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PRE-SERVICE TEACHERS' COGNITIVE CONSTRUCTS REGARDING THE CHARACTERISTICS OF A GOOD INFORMATION TECHNOLOGIES ACADEMICIANS

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Abstract

This paper focuses on revealing and modeling the cognitive constructs of pre-service teachers regarding the characteristics of a good IT academician. The research was carried out via the exploratory sequential design with the participation of 42 volunteer pre-service teachers enrolled in the Department of Computer and Instructional Technology. The data were obtained through the structured interview according to the repertory grid technique. The data obtained were analysed by taking into consideration similarities and common features. 426 cognitive constructs were found. Cognitive constructs were collected under 11 sub-categories. These categories were also divided into three main categories: attitudes and values, professional knowledge, and professional skills. As a result, essential constructs within the model of a good academician include the relationship among students, knowledge of field education, and field knowledge. The model revealed a whole set of characteristics rather than a few characteristics of a good IT academician. The model can be used to evaluate IT academicians and to explain the relationship among their characteristics.

Keywords: Pre-Service Teachers', Good IT academician, Cognitive constructs, IT academician Characteristics

Introduction

Education is a process that helps individuals gain knowledge, skills, and insights required for self-realization in society and teaching effectiveness. Basically, there are two indispensable factors in education. These are those who teach (teacher) and who learn (student) (Akgün, 2016), followed by physical fitness and some other factors. A teacher refers to a person specialized in both practical and theoretical fields, who uses different

teaching and learning environments in the most effective way and constantly interacts with students (Başaran, 1993). A teacher is traditionally seen as the person who obtains and transfers information. However, advancing technology has changed the way students have access to information. Although such advances make access to information simpler, students need mentors to guide them (Karacaoğlu, 2008). Technological advances have significant influences on the educational, socio-cultural, socio-economic, and political structures of the countries.

Consequently, technology is used in various forms of education depending on the field. One of these fields is the field of information technologies. Information technologies (IT) is a system that uses communication technologies with the computer and transforms data into information (Özdemir & Pınar, 2019). IT is conceived as data that can be meaningful and useful for users (Akolaş, 2009). Information technologies ensure that we complete tasks more quickly as well as increase the effectiveness and quality of tasks. The demand for information technologies is increasing day by day and if such demand emerges at a young age, then the use of technology may be more accurate and effective (Özgenel, Baydar & Çalışkan Yılmaz, 2018). Being more common today, information technologies have started to play a role, particularly in education, by imposing several obligations on educators and requiring several characteristics that good and ideal teachers should possess apart from professional development.

Some studies have been conducted on the characteristics of good teachers. According to Kivinen and Rinne (1995), a good teacher should be a success-oriented and healthy one who has the ability to undertake the responsibility of management and produce creative ideas. Witcher and Onwuegbuzie (1999), on the other hand, stated that pre-service teachers were of the opinion that a good teacher should be student-centred. In the study based on student opinions to determine the competencies of teachers, Senemoğlu (2001) reached the following conclusions: A good teacher should make necessary preparations before the lesson starts, be solution-oriented and aware of how students best learn, maintain discipline in the classroom, strive to strengthen students' motivation, use the necessary materials, and always show love and respect. In another study, it was determined that a good teacher should be mainly student-centred (Minor, Onwuegbuzie, Witcher & James, 2002). In another study, some of the characteristics of a good teacher include motivating and guiding students, helping them gain self-confidence, establishing good relationships, and commanding respect for one another (Telli, Brok, & Cagiroglu, 2008). In his study related to the teacher of English, Khan (2011) claims that teachers, in general, should be role models to future generations by being good instructors, facilitators, and curriculum developers. In another study with 224 pre-service teachers, four main characteristics of a good teacher were given as respect, responsibility, reliability, and honesty (Gallavan, Peace & Thomason, 2009). Ulusoy (2013) conducted a study with 234 elementary pre-service teachers attending a public university in Ankara with the conclusion that a good classroom

teacher should possess a love for children and his or her profession. Başaran and Baysal (2016) also revealed that pre-service teachers believe that a good teacher should not only impart knowledge but also keep teaching interestingly. Also, pre-service teachers should have a good knowledge of the field and a love for the profession, and moral values. Sezer (2018) studied the cognitive structure of 21 pre-service teachers and found 210 cognitive structures in eight categories emerged. The frequently repeated cognitive structures in the research were "communication skills, professional competence, field expertise, motivational skills, friendliness, fair behavior, respect for opinions, creativity, innovation, academic equipment, being scientific and classroom management".

Personal constructs are used in the researches based on the opinions of individuals. Many theories in the literature explain the personal construct. In this research, the personal construct theory developed by Kelly (1955) was taken as a basis. This theory does not take into account the common perceptions of individuals in the group; on the contrary, it gathers data based on individual perceptions (Kelly, 1991). Personal structure theory aims to explain that individuals' tendencies in their psychological systems are formed through their experiences as each individual has distinctive experiences. Each individual is expected to make more valid and realistic predictions about real-life events (Adams-Webber, 1996). The basic foundation of the personal construct is the cognitive construct. The cognitive construct determines the general lines in which a range of information is combined and how this range of information should be related (Cüceloğlu, 1991). This construct plays a crucial role in remembering and learning. The cognitive construct is defined as new interconnected information as interconnected groups used to separate them (Davidson, 1977). Kelly (2003), on the other hand, stated that they use various fictional constructs to express the dimensions of the individuals' experiences, which are based on the sentences and definitions that individuals express.

Moreover, it has been observed that the characteristics of a good teacher and academician are revealed in different fields based on these analyses. However, there is no consensus on the characteristics that good academicians should possess and no study that reveals these characteristics. In this context, it is important to determine the cognitive constructs regarding the characteristics of the senior IT pre-service teachers. It is believed that if the characteristics of a good academician are revealed, then IT academicians may be better evaluated based on these characteristics. Therefore, this study aimed to reveal and model the characteristics of a good IT academician in the cognitive constructs of pre-service IT teachers. For this purpose, the following research questions were addressed:

1. What are the first ten cognitive constructs of pre-service IT teachers regarding the characteristics of a good IT academician?
2. What are the sub-categories of cognitive constructs of pre-service IT teachers regarding the characteristics of a good IT academician?
3. To what extent are these sub-categories important?
4. What are the main categories of these sub-categories?

5. How do pre-service IT teachers model a good IT academician in their cognitive constructs?

Method

This section includes the design, participants, data collection tool, and data analysis of the research.

Research Design

This research is based on the exploratory sequential design as one of the mixed model methods. The mixed model ensures that both qualitative and quantitative data are obtained and it unearths results by combining two sets of these data (Creswell, 2003). Within the exploratory sequential design, on the other hand, the researcher collects and analyzes the qualitative data from the study group at the first stage, while the researcher collects quantitative data and tests or generalizes these data (relationship and similarity) at the second stage (Creswell, 2003).

