

## Examining the Computer Self-Efficacy Perceptions of Gifted Students\*

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### Abstract

This study was conducted in order to determine the computer self-efficacy perceptions of gifted students. The research group of this study is composed of gifted students (N=36) who were studying at the Science and Arts Center in Gümüşhane province in the spring semester of the 2012-2013 academic year. The "Computer Self-Efficacy Perception Scale for Elementary School Students", which was developed by Işıksal and Aşkar (2003), was used as a data collection tool in the study. In view of this study, it was found that computer self-efficacy perceptions of the gifted students were high. Furthermore, it was found that computer self-efficacy perceptions of the gifted students differed in favor of male students. No significant difference was observed when computer self-efficacy perceptions of the gifted students were examined in terms of class level.

**Keywords:** Gifted students, self efficacy, computer self-efficacy perception.

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The concept of gifted students is defined differently in many diverse sources. The term “gifted students”, which was mentioned in this study, was used in accordance with the definition given by the Ministry of National Education (2007) of the Republic of Turkey. MEB [Ministry of National Education] (2007) defines gifted students as children/students who are determined by experts to exhibit a high level of performance compared to their peers in intelligence, creativity, arts, leadership capacity or specific academic fields. Johnsen (2004) stipulates three conditions for defining a student as gifted. The student must be observed to have features such as success and leadership; he/she must be compared with other groups having the same age and educational level; and it must be felt that he/she has a need for the development of his/her gift.

Prior to the 1950s, gifted students were identified using IQ tests. It became important to prioritize the academic success of gifted students as well as factors such as creativity, gift, learning potential and taking on a task in the models that were developed after this period. Gifted students are keen on developing abstract ideas and setting forth new ideas. Gifted students must be considered separately from successful students, and they must continue their learning process in a different educational program (Greenes, 1981).

Regarding the selection of gifted students in Turkey, students, who are suggested by classroom guidance counselors, parents or counseling and research centers, are nominated as candidates and sent to the related science and arts center by the office of principal in accordance with the criteria specified by the Ministry of National Education. Identification commissions, which are formed in the science and arts centers, perform a preliminary assessment for the students and report the results to the schools and parents of the students. The selected students were admitted to the basic ability test for the 7-11 age group. Students who succeed in this test become entitled to take the individual survey test that makes them realize their gifts (MEB, 2007). This test is conducted in order to distinguish the gifted students from the successful students. The students who are found to be gifted in view of the survey and assessment conducted by experts begin education in the science and arts centers in order to improve their gifts at an early age according to the individual education plan.

Individual learning is becoming a prerequisite for gifted students to improve their abilities. Since the number of gifted students is limited, an instruction through computer and teacher interaction or a computer-assisted instruction will help such students improve themselves through individual learning (Rosenthal & Suppes, 2002). Gifted individuals are

the ones that are expected to take significant roles in space research and technological developments in the society of the future (MEB, 2013).

Computers can be presented as the most fundamental factor that facilitates technological development (Öztürk, Kaplan & Öçal, 2011; Yıldız, 2012). Individuals, who can use a computer from early ages, are known to adapt to society more easily and become more successful in the society in their later years (Uzun, Ekici & Sağlam, 2010). Individuals' levels of computer self-efficacy are considerably important (Çetin, 2008). In this regard, it must be determined whether or not gifted individuals, who are the most fundamental people expected to support technological development, are adequate in computer literacy and how adequate that they feel themselves (their self-efficacy).

