeable visual- or other art, music, dancing, the theater, in addition to a scientific or humanistic subject matter.

Interviewers: I imagine sometimes you will hear difficult things from those you counsel. Who do you talk to? How do you protect your emotional integrity?

Hanna David: I hear "difficult things" from both children and adolescents and their parents, on a weekly basis. It is certainly the hardest part of my work, but knowing that many people, including too many who are in charge of the children's mental health, are not able to handle such things, while I believe I do, keeps me going. I use several means to protect myself; first of all, I take into consideration my own health- and familial situation at that time.

Protecting myself is, first of all, being most careful not to cross the border of law, even when the child's interest might be questioned. For example: more than once a child under 10 told me about their sabotaging the computer system of their school by inserting a virus". In one of these cases the child demanded, prior to his confession, that I signed an obligation not to tell anybody what he was about to confess about. I told him that I was willing to sign that document if the fact that I was to hear was not going to endanger him or anybody else. He said that it did not and agreed that if I proved to him that it endangered anybody, I would tell his parents about it. At the end it was not. Though I resented his act I was glad that he gave me access to something he did not want anybody else to know, enabled us to discuss the subject in length and I finally made him promise he would not do it again.

[5] In 2021 Tel Aviv had the highest cost of living of any city in the world!

Another case was of a grade 3 child learning in a gifted class who told me that some of his classmates had a habit of watching porn-videos. I explained him that this might lead to a real danger, as pedophiles could have discovered who was watching these videos and contact the children. The child agreed that I spoke with his mother about it; she spoke with several other parents from that class and together they approached the teacher, counselor and the headmistress in order to decide about the next steps. In this case, though I could not promise it, the child's identity was not exposed and his fear of being labeled as "snitch" did not come true.

Working in the public sector confronted me with more extreme incidents. For example: a 5-year-old girl told her kindergarten-teacher that she had been raped by a young man from her village. When I, in my capacity as the municipal psychological, was called to the kindergarten, it was already known that the man had hurt two more girls at about the same age. The teacher, who had no knowledge about legal or psychological procedures, had already questioned the first girl, and thus compromised the future investigation. My immediate task was to calm the kindergarten teacher, who was very agitated, and inform the appointed officer-of-law for child and adolescent affairs, urged him to urgently open a police file against the suspect-rapist. But to my surprise, nothing happened: the suspect was not arrested, and the child got no treatment. It turned out that as the child's testimony was compromised, the kindergarten teacher had to testify instead, and she refused to do that saying: "I live in this village and if I testify against the son of X, I'll be banned". This incident had moved me badly, to the point I hardly slept for a whole week.

The main thing that I have learnt during my long counseling career that there is no "maximal protection" – there will always be cases that will hurt me deeply. But I also learnt but in many others, I will be responsible for a real change in children's lives. Knowing that is my main source of power, helping me go through the hardest incidents, the most severe cases of abuse. I know I will never let them conquer me.

Being helped by professionals is another means of self-protection. During several periods of my life, I have been helped by older and more experienced psychologists and psychoanalysts whom I was seeking advice and support. As years pass by, I am becoming the older person, whom younger professional need help from. But getting old confronts me with many personal complicated situations, connected mainly to illness and death, and here, again, I am the "strong person".

Quite often I do not even get the opportunity to process my own losses. One such situation has recently happened, when during 8 days I had to go through a heart catheterization and the loss of my mother. 4 of my older patients – aged 16-19 as well as their parents knew about my heart catheterization, none knew about the death of my mother, as I felt it would have been "too much" for them to digest. Such situations are extremely difficult and cause a lot of stress. There is no remedy for series illness and death, but Pilates – I got my instructor's license at age 65 – and Yoga are of great help.

Interviewers: What guidance would you offer to those who are beginning their journey in counselling young people? What would you suggest they avoid and what would you recommend as an approach to forming an effective partnership between the counsellor and the counselled.