Participants

Participants were 42 volunteer pre-service teachers attending the fourth-grade education of computer and instructional technology education departments of three public universities in the spring term of the 2019-2020 academic year. The research was limited to the fourth-grade pre-service teachers as they were thought to reveal distinctive characteristics. The demographic characteristics of pre-service teachers were presented in Table1.

Table 1. The Demographic Characteristics of Pre-Service Teachers

Universities	Gender	N	%
University	F	9	21
	M	11	26
University	F	7	17
	M	5	12
University	F	6	14
	M	4	10

Data Collection Tool

Data were obtained through an interview form structured based on the repertory grid technique. The repertory grid is a technique that was developed to identify the ways that a person construes his or her experience (Kelly, 1955). The researcher asked participants to write down at least 10 characteristics that may identify three good IT academicians. The data obtained were used to identify the cognitive constructs of pre-service IT teachers. It was decided by the ethics committee unit of Siirt University that there are no objections in terms of research ethics in the research in accordance with the decision dated 2020 and numbered 1816.

Data Analysis

426 positive cognitive structures emerged via the repertory grid form applied to pre-service IT teachers. Before starting the analysis, the first 10 cognitive constructs were identified and then these constructs were analyzed by taking into consideration similarities and common features. After the analysis, cognitive constructs were first ranked in sub-categories and then in main categories. Accordingly, the characteristics of good academicians were divided into 11 sub-categories and 3 main categories. The categories were grouped in such a way that no cognitive construct was excluded. In order to add relative values to the cognitive constructs reached in such studies, the hypothesis "first answers precede those reached later" (Gordon, 1968). Accordingly, the first cognitive construct of pre-service teachers participating in the study was graded as 10 while the other cognitive constructs were graded backward, respectively. In the research, the cognitive constructs of the pre-service teachers were ranked according to frequency and averages. It was observed that some of the pre-service IT teachers mentioned negative constructs of the characteristics of IT academicians in the relevant repertory grid form. Since this situation does not match the purpose of the research, 9 repertory grid forms were not included in the analysis.

Findings

426 positive cognitive constructs emerged as shown in Table 2, which includes the first 10 cognitive constructs.

Table 2. The First Ten Cognitive Constructs

Cognitive Constructs	N	%
Student-centeredness	28	6,57
Good command of technology	25	5,87
Field knowledge	24	5,63
Good command of a specific course	19	4,46
Good Communication	19	4,46
Openness to innovation	19	4,46
Loving job	14	3,29
Guidance	11	2,58
Learning to teach	10	2,35
Classroom management	10	2,35

Table 2 shows that the first ten cognitive constructs of pre-service IT teachers regarding the characteristics of good IT academicians are student-centeredness (N= 28, 6.57%), good command of technology (N=25, 5.87%), field knowledge (N=24, 5.63%), good command of a specific course (N=19, 4.46%), good communication (N=19, 4.46%), openness to innovation (N=19, 4.46%), loving for job (N=14, 3.29%), guidance (N=11, 2.58%), learning to

teach (N=10, 2.35%) and classroom management (N=10, 2.35%), respectively. Thus, these cognitive constructs were divided into sub-categories as shown in Table 3.

Table 3. Sub-Categories of the Cognitive Constructs

Sub-categories	N	%
The relationship with students	106	24,88
Knowledge of field education	61	14,32
Communication and cooperation	56	13,15
Field knowledge	55	12,91
Management of the teaching and learning process	38	8,92
Personal and Professional Development	34	7,98
Creating Learning Environments	23	5,40
Universal values	22	5,16
Education Planning	21	4,93
Knowledge of Regulations	8	1,88
Assessment and Evaluation	2	0,47

Table 3 shows 11 sub-categories which includes the relationship with students (N=106, 24.88%), knowledge of field education (N=61, 14.32%), communication and cooperation (N=56, 13.15%), field knowledge (N=55, 12.91%), management of teaching and learning processes (N=38, 8.92%), personal and Professional development (N=34, 7.98%), creating learning environments (N=23, 5.40%), universal values (N=22, 5.16%), education planning (N=21, 4.93%), knowledge of regulations (N=8, 1.88%), and assessment and evaluation (N=2, 0.47%). Thus, the importance level of these 11 sub-categories was given in Table 4.

Table 4. Ranking of Importance Levels of Sub-Categories of Cognitive Construct

Sub-categories	N	Mean	%
Assessment and Evaluation	2	6,50	0,47
Knowledge of field education	61	6,43	14,32
Personal and Professional development	34	6,21	7,98
Communication and cooperation	56	6,11	13,15
The relationship with students	106	5,75	24,88
Knowledge of regulations	8	5,50	1,88
Field knowledge	55	5,22	12,91
Management of the teaching and learning process	38	4,77	8,92
Education planning	21	4,65	4,93
Creating learning environments	23	4,56	5,40
Universal values	22	3,83	5,16

Table 4 shows that 11 sub-categories based on the importance level are as follows: assessment and evaluation (M=6.5, 0.47%), knowledge of field education (M=6.43, 14.3%), personal and Professional development (M=6.21, 7.98%), communication and cooperation (M=6.11, 13.15%), the relationship with students (M=5.75, 24.88%), knowledge of regulations (M=5.50, 1.88%), field knowledge (M=5.22, 12.91%), management of the teaching and learning process (M=4.77, 8.92%), education planning (M=4.65, 4.93%), creating learning environments (M=4.56, 5.40%), and universal values (M=3.83, 5.16%). Thus, these sub-categories were divided into three main categories, which were presented in Table 5.

Table 5. Main Categories of Cognitive Constructs

Sub-categories	Main Categories	N	%
The relationship with students Communication and cooperation Personal and professional development Universal values	Attitudes and values	218	51,17
Management of the teaching and learning process Education planning Creating learning environments Assessment and evaluation	Professional Knowledge	124	29,11
Knowledge of field education Field knowledge Knowledge of regulations	Professional Skill	84	19,72

Table 5 shows three main categories, which were as follows: attitudes and values (N=218, 51.17%), professional knowledge (N=124, 29.11%), and professional skill (N=84, 19.72%). Thus, the model of a good IT academician was presented in Figure 1.