Bandura (1997) defines self-efficacy perception as the degree to which an individual see himself/herself as adequate to organize the necessary knowledge and perform the necessary skill to exhibit a certain performance. Özder, Konedralı and Sabancıgil (2010) define self-efficacy perception as the perception in one's capabilities to perform an activity. Computer self-efficacy perception can be defined as the degree to which an individual see himself/herself as adequate to use computer (Compeau & Higgins, 1995). Since self-efficacy is related with how much effort an individual will exert to solve the problem when he/she is in a difficult situation, it is a considerably important concept. Self-efficacy is important in order for the individual to reinforce his/her morale of resistance against an adversity and find instantaneous solutions (İpek & Acuner, 2011; Yılmaz, Gerçek, Köseoğlu & Soran, 2006). Self-efficacy also affects motivation and performance (Doruk & Kaplan, 2012; Gist, Schwoerer & Rosen, 1989). Individuals with a high level of computer self-efficacy perception are known to be more successful in computer usage and want to take more responsibility (Kutluca & Ekici, 2010).

Various studies, which measure computer self-efficacy perceptions of elementary school students, are as follows. In his study, Kutluca (2009) found that computer self-efficacy perceptions of elementary school students were at a good level. In their study in which they examined computer self-efficacy perceptions of second-level elementary school students, Uzun, Ekici and Sağlam (2010) concluded that self-efficacy perceptions of the students were at a moderate level. In his study in which he measured computer self-efficacy perceptions of the elementary school students, Tuti (2005) concluded that computer self-efficacy perceptions of the elementary school students were at a moderate level.

When the literature is examined, it is seen that there are many studies that highlight computer self-efficacy. However, a great majority of these studies was conducted with teachers and prospective teachers while some studies were conducted with elementary school students. Nonetheless, no study was encountered in the literature, which examined computer self-efficacy perceptions of the gifted students who must necessarily use computers in the future.

This study was conducted in order to determine computer self-efficacy perceptions of the gifted students. Answers were sought to the following problems in line with this aim.

1. What is the level of computer self-efficacy perceptions of the gifted students?
2. Do computer self-efficacy perceptions of the gifted students differ in terms of gender?
3. Do computer self-efficacy perceptions of the gifted students differ in terms of class levels?

### Method

In this section, information was given about the research method, research group, data analysis and data collection tools.

#### *Research Method*

This study was conducted by taking the quantitative research approach as basis. The utilized quantitative research design is case study. This is because case study is rather used in examining a specific case in detail and basing this case upon cause and effect relationships (Çepni, 2010).

#### *Research Group*

A total of 36 gifted students – who were studying at Gümüşhane Science and Arts Center; who accepted to participate in the study willingly; and who were selected in accordance with purposive sampling among the non-random sampling methods – constitute the study group in this study.

#### *Data Analysis*

Descriptive and inferential statistics methods were used in analyzing the data. Descriptive statistics methods were utilized in order to determine the gifted students' level of computer perceptions. For determining the students' level of computer perceptions, arithmetic mean ranges were found by considering calculation via "series span/number of groups to be formed" (Tekin, 1996) formula. Arithmetic mean ranges, which were used in the evaluation, are as follows: "1.00-1.80=Strongly Disagree", "1.81-2.60=Disagree", "2.61-3.40=Uncertain", "3.41- 4.20=Agree" and "4.21-5.00=Strongly Agree". Inferential statistics methods were utilized in determining whether or not computer self-efficacy perceptions of the gifted students differed in terms of gender and class level. When the data obtained via the scale were examined, it was observed that the data did not exhibit a normal distribution according to the variables of class level and gender. Therefore, the Mann-Whitney U Test was applied in order to determine whether or not computer self-efficacy perceptions of the gifted students differed in terms of gender whereas the Kruskal-Wallis H Test was applied in order to determine whether computer self-efficacy perceptions of the gifted students differed in terms of class level.

#### *Data Collection Tool*

The "Computer Self-Efficacy Perception Scale for Elementary School Students (CSEPS)", which was developed by Işıksal and Aşkar (2003), was used as data collection tool in this study. The scale was developed in accordance with 5-point Likert type composing of the following options: "Completely Agree, Agree, Undecided, Disagree and Completely Disagree". The reliability of the scale is 0.86. CSEPS is composed of two subscales, namely computer-related general knowledge (CRGK) and special computer skills (SCS). In the conducted study, Cronbach's Alpha internal consistency coefficients of CSEPS, CRGK and SCS were calculated as 0.87, 0.80 and 0.75 respectively. These values confirmed that CSEPS is a reliable measuring tool.