Hanna David: My first advice to those beginning their journey in counselling the gifted is: do it if and only if you love gifted children and hope to get up every morning challenged in a new, creative way.

My second piece of advice – do not do it if you are not ready to train for a marathon. If you are – take into consideration that the way to become a good counselor is exceptionally long. If you do not love learning, if you are not a flexible person, or you are not willing to constantly admit to your clients – even if they are 5-year-old, that you do not know – please, reconsider your decision.

My third piece of advice – which is no less important – be honest. Gifted children and adolescents need you to be honest not only about your strengths but also – maybe particularly – about your weaknesses and disadvantages. If admitting them to yourself is hard for you, just leave the whole thing. I can assure you it is going to be much more difficult when you have to tell a 7-year-old that you do not know what the Fibonacci numbers are.

In addition, it is crucial that you admit that you do not know everything. Indeed, it is highly recommended to be educated at least in one subject matter, but there will always be someone who knows something that you do not. You are not expected to know it all; you are required to admit it.

You are to set an example to your clients and be sure – they are to know who you are as soon as they know how to read, which might be even at age 4. As much as you are trying to keep your private life to yourself, it is not going to work. The first time one of my children told me something about my life that had never been published, was also the first time I heard the term "dark-net". So, if you think you can change the truth just a little bit, or you are afraid something about you will be exposed, please back off. Many gifted children and adolescents will seek your help after

being failed by many adults, such as educators, mental health professionals and family-members, including parents. You will be able to establish a therapeutic alliance with the gifted and their parents only if you are 100% honest with them.

Please, be aware of your limitations, too often parents seek help by a giftedness expert rather than call a psychiatrist or clinical psychologist believing "everything is because my child is gifted" (e.g. David, 2020c). If you are unable to refer potential patients to other professionals due to vanity, omnipotence or else – counseling the gifted is not your thing. You do not want to endanger anybody, nor do you wish to have a burden which is beyond your power to carry.,

Be aware of cases of problems that are too difficult for you emotionally. Indeed, it is not always possible. Such had been the case when a couple who lost their gifted child during his military service was sent to me by an officer who had been familiar with my work. As I did not want the parents to know that their story was "too close" to my own (Dedication, David & Wu, 2009) I met with them. But in most cases a counselor who is aware of her limitations can refuse to meet with parents whose case causes her a high level of distress. In my case the "red line" is anorectics. I am quite good at identifying potential to anorexia, even diagnosing it, both among girls and among boys, but at a very early stage of my work I had realized that anorectic youngsters make me feel very bad, so I had questioned my ability to help them. It does not really matter where it comes from – one of my former psychologists suggested that the roots of this extreme discomfort was being a second-generation holocaust survivor. Whether she was right or not – I recommend that anybody who starts working with any population – especially with the gifted, who are more sensitive than the in general, will be able to say "no" some situations rather than drag interventions whose end is doomed.

Interviewers: What are you working on now?

Hanna David: Since I have retired from teaching career, I have been working both as a counselor of the gifted and their families and as a writer – of books and scientific papers in a variety of subjects connected to the gifted: psychological and social problems, conflicts in the gifted family, mainly in families with double exceptionalities, educational problems underachievement of adolescents who had been identified as gifted but failed to materialize their giftedness. This includes young people who have already dropped out of school, others who are at the verge of drop-out, and some who have failed – mostly for the first time in their lives – in academia. I also work from time to time as a counselor for lawyers or families who need professional advice in issue such as class-skipping, entrance to certain schools or programs, or helping home-schooled students at all stages. During some of the parents' instruction meeting I occasionally help in matters such as finding a new professional path, or helping the parents reveal their own disability. Such had been, for example, the case of a system developer in a very successful startup, who had been exposed to the world of giftedness during the intervention process with me, and currently works as a counselor of the gifted. Another noticeable case is that of a father who had realized in one of our parents' meetings that he might have also had ADHD, took the MOXO test and started medical treatment that enabled him to fully materialize his own financial giftedness.