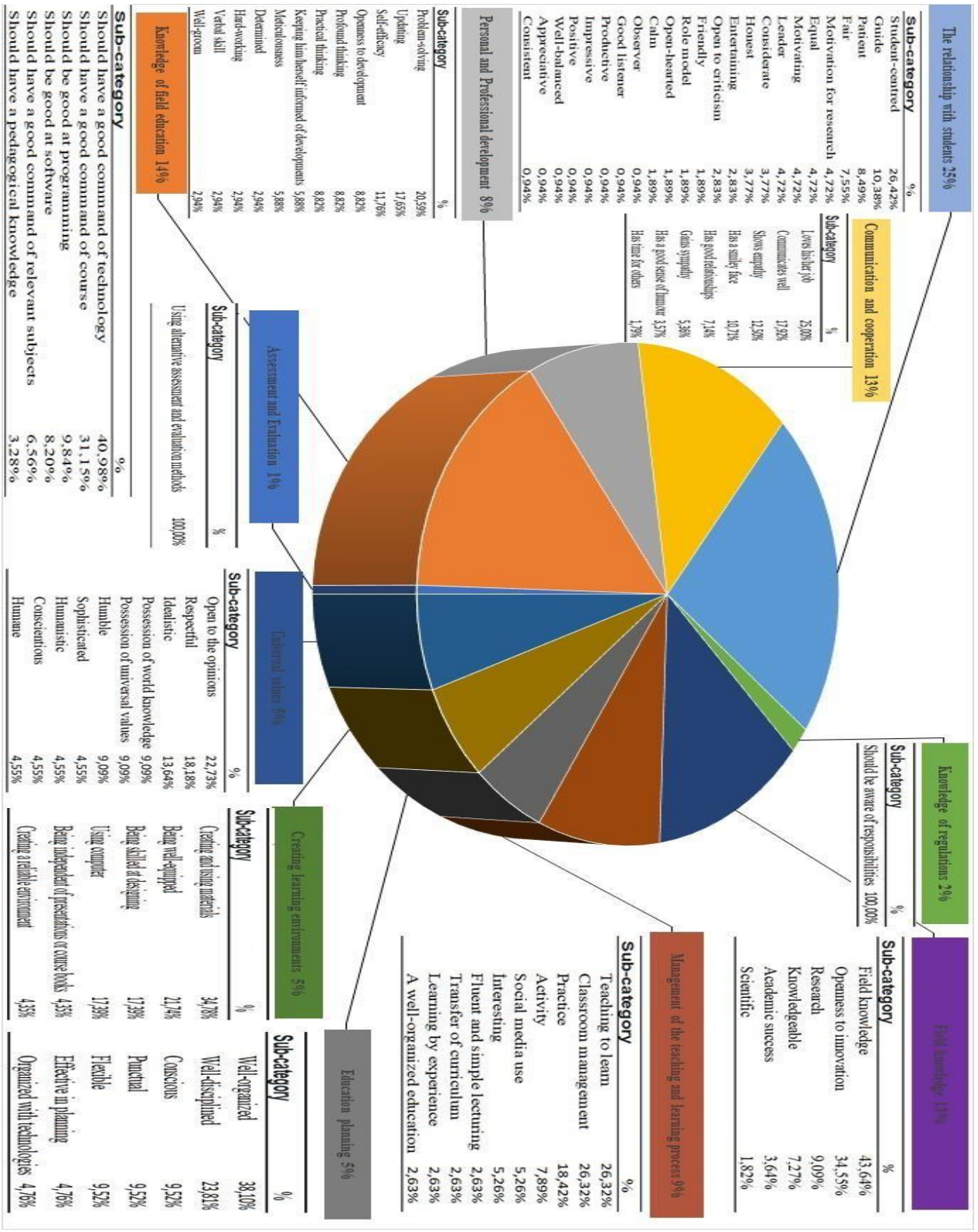

Figure 1. The model of a good IT academician

Figure 1 includes 11 sub-categories that were divided into internal constructs ranked in percentage. The three main characteristics of a good IT academician in the model were the relationship with students by 25%, knowledge of field education by 14%, and field knowledge by 13%. The essential constructs of the relationship with students were student-centeredness by 26.42% and guidance by 10.38%. The essential constructs of field knowledge were good command of technology by 40.98% and a good command of a specific course by 31.15%. Finally, the essential constructs of knowledge of field education were field knowledge by 43.64% and openness to innovation by 34.55%.

Discussion

This study was designed to reveal and model the cognitive constructs of pre-service IT teachers regarding the characteristics of IT academicians using the exploratory sequential design and via the repertory grid form technique. However, since 9 repertory grid forms filled by pre-service IT teachers did not match the purpose of the research, they were excluded from the analysis. 426 cognitive constructs were produced by pre-service IT teachers regarding the characteristics of good IT academicians.

In the study, the top ten frequently repeated characteristics of IT academicians were found to be student-centeredness, good command of technology, field knowledge, good command of a specific course, good communication, openness to innovation, loving job, guidance, learning to teach, and classroom management. These results are similar to the results of some other studies, albeit in a different order. Sezer (2016) revealed similar cognitive constructs. Sezer (2018) found the following constructs: communication skills, professional competence, field expertise, motivation skills, geniality, fair behavior, respect for opinions, creativity, innovativeness, academic competence, being scientific, and classroom management. Başaran and Baysal (2016) also enumerated 10 cognitive constructs, which are as follows: conscience, patience, personal care, cleanness, amiableness, friendliness, decency, solution-orientation, fairness, and confidence. Furthermore, it should be noted that results are in line with the results of different studies in the literature (Senemoğlu, 2001; Stronge, Tucker & Hindman, 2004; Telli, Brok & Çağıroğlu, 2008; Gençtürk, Akbaş & Kaymakcı, 2012; Küçükoğlu, Taşgın & Saadni, 2014).

The cognitive constructs obtained in the study were collected in 11 sub-categories based on their similarity and common features. These categories were divided into three main categories, which were attitudes and values, professional knowledge, and professional skills, respectively. The importance levels of the categories collected were assessment and evaluation (0.47%), knowledge of field education (14.3%), personal and professional development (7.98%), communication and cooperation (13.15%), the relationship with students (24.88%), knowledge of regulations (1.88%), field knowledge (12.91%), management of the teaching and learning process (8.92%), education planning (4.93%), creating learning environments

(5.40%), and universal values (5.16%). Sezer (2016) obtained eight similar main categories considering the similarity and functionality. Başaran and Baysal (2016) examined the characteristics of good teachers in terms of the definition of a good teacher, individual characteristics, field competence, pedagogical formation, communication skills, general culture, the relationship with students, selection features, and educational environment. Therefore, this shows similarity with the findings of some studies (Beyer, 2002; Murphy, Delli, & Edwards, 2004; Darling-Hammond & Baratz-Snowden, 2005) conducted in the literature.