### Results

The arithmetic mean and standard deviation values of the scores achieved by the students were utilized in order to determine the level of computer self-efficacy perceptions of the gifted students. The arithmetic mean and standard deviation values of the scores achieved by the students in CSEPS and its subscales are presented in Table 1.

Table 1

The arithmetic mean and standard deviation values of the scores achieved by the students in CSEPS and its subscales

|       | N  | $\bar{X}$ | Sd  | Degree of agreement |
|-------|----|-----------|-----|---------------------|
| CSEPS | 36 | 4.12      | .54 | Agree               |
| CRGK  | 36 | 4.07      | .51 | Agree               |
| SCS   | 36 | 4.21      | .65 | Strongly Agree      |

When Table 1 was examined, it was found that the computer self-efficacy perceptions of the students were at “Agree” level. Thus, it can be stated that the computer self-efficacy perceptions of the students are at a high level. When the subscales were examined, it was observed that the scores achieved by the students in the subscale of computer-related general knowledge were at the “Agree” level whereas the scores that they achieved in the subscale of special computer skills were at “Strongly Agree” level. Thus, it can be stated that students’ computer-related general knowledge and their special skills are at a high level whereas their special computer skills are higher compared to their computer-related general knowledge.

In order to find an answer to the second problem of the research, the Mann-Whitney U Test was applied to the scores achieved by the students in CSEPS and its subscales according to their genders. The data, which were obtained by the implementation of the test, are given in Table 2.

Table 2

The Mann-Whitney U test applied to the scores achieved by the students in CSEPS and its subscales according to their genders

|       | Gender | N  | Mean Rank | Sum of Ranks | U      | Z     | p    |
|-------|--------|----|-----------|--------------|--------|-------|------|
| CSEPS | Male   | 19 | 23.37     | 444.00       | 69.00  | 2.992 | .003 |
|       | Female | 17 | 13.06     | 222.00       |        |       |      |
| CRGK  | Male   | 19 | 23.76     | 451.50       | 61.50  | 3.248 | .001 |
|       | Female | 17 | 12.62     | 214.50       |        |       |      |
| SCS   | Male   | 19 | 21.39     | 406.50       | 106.50 | 1.866 | .062 |
|       | Female | 17 | 15.26     | 259.50       |        |       |      |

When the data in Table 2 were considered, it was found that average score achieved by the students in the overall scale differed significantly in terms of their genders ( $U= 69.00$ ,  $Z=2.992$ ,  $p<.05$ ,  $r=.49$ ). This difference is in favor of male students. Therefore, it can be stated that computer self-efficacy perceptions of the gifted male students were higher compared to those of the gifted female students. When the subscales were examined, it was found that the scores achieved by the students in the subscale of computer-related general knowledge differed significantly in terms of their genders ( $U=61.50$ ,  $Z=3.248$ ,  $p<.05$ ,  $r=.54$ ). This significant difference occurred in favor of gifted male students. Therefore, it can be stated that computer-related general knowledge of the gifted male students are higher compared to those of the gifted female students. When the scores achieved in the subscale of special computer skills were examined, it was observed that the scores of the gifted male students were higher compared to those of the gifted female students, but this difference was not statistically significant ( $p>.05$ ).

Lastly, Kruskal-Wallis H Test was applied to the related scores to determine whether computer self-efficacy perceptions of the gifted students differed in terms of class level. The data obtained by the implementation of the test are given in Table 3.