My scientific work includes currently finishing my part in a book I write with Prof. Eva (David & Gyrmathy, in preparation), a few collaborative works with theoreticians and practitioners, the preparation of a few presentations for future meetings and conferences, and posting both in my blog (David, 2020-) and in the "Temporary sanity" (2022) one of the Hebrew Psychology web.

Interviewers: What do you see as the current social and emotional needs of the gifted?

Hanna David: In my opinion, the most important emotional as well as social need of the gifted is the feeling that she or he is not alone, that there are others who understand them, both peers and adults. Intellectual and creative needs are also to be fulfilled, but a leading role is not just to satisfy the need of learning, knowing, but the need of social connections. Social problems of the gifted child have started being an educational issue only after education had become compulsory all over the world; prior to the second half of the previous century gifted children did not spend most of their time with peers of the same age, doing solely what the teacher had ordered them to. Often, they could learn with older children, in exclusive learning settings, by family members or adults who were carefully chosen by their parents. Having to "go to work" – the child's or adolescent's school – every day, for many hours, where they are to "learn" new things, but are offered subjects they have already mastered, deepens the feeling of loneliness the gifted feel. Furthermore: it happens quite often that the gifted child or adolescent is mocked, even bullied; in other cases, she or he learns that it would be better to hide their giftedness, and thus they learn to deny their own self, as giftedness is a substantial part of them, not a single characteristic that can easily be pushed aside of denied.

One of the main solutions to the "loneliness problem" is allowing, even encouraging a much more flexible school system, including the possibility of participating in special programs for the gifted, as well as free entrance to university-

based programs to whoever wishes to participate. When broadening the circle of potential peers, whether older or younger, initiating activities of all kinds for families with gifted children, opening access to university courses for everybody interested, not just to a certain-age-students who had been identified as gifted at a certain age by a certain test, any gifted child or adolescent will have a better opportunity to find others who share the same way of thinking, same interest, or both. This might alleviate – if not completely solve, the feeling of loneliness so many gifted children and adolescents feel.

Interviewers: The needs of the gifted are many- but are the competencies of our gifted teachers up to the challenge?

Hanna David: No, they are not. In Israel teachers do not have to take any courses in didactics for the gifted or psychology of the gifted, and it has been found in many studies, teachers' attitudes towards the gifted is far from being positive (e.g. David, 2011, 2014a). In fact, in a study of the 3-year program for future teachers of the gifted. Vidergor & Eilam (2010) found, that there was no difference between teachers who finished successfully this track and who did not take it.

Interviewers: Are there instances where gifted kids just need to be left alone to pursue their own interests?

Hanna David: Yes, there are. Here are some examples.

- A 7-year-old gifted girl who is the best student in her class wishes to pursue her goal: being a champion in rhythmic gymnast. She has expressed her school boredom time and again, there is no suitable learning system for her, while in order to become really exceptional in the sport she loves, she has to practice every day for the whole afternoon. Taking into consideration that a rhythmic gymnast must start while still very young, it is clear both to her and her parents that she might not be the best student in her classroom, neither will she have any time or energy for learning science, participating in any other creative of intellectual activity, or even participate in all social activities initiated by her school mates. But this girl has a dream which she has good prospects to materialize; I would recommend her parents to encourage to pursue her goal.
- A 14-year-old boy who has not been accepted to the local gifted classroom is an excellent programmer who had already started working in a start-up company. The parents are worried because their talented son has given up the prestigious physics-math track offered by his school and insisted that as he already knew what he wanted, they should allow him put a minimal effort in schoolwork and let him continue working in the same place. I would recommend the parents to be as tolerant with their son as possible, as there are good prospects he is to do both: make money while becoming more professional in his field of interest, while still being a school student and at the end being entitled to the matriculation certificate.
- A 15-year-old girl has just started her university math track (about two such Israeli tracks see David, 2019b). The teachers in her school call her parents every time she does not show in school because participating in university classes is more important for her. The parents fail to explain the school staff that their daughter is happy doing math, while in school she feels she just wastes her time. In such cases, which occur in various versions not rarely, I suggest that the parents notify the school principal that they are to let their child continue her formal learning in another, more permissive school. In most cases this notice work, and the girl continues to skip school classes in order to participate at the universities classes. But when it does not, I help the parents find another high school, sometimes in a different town, in order to help their daughter, materialize her dream.