Subsequently, the three main characteristics of good IT academicians were found to be the relationship with students, knowledge of education regarding the field, and knowledge of the field itself in the study. One may notice that the essential constructs regarding the relationship with students are student-centeredness and guidance. Besides, while the essential constructs of knowledge of field education are a good command of technology and course, the essential constructs of field knowledge are field knowledge and openness to innovation. Işıktaş (2015) emphasized the importance of using technology and pursuing innovation regarding the characteristics of a good teacher. These constructs overlap with the findings of studies conducted by (Yanpar-Yelken, Çelikkaleli & Çapri (2007), Darling-Hammond (2008), Şahin (2011), Gençtürk, Akbaş & Kaymakcı (2012), Ulusoy (2013), Çalışkan, Işık & Saygın (2013), Shuls & Trivitt (2015)).

Conclusion

In conclusion, the good IT academician model that emerged in the study was comprised of 426 cognitive constructs collected under 11 sub-categories of three main categories. Among the three main characteristics that constituted 52% of all, which the researcher believes are vital for the definition of a good IT academician, were the relationship with students by 25%, knowledge of field education by 14%, and field knowledge by 13%. However, the model reveals a whole set of characteristics of a good IT academician rather than a few characteristics specified above. Therefore, the model taken as a whole may help explore the relationship between the characteristics of a good IT academician and evaluate them.

As today's world is evolving into a digital world, it is essential to keep up the advances, particularly in the field of IT and thus, those who are responsible for teaching in such fields should be well-educated. The findings of this study reveal that good IT academicians should possess the qualifications not only in the field but also in terms of pedagogical issues. For, students constitute the main parts of education life at all levels of education, therefore, academicians should be aware of strategies that may enhance student motivation and improve their relationships with students not only in classes but also outside of classes. This is a sort of prerequisite for good academicians. Besides, academicians should be well-equipped in terms of advances in the field without being confined to old methods and strategies

to be applied while teaching. Finally, as field knowledge changes day by day, just like in any other professions or academicians in universities, IT academicians also should build on their field knowledge through reviews of articles, laboratory studies, policies, or methods created by other scholars in the field.

This study is limited to only the students of computer education and instructional technology teaching departments at three universities in Turkey. Thus, it should be kept in mind that more research is needed for the field and to contribute to the literature to reveal other characteristics of good academicians not only in the field of IT but also in other fields that are closely or slightly related to the field of IT.

Implications and Recommendations

The findings highlight that IT academicians should be provided with in-service training about student-centeredness and guidance as well as courses about using technology and innovative approaches. As this study was limited to 42 pre-service IT teachers, it is recommended that studies on more participants should be conducted. Finally, it is recommended that studies on the cognitive constructs of different phenomena may be carried out using similar techniques.

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SCIENCE EDUCATION FOR GIFTED STUDENTS: OPINIONS OF STUDENTS, PARENTS, AND TEACHERS

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Abstract

This paper aims to examine the opinions of gifted children, their parents, and science teachers working at the Science and Art Centre (BILSEM) regarding science education for the gifted. The present study participants, which was conducted by utilizing the phenomenology design using one of the qualitative research methods, were ten talented students, seven parents, and two science teachers working at BILSEM. The study's data were collected using semi-structured interviews held with the participants. The collected data were analyzed by adopting the data analysis process proposed by Moustakas (1994) for phenomenological studies. The study revealed that gifted students possess a mental perception of sciences in the form of life, experience, and scientific knowledge. Talented learners want to learn science by employing experiments, projects, excursions, and observations. Based on these findings, it is recommended that gifted students should be provided with an enjoyable science learning environment to make them active, have fun while learning, perform experiments, and develop projects.

Keywords: Science, gifted children, teacher, parents, phenomenology

1. Introduction

Gifted children often try to understand and are curious about all that is happening in their environment. Based on this data, it would not be wrong to claim that gifted children are generally interested in sciences (Camcı Erdoğan, 2014; Gallagher, 2006; Smutny & Von Fremd, 2004). While Gallagher (2006) states that sciences naturally appeal to gifted children,

Smutny and Von Fremd (2004) claim that gifted students have an inborn interest in sciences as they satisfy their imagination. On the other hand, natural science is a branch of science that necessitates reason, and the gifted possess a high level of reasoning ability (Brody & Stanley, 2005). Accordingly, it can be concluded that the attributes possessed by gifted children are relatively consistent with the nature of sciences. The best way to develop gifted children's unique talents is to expose them to challenges. Since science challenges the gifted learners' minds and curiosity, it is the most effective subject in enhancing their potentials (Singh, 2008; VanTassel-Baska & Stambaugh, 2006). However, it is observed that gifted students' success or performance during science education is not at the expected level. Hence, it is essential that more effort should be put to develop new science standards and to support and enhance gifted children's science education capacities (Singh, 2008). VanTassel-Baska (1998) proposes a science education based on active learning, problem-solving in-depth understanding of the units, and independent learning groups. Compared to other methods, problem-based and hands-on student-centred science education instil in gifted children more excitement and motivation to interact and the willingness to participate in class activities (VanTassel-Baska et al., 1998). A study conducted to evaluate materials for gifted children revealed that textbooks used in science lessons failed to satisfy the talented ones. During the education of the gifted, modular materials, which require students to exercise their questioning skill, helps them to carry out research such as problem-based activities, which enable students to engage in higher-order thinking (Johnson et al., 2013).

Receiving science education in such a way is not a privilege but a right for gifted students. However, the teaching that the gifted are exposed to schools is generally far from including the enriched science activities they need (VanTassel-Baska, 2006). When educators provide the gifted with opportunities to do free research and make discoveries, they often believe that they have designed the learning environment conducive to them. Differentiated programs in line with the needs of gifted students increase the academic achievement, creativity, attitude, and self-confidence of these students (Ayverdi, 2018). However, even though these implementations accelerate gifted students' ability to ask and respond to questions, they are, indeed, insufficient (Meador, 2003). Thus, it can be concluded that certain insufficiencies and problems in science education for the gifted need urgent solutions. Considering the deficiencies and problems, efforts are continuously made to make science education for the gifted more effective.

Research on gifted Turkish education is slow-paced when compared to other countries (Gökdere & Çepni, 2005). Moreover, the exceptional educational opportunities for the gifted in Turkey are limited to BILSEM (Camcı Erdoğan, 2014). BILSEM was founded to help talented students get enrolled in schools bound to the Ministry of National Education (MoNE) with education in areas they are interested in and have a talent for after formal school hours. These institutions, which provide part-time education, prepare individualized education programs and lesson plans for each student.

In other words, BILSEM does not implement one common curriculum for all the students. BILSEM aims to raise gifted students who can think creatively, conduct scientific research, make discoveries, and actively participate in the educational process by engaging in hands-on experimental learning with the guidance of leader teachers (BILSEM Guidelines, 2007). Students who attended BILSEM are selected by utilizing an exam administered by MoNE. Also, students who achieve a sufficient level of performance in this test are subjected to an individualized assessment by MoNE experts. With the experts' approval, students start to receive education at BILSEM (BILSEM Guidelines, 2007).