*Tablo 3*

Kruskal-Wallis H test applied to scores achieved by the students in CSEPS and its subscales according to class level

|       | Class level | N  | Mean Rank | df | $\chi^2$ | p   |
|-------|-------------|----|-----------|----|----------|-----|
| CSEPS | 3th grade   | 10 | 16.30     | 3  | 3.61     | .30 |
|       | 4th grade   | 4  | 20.75     |    |          |     |
|       | 5th grade   | 7  | 24.57     |    |          |     |
|       | 6th grade   | 15 | 16.53     |    |          |     |
| CRGK  | 3th grade   | 10 | 14.25     | 3  | 5.10     | .16 |
|       | 4th grade   | 4  | 20.88     |    |          |     |
|       | 5th grade   | 7  | 25.29     |    |          |     |
|       | 6th grade   | 15 | 17.53     |    |          |     |
| SCS   | 3th grade   | 10 | 19.65     | 3  | 2.59     | .45 |
|       | 4th grade   | 4  | 19.38     |    |          |     |
|       | 5th grade   | 7  | 22.50     |    |          |     |
|       | 6th grade   | 15 | 15.63     |    |          |     |

According to Table 3, it was observed that the scores achieved by the gifted students in CSEPS and its subscales did not differ in terms of class level ( $p>.05$ ). Therefore, it can be

stated that computer self-efficacy perceptions of the gifted students, their computer-related general knowledge and their special skills did not differ in terms of class level.

### Discussion

Gifted individuals, who are expected to contribute greatly to technological research and space research, not only nationally but internationally, must be in a constant interaction with computers. It is not the case that the students should study only one aspect of computers; they must study them multi-dimensionally. The degree to which individuals who are expected to exhibit skills in many fields later in life interact with computers and develop their computer self-efficacy is considerably important.

In view of the study, it was found that the computer self-efficacy perceptions of the students were at the “Agree” level. When the subscales were examined, it was observed that their computer-related general knowledge was at the “Agree” level whereas their special computer skills were at the “Strongly Agree” level. That is to say, gifted students consider themselves exceedingly adequate in using computers and they believe that they can solve the problems they encounter. This result, which was obtained in the research, shows parallelism with the result of the research that was conducted by Kutluca (2009). This shows us that gifted students who are required interact with computers in their later lives are prepared for this interaction.

According to the results of this study, in which it was concluded that the computer self-efficacy perceptions of the gifted students were considerably high, attitudes and perceptions of the students can be identified by conducting studies that will measure the gifted students’ computer attitudes and self-efficacy perceptions in more comprehensive and larger samples. In performing the required activities, continuity must be maintained in the activities that increase the computer attitudes and self-efficacy perceptions of the students, and an attempt must be made to raise the attitudes and self-efficacy perceptions of the students.

In view of the study, it was observed that there was a significant difference in favor of male students in computer self-efficacy perceptions of the gifted students. This result shows parallelism with the results of various studies that were conducted with elementary school students (Işıksal & Aşkar, 2003; Miura, 1987; Uzun, Ekici & Sağlam, 2010). In some conducted studies, it was concluded that there was no significant difference between computer self-efficacy perceptions of elementary school female students and male students (Kutluca, 2009; Tuti, 2005).



Moreover, it was also concluded in the study that the computer self-efficacy perceptions of the gifted students did not differ in terms of class level. This result shows parallelism with other studies that were conducted with elementary school students (Uzun, Ekici & Sağlam, 2010). In some conducted studies, it was concluded that there was a parallelism between class level and computer self-efficacy perceptions of the students (Kutluca, 2009).

This study is limited to 36 gifted students who were studying at Gümüşhane Science and Arts Center. This study can be repeated using different research approaches, different study groups and different data collection tools. Cognitive and affective competences of gifted students at every educational level can be determined using various measuring tools. Insufficient points can be detected and preventive measures can be taken by conducting these measurements. The relevant institutions must attach importance to these sorts of studies on gifted students. These students are the individuals who will contribute to the development of our country in scientific, social, cultural and economic fields in the future; or at least, these are the individuals with the greatest potential to provide such contributions. It is hoped that the results, which will be obtained via the studies conducted on these individuals, will not only add to the related literature but also provide great contributions to raising the students better and taking preventive measures to eliminate detected insufficiencies.

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