Interviewers: What is the role of the mentor in gifted education?

Hanna David: The role of the mentor in gifted education is of great importance. In some cases, she or he is the only person the gifted child or adolescent feels close enough to emotionally. Sometimes the mentor's task is both social and intellectual: introducing the child to a new subject area while making it possible for them to meet others who share the same interests helps enormously. But even if the mentor's main role is helping the gifted find an area of interest, a subject matter to "fall in love with" (Kerr, 2014; Zorman & David, 2000); or choosing among the many interests, when the gifted is versatile (e.g. Kerr & Sodano, 2003), it is of great assistance. Pursing your goal might lead to find other people who become your friends, as has been the case in some University-based Israeli programs for gifted high school students (e.g. The Odyssey Program at Tel Aviv University, 2021).

Interviewers: There are many journals and conferences about gifted- do they really help the classroom teacher?

Hanna David: No, they do not help teachers in my country. Almost 30 years ago, when my first publications dealing with gifted students were published, I was sure that teachers would be interested in reading them. Thus, I published three of them in Journals whose target audience was schoolteachers, teachers in academic teachers' colleges, and policy makers in the field of education. My first publication was named "Educating gifted children in regular or special classes?" (David, 1997), it was published in a journal which "focuses on theory, research and practice regarding teacher education and professional development. The journal is designated for teacher educators, lecturers and students who are engaged in the field of teaching and education" (The Mofet Institute, 2022).

A year later it was re-published in a textbook of the Open University (ibid). The textbook consisted mainly of translated from English articles; mine was one of the 3 written in Hebrew, which had made me think that it would be read by many. On that year I also published: "Mathematical giftedness "(David, 1997b); this time in a yearly of the teachers' college where I was teaching. My article: "Five gifted children in one classroom: A case study" (David, 1999) was uploaded to the DAAT [=knowledge] web immediately after its publication, and since then was re-published once more in Hebrew and twice in English (ibid). More than 20 years have passed since then, during which many hundreds of families have met me, informing me about their child's difficulties in school.

But only two school teachers were willing to meet with me in order to help gifted children in their classes – all others required "information about the child" which, by both by law and ethics, I am forbidden to supply. My trials to meet with the whole school staff in order to answer their questions about gifted children have also been always refused. I met teachers and headmistresses only when the issue in question had to do with the child's behavior – in most cases my "role" was to defend it and try to persuade the teacher to let the child do more challenging tasks rather than the ones given to the rest of the children. In most of these trials I have failed.

I have also discovered, that though my writings in "Hebrew Psychology" (2022) web reached more than 750,000 readings (in January 2022), and there are many hundreds of people who follow each of my personal webs, teachers consist of a very small minority of my readers. To the best of my knowledge, none of these teachers is Israeli. I am disappointed, even sad, but I have already come to terms with this situation.

As for the influence of conferences on teachers: the situation is very similar to that of publications. Teachers in my country do not participate in activities aimed for enriching their knowledge about the gifted. For many years I had been trying to change this situation, but after my last trial I have ceased… In 2005 I had founded the Israeli Society for Research on and Promotion of Giftedness and Excellence and served as its head for two years. While about 80 researchers, university staff members and therapists participated, there was not even one schoolteacher who wished to be a member. Obviously, Israeli teachers – whose English is not sufficient in most cases – do not participate in non-Hebrew conferences and meetings.

Interviewers: What have we neglected to ask?

Hanna David: I do not think you have neglected any relevant subject.

Thanks a lot for this enjoyable interview. Answering the questions was stimulating, and gave me an interview to look inside myself, to look back at my life, and realize how much is still there for me to do!

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