Therefore, the opinions of teachers working at BILSEM and those of parents, who closely follow what their children experience during their educational process, can provide clues as to how science education for the gifted should be designed. In this way, if gifted students receive education in these centers following attributes peculiar to themselves, this will contribute to the development of both the gifted individual, the society, and our country. If this education is implemented with special care in sciences, these children will become scientists. Consequently, it can be stated that gifted children are a minority group that is highly important for the future of our country, and they have the power to shape our future. Thus, the present study focused on two crucial areas, namely the gifted and science education. The study's primary aim is to examine and synthesize the opinions of gifted children, their parents, and the science teachers working at BILSEM with respect to science education for the gifted. It also aims to propose a framework regarding science education for the gifted. The research question that the study sought to answer is as follows: "What are the opinions of gifted children, their parents, and the science teachers working at BILSEM following science education for the gifted?"

2.Methods

2.1 Research Design

One of the qualitative research methodologies, namely the phenomenology design, was utilized in the present study. Phenomenology is a design by which individuals' experiences related to a phenomenon are described (van Manen, 1990; Moustakes, 1994). The phenomenon examined in the present research study is the participants' opinions regarding science education for gifted students.

2.2 Participants

The research study participants were the gifted students attending BILSEM, located in Central Anatolia in Turkey, their parents, and the science teachers working at the same BILSEM. Subsequently, the gifted children who are to participate in the study were selected using criterion sampling, a purposeful sampling. The criteria defined in the present study were as follows:

- ✓ Attending the BILSEM supportive education program,
- ✓ Being interested in sciences, and

✓ Volunteering to participate in the research study.

In conclusion, the participants of the present study were comprised of 10 gifted students (between 12-13 years of age, six males and four females, two from a private school and eight from a public school), seven parents (three males, four males), and two science teachers working at BILSEM (two males, one with a bachelor's degree and one with a master's degree). The initial aim was to interview all the students participating in the study, but three of the parents were reluctant to participate in the study. Therefore, an interview could not be held with the parents of three students.

2.3 Data Collection Tools

The data of the research were collected in the second semester of the 2015-2016 academic year. The data collection technique employed in the present research study was the semi-structured interviews held with the participants. Interview protocols were prepared before the interviews. The researcher formulated the questions in the protocols based on the research questions by reviewing the related literature. The protocols designed were submitted to three field experts to be evaluated from various aspects, such as the consistency of the protocol questions with the research questions and the participant groups. Two of these experts were associate professors in science education, while the other expert held a PhD degree in the Education of the Gifted. Before the interviews in the present study, a meeting was held with the students, teachers, and parents.

The interviews were held in the counsellor teachers' room in BILSEM with only the researcher and the participant being interviewed. The interviews were held in this environment to ensure the security and easy accessibility of the participant. The interviews were recorded via a voice recorder upon the approval of the participant during the interview. The recorded interviews were transcribed within the shortest possible time. During the transcription, the data were written verbatim, making no changes whatsoever. Moreover, the participants' hesitations (e.g., expressions indicating waiting, thinking), and indications such as joy (e.g., laughing) and distress were also incorporated into the transcription.

2.4 Data Analysis

The data collected were prepared for analysis prior to the beginning of the study's data analysis process. To this end, initially, the interviews held with 19 people were transcribed verbatim by the researcher. The transcription process was completed in approximately two months. After the interviews, which were voice recorded with the participants' approval, it was converted to a Microsoft Word document and a code was assigned to each participant. The gifted students were coded from GS1 to GS10, the parents were coded from P1 to P7, and the science teachers were coded as T1 and T2. Subsequently, data analysis was conducted.

In the present study, the data analysis process proposed by Moustakas (1994) for phenomenological studies was employed. Thus, prior to data analysis, the data were prepared for data analysis. By following the steps of

phenomenological reduction, imaginative variation and uncovering the essence of the experience, the data analysis process was completed. Thus, Figure 1 displays the stages of phenomenological data analysis.

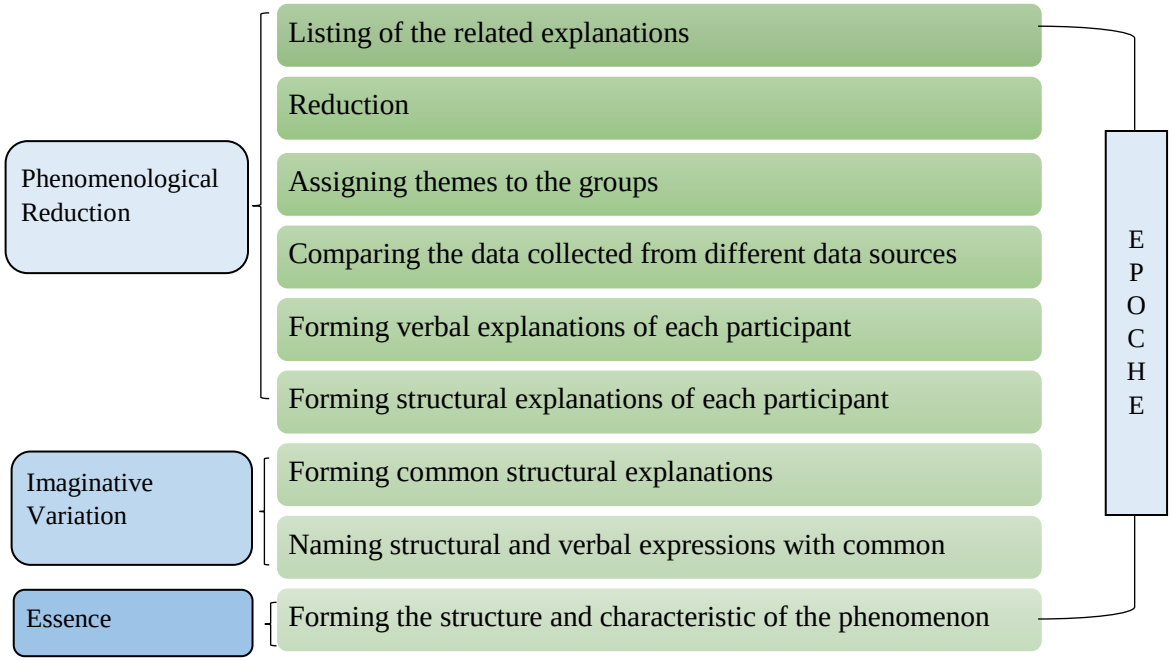

Figure 1. The Data Analysis Steps in a Phenomenological Study (Moustakes, 1994)

2.5 Validity and Reliability

To ensure the present study's internal validity, data source variability was obtained by interviewing gifted children, parents, and teachers. With the analysis of the data collected by two experts, the researcher variability was ensured. Another way the researcher can obtain internal validity is to collect data in the participants' natural environment. Hence, the data of the study were collected at BILSEM. In addition, the study was followed up by experts in the field throughout the process.

To guarantee external validity in the study, the research took the following measures: defined her role in the research process, straightforwardly defined the participants, described the environment where the research was conducted, and explained in detail the data collection and analysis processes (Yıldırım & Şimşek, 2013). Thus, another research wanting to replicate the study can arrive at similar results with similar implementations.

To assert that the study was internally reliable, the data were described and presented in the results section without adding any interpretations. Moreover, direct quotations of the participants' statements have been reported in the results section. Another measure was taken to ensure that the study's internal reliability was the data being analyzed by both the researcher and another expert in the field. The data obtained from the interviews held

with each participant in the research were transcribed. Subsequently, the researcher had the participants read these transcriptions and obtain their opinions regarding whether the data expressed them wholly and accurately (Member Check). Likewise, after the completion of the data analysis process, the participants were consulted, and feedback was received regarding the accuracy of the analysis. Besides, to increase the validity and reliability of the present research study and prevent loss of data, the interviews were voice recorded with the participants' approval, and notes were taken. The interviews were transcribed verbatim. Subsequently, by using a member check mechanism, the participants were asked whether the data reflected them and to make corrections if there were any that did not reflect them.

3. Findings

3.1 The Perceptions of the Gifted Regarding Sciences

Individuals' perceptions regarding any phenomenon can influence their life with respect to that phenomenon. Accordingly, before eliciting their opinions regarding science education, the gifted students were asked the following questions: "What does science mean to you? What does science mean? Could you please explain?" The findings obtained reveal that the gifted envisage sciences as experiments, as something fun, the whole of scientific knowledge, life, natural science, and a multi-disciplinary field. However, the most frequent statements used by the gifted students to describe their perceptions of sciences were 'Science is life' and 'Science is an experiment' (4/10). Furthermore, some participants described sciences as the whole of scientific knowledge (3/10), while others described it as being fun (3/10). Below are some direct quotations from some most clearly expressed participant statements of opinion:

"[Natural] Sciences is a branch of science which is fun and comprises our life and for this reason very useful and also it includes many topics." (GS6)

"Science, uhmmm (thinking)… I think science means experiment and life." (GS8)

3.2 The Educational Methods and Techniques Preferred by the Gifted in Science Education

The Opinions of the Gifted Students

In the interviews held with the gifted students, they were asked how they would like to learn the sciences, that is, what teaching method or techniques they wanted to use in the lessons. It was revealed that gifted students want to learn science by utilizing a student-centered approach using practice and research-based strategies. The participants were found to prefer to learn science operating practice, not memorization. Moreover, gifted students reported that they wanted to learn sciences through a method by which students did research and analysis, had fun, and how students' attributes were taken into consideration.

Participant GS5 expressed his/her opinions regarding science education as follows: *"I would like to learn science hands-on; I mean by*

doing experiments and research. Also, the teacher should be one that is closely concerned about his or her students. In this way, we can learn science easily; that's how I would want it to be." On the other hand, to summarize, it can be concluded that gifted students underscore the importance of the use of teaching strategies based on research and analysis in science, just as it is done in current science programs. In addition, the participants desire a science learning environment where their interests and attributes are prioritized.

The Opinions of the Parents

The parents participating in the study were asked what their opinions were regarding how they would like their gifted children to learn sciences. The parents' responses revealed that they wanted their talented children to learn sciences hands-on by doing experiments that are their responses, which were entirely consistent with those of the students. Moreover, some parents stated that they wanted their children to learn sciences by researching, reading books, and watching videos on the Internet.

Of the parents who stated that they wanted their children to learn science by doing experiments (P1, P3, P4, P5, P7), P4 explained his/her opinions as follows: *"He/she wants to do many, many experiments. He/She says s/he wants to learn everything new related to sciences by doing experiments, by practice."*

The Opinions of the Science Teachers at BILSEM

T1 and T2, who were asked to express their opinions on how gifted students wanted to learn sciences, stated that gifted students wanted to learn science through a hands-on and experiential method, and they believed that this was the best way. T2 expressed his/her opinion as follows:

"Upon starting to work at BILSEM, I realized that most gifted children have learning styles peculiar to themselves. Though not all, most gifted children state that they get bored during theoretical lectures. They are more participative during hands-on educational activities, and I have observed that permanent learning takes place with experiments and science activities implemented by using robotic devices."

During the interviews held with the teachers, both teachers emphasized that gifted children displayed significant differences from each other. Thus, providing these students with an individualized learning environment rather than a familiar learning environment for all was necessary. In this respect, ST expressed his/her opinions as follows:

"Hocam, the essence of the matter is this: gifted students are students who have different individualized intelligence. Whether one is gifted, every individual is unique, but common attributes can be present among the nongifted. But the gifted show a wide variation from a thing, uhm, from each other. For this reason, with gifted children, a different teaching method should be used following each student's area of interest and abilities."

As a result of the analysis of the data collected from the gifted children, parents and teachers, it was revealed that the participants believed that

experiments, research and analysis, projects, and hands-on teaching methods and techniques should particularly be preferred in the education of gifted students.

3.3 Science Education Activities at BILSEM

The Opinions of the Gifted Students

It can be stated that the positive views of the students attending BILSEM regarding science education were based on cognitive and affective justifications. The participants reporting views under the affective justifications theme believe that science activities based on experiments and practice at BILSEM are more educational. Furthermore, the participants stated that these activities were delightful and delighted to attend BILSEM as they loved their teachers. To illustrate, GS6, a participant holding this opinion, expressed him/herself as follows:

"The science activities here are quite good and sufficient. S/he do projects, so we find the opportunity for practice, and we do plenty of experiments. We have so much fun here that we learn science topics by having fun, but this is not the case at schools; there is always uniform instruction."

In addition, GS8, who were among the participants (GS6, GS8, GS9, GS10) stating that the science activities carried out at BİLSEM increased their accumulation of knowledge to a very great extent, expressed his/her opinions in the following way:

"We all like our teacher at BILSEM very much; I do so too, and this makes us come here very enthusiastically. We do many experiments, and when we learn through experiments, I learn more things at BILSEM than I do at school. I learn what I cannot learn in 40 lessons at school in four lessons at BILSEM."

The Opinions of the Parents

The gifted students' parents were asked to express their opinions regarding the science education activities implemented at BILSEM. Just like the gifted students, parents also stated that they believed such activities were performed quite effectively and productively and that their children were pleased about these activities. The parents, who thought that their children did not like education based on memorization and that lessons based on highly theoretical lectures and memorization did not appeal to the gifted, claimed that the experiments, projects, and research implemented at BILSEM were appropriate for their children's productivity and level of intelligence. Moreover, the parents added that since their children engaged in education at BILSEM the way they wanted to, they attended BILSEM enthusiastically, despite being after school hours.

Thus, it can conclude that both the gifted children and their parents considered science education practices at BILSEM to be effective and

productive. For example, P1 expressed his/her opinion as follows:

"Hocam, my child does experiment even at home. S/he creates new moving things from toy car pieces, electric supplies, and Lego pieces, and does these types of projects. Would you think that such a child would be happy from the regular lecturing at school or learn something by solving questions? My child finds what s/he expects from BILSEM. S/he enjoys the experiments, the project implementations, and the analysis they do there very much, and when this is the case, s/he always wants to go to BİLSEM, not to school. Naturally, I think like my child; God created this child with a different intelligence, [so] s/he deserves to be a scientist and as the name BILSEM suggests, [it is] a science centre."

The Opinions of the Science Teachers at BILSEM

When the teachers were also asked what gifted students thought about the activities implemented at BILSEM, just like the talented children and their parents, the teachers stated that children generally attended BILSEM enthusiastically, that they tried to refrain from being absent from BILSEM, and that they were positively eager to do experiments and to take part in project work. However, the teachers added that the 8th students preparing for the high school entrance exam could disrupt their BILSEM activities at times. Moreover, T2's claim that by attending BILSEM, gifted students are labelled. For this reason, one of the significant finding is that they are sometimes reluctant to go to BILSEM. P2, who expressed this opinion, made the following claims:

"Students want to participate in the experiments, projects, and research we do at BILSEM, and they come enthusiastically. The only problem here is the 8th-grade students who are preparing for the TEOG [exam]. Because these students are more focused on the exam, their scientific work is disrupted at times. Moreover, the mission of being the most successful that the society imposes upon gifted children makes them tense and, that's why they can be unenthusiastic about BILSEM sometimes."

When the opinions of the gifted students, their parents, and teachers are evaluated in combination, it can be observed that they are all consistent with each other. The participants believe that the science education activities at BILSEM are useful and productive since they are based on such practices as experiments and projects and are research-based and that there is a science learning environment conducive to the attributes of the gifted children at BILSEM.

3.4 Opinions Regarding the Comparison of BILSEM and Schools

The Opinions of the Gifted Students

The gifted students were asked to compare and express their opinions regarding whether the BILSEM activities or the education offered at their schools contributed more to their development. They were also asked to explain the reasons underlying their views. The data obtained revealed that all the participants thought that the activities they engaged in at BILSEM were more effective and productive than their schools' education. As

mentioned earlier, all the participants reported that they were highly pleased to be attending BILSEM. Moreover, the gifted generally held a negative opinion about being subjected to mixed education at schools. For this reason, an expected finding shows that talented children find BILSEM more useful for their development.

When the participants were asked about the reasons underlying their opinions, most of the students stated that as BILSEM provided them with hands-on education, they learned more effectively and in an enjoyable way (GS1, GS2, GS3, GS4, GS6). Besides, some participants reported that education at BILSEM was useful because there were only gifted children at BILSEM and that experiments were done frequently (GS1, GS2), the teachers were more understanding and answered every question asked (GS8), the small number of students enabled the teacher to pay more attention (GS9), students found the opportunity to receive an education that was more appropriate to the students, and that the aim was not successful in an exam (GS10). Some participants' opinions regarding this issue are as follows:

GS8*: "What do you think? (laughs) BILSEM, of course. At BILSEM, our science teacher and all the teachers are more understanding and responsive to all our questions. But at our schools, not to go beyond the level of nongifted students or could be because the teacher does not know the answer, I cannot get responses to my questions."*

GS9: *"Come on, the answer to this question is clear, the answer is BILSEM because there are few people at BILSEM, but schools are very crowded, so here we are given more attention."*

The Opinions of the Parents

The gifted students' parents were asked to compare the science education activities implemented at their children's school and BILSEM. As a result of the data obtained, it was revealed that the parents believed that the science education activities performed at BILSEM were more appropriate to their gifted children's nature and that the implementations at BILSEM were effective and productive. When the participants were asked to explain the reasons underlying their opinions, the point on which there was unanimous agreement was that projects and experiments, which students participated in actively, were carried out at BILSEM. Parent P3 explained his/her opinions as follows:

P3: *"I think I had told you, hadn't I? My children are twins. One is gifted; the other isn't. Of these two kids, the gifted one loves BILSEM as much as s/he hates school. Of course, the other does not go to BILSEM, but s/he likes school because s/he has a remarkable ability to memorize.*

On the other hand, the gifted one wants to do experiments and is hasty. S/he gets bored when the teacher at school explains a topic. But s/he likes to participate, be active in the implementations at BILSEM. I also think more effective implementations are done at BILSEM."

The Opinions of the Science Teachers at BILSEM

BILSEM science teachers also reported that gifted children spent

more effective and productive hours at BILSEM than they did at their schools. According to the teachers, the possible reason of this situation is that at BILSEM, gifted children are paid attention on a one-on-one basis, theoretical lectures are not delivered, and emphasis is laid upon experiments and project practices. In addition, teachers emphasized that since special education needed by gifted children is offered at BILSEM, it has a place of particular importance. T1 explains his/her opinions as follows:

"Our students say this as well; I think so too. The students enjoy more and learn more quickly thanks to the activities we do at BILSEM, such as doing experiments and watching videos. But of course, we are at an advantage; the children learn and solve school questions [before coming to BILSEM]. We do not prepare students for an exam by working as a tutoring centre, like some BILSEM centres in Turkey. Carefully selected gifted students are admitted here, and we implement activities intending to develop them and enable them to discover their interests, abilities, and themselves. We are providing the special education they deserve. Ultimately, this place is a special education institution. Here, as teaching materials, I use experiment materials, robots, software specific to the field of sciences, and web designs. I never do lessons like 'Come friends, listen to me. Force is this. Its unit is this.' Anyways, if I did, I know they wouldn't listen. And our mission is not this anyway. We are not training students for an exam; we do not assign grades to students. But our students learn; they apply what they learn. That's why we cannot be compared to schools."

Considering the views of the three participant groups regarding the issue in question, it can be claimed that all are in unanimous agreement. Also, there is a more effective and productive learning environment at BILSEM than in schools. The reasons expressed by the participants are that gifted children are more actively engaged in the educational process at BILSEM, they like experiments and project work more than they do theoretical lectures, and they find the opportunity to develop themselves. On the other hand, without denying the positive aspects, some of the participants expressed some negativities. One of the gifted students stated that s/he occasionally got bored at BILSEM, and both one gifted student and one parent commented that BILSEM sometimes took a lot of their time. One teacher also highlighted that after being labelled as talented, the pressure imposed upon the gifted to display full performance was too much.

4. Conclusions & Discussions

4.1 The Opinions of the Gifted towards Sciences

Based on the view that individuals' perceptions of any phenomenon can impact their experiences regarding that phenomenon, the present study aimed to identify gifted students' perceptions of sciences. The findings obtained indicate that the gifted envisage sciences as experiments, something fun, the whole of scientific knowledge, life, natural sciences, and a multi-disciplinary field. In a study by Afacan (2011), which was conducted to identify prospective science teachers' perceptions of science, it was found that the most frequent metaphor produced for sciences by the participants of

the study was "life". Considering the findings of this study, many science teacher candidates consider sciences as life itself. Moreover, Afacan (2011) reported that teacher candidates think that the science course is fun and includes different sciences disciplines. Therefore, these findings are consistent with those arrived at in the present study.

Consequently, the gifted children in the study perceived science as life and experiment. It should be highly emphasized in the present study because this enables one to think that talented students have a positive view of sciences. In support of this view, when the findings are examined, it can be observed that the talented did not report any negative image concerning the science course. Similarly, Smutny and Von Fremd (2004) stated that the gifted displayed a high interest in sciences. This interest originated from the fact that the gifted are individuals with a high level of curiosity and imagination. Moreover, it can be claimed that the findings that the present study revealed are consistent with those studies reporting that gifted students showed interest in the content of and the learning process in the science course (Tannenbaum, 2002).

4.2 Methods and Techniques Preferred by the Gifted in Science Education

Negative teacher attitudes and false beliefs about these students and myths may prevent gifted students from not receiving adequate support in normal classrooms (Kutlu Abu & Gökdere, 2020). For this reason, the methods and techniques teachers use in teaching science to gifted students are very important. As a result of the analysis of the data collected to identify the teaching methods and techniques that gifted children preferred in science education, it was revealed that the gifted wanted to learn science enjoyably using such methods as experiments, practice, and projects. Gifted students want to learn science through the projects they develop based on hands-on techniques, not by memorizing the overloaded theoretical information they are provided with. Furthermore, science education should be implemented by utilizing hands-on methods as a doctrine upon which there is an agreement in the entire world. Another study that supports the findings that the present study yielded was conducted by Aktepe and Aktepe (2009). This study revealed that while learning science, gifted students wanted methods such as experiments, excursions and observations, questions and answers, and role-plays to be utilized; they did not want their teachers to present theoretical lectures.

However, it is quite unfortunate that gifted children express complaints that teaching practices are signaling the traditional method in the schools they are attending. Thus, they stated that they found the opportunity to do projects and experiments only at BILSEM. Consistent with this view of the gifted students, in a research study conducted with primary school teachers at schools by Ekinci (2002), it was reported that even though the teachers believed that 85.1% of the participants consisted of gifted children, they could not establish an exceptional and supportive learning environment for these children.

The parents also stated that they wanted their gifted children to learn science by doing hands-on experiments, conducting research and analysis, reading books, and watching videos. Similarly, the science teachers of the talented children at BILSEM highlighted that their students like to learn through experience and participant in projects, while they do not like theoretical lectures. In a study conducted by Cross and Coleman (2014), it was reported that gifted students wanted to learn through experience and hands-on activities and research. Furthermore, Ngoi and Vondracek (2004) revealed that learning through research was a method that increased the motivation of gifted students. Colangelo et al. (2005) assert that gifted children should be kept active during their educational process, during which teachers play a catalyzer role. Accordingly, it can be claimed that the findings of these studies are consistent with those of the present study.

Another teaching method that has emerged in the teachers' statements is a teaching method designed per gifted children's characteristics. In support of this finding, it is highlighted in the literature that talented children should be subjected to an educational process in which individual differences and needs are considered (Van Tassel-Baska & Johnson, 2007). In other words, gifted children should go through an education which is appropriate to their areas of interest and that enables them to develop their potentials (Ataman, 2003; Davis & Rimm, 2004; Van Tassel-Baska, 2005) and in which their particular needs are taken into consideration (Chan, 2001; Davis & Rimm, 2004; Van Tassel-Baska & Stambaugh, 2005).

4.3 Science Education Activities at BILSEM

Opinions regarding science activities BILSEM of the gifted students who were not pleased about receiving education in mixed classes at school were also examined. Based on the data obtained, it was revealed that the gifted found the science education activities at BILSEM quite useful and productive. These activities at BILSEM are based on experiments and practice and are designed to teach science enjoyably to please the gifted. Like talented participants, the parents and teachers also reported that the gifted loved the science activities implemented at BILSEM. Likewise, Kunt and Tortop (2013) stated that gifted students used positive metaphors to describe BILSEM such as source of knowledge, information transmitter, an enjoyable and secure learning environment; that is, they held positive views of BILSEM.

In support of these opinions of gifted children, they found an enjoyable learning environment at BILSEM based on experiments and practice. Çaylak (2009) stated that the science activities at BILSEM were generally hands-on. According to Çaylak, in BILSEM science activities, experiments and laboratory techniques, experience sampling, and discussion methods are often preferred. Moreover, Van Tassel-Baska and Stambaugh (2006) indicated that project work was the most commonly used method in gifted students' education.

4.4 Opinions Regarding Comparison of BILSEM and Schools

The present study revealed that gifted children thought that BILSEM

was more beneficial for them than their schools. The low number of students at BILSEM, the non-existence of exam anxiety at BILSEM, teachers' particular attention, and the employment of student-centred hands-on teaching methods enable the gifted to engage in a more effective and productive learning experience at BILSEM than in their schools. However, the present study results also showed that the parents of the gifted and the science teachers held the same opinion in that gifted children benefitted from their education at BILSEM more than they did from their education at school. Similarly, it was reported in a study by Çelik Şahin (2014) and Yıldız (2010) that the participants of their study believed that BILSEM was beneficial for gifted students and it even supported students' lessons at school. This shows that the participants specified that the activities of BILSEM education are productive and the activities in question are considered positive from an overall perspective. In support of this finding, in a study by Özarslan (2015), it was revealed that gifted students believed that they would use the skills and knowledge they learned during their education at BILSEM and at the university as well. Furthermore, BILSEM was very beneficial for them.

Based on the present study's findings, it seems that the only problem for the gifted and their parents regarding gifted students attending BILSEM is the time constraint. Since gifted children attend BILSEM and their traditional schools simultaneously, the remaining time for the gifted themselves is limited. This finding is totally consistent with the results reported in a study by Ülger (2011).

5. Suggestions

1. Gifted students should hold positive views about sciences as they seem to have a high level of interest in it. This condition can be used to an end in the education of gifted children. This implies that science can be integrated into the other subjects of gifted children. In this way, students' interest or eagerness to learn in other subjects would increase.

2. It is recommended that the frequency of gifted students' attendance at BILSEM should be increased.

3. A guiding program for BILSEM centers, which can facilitate teachers' work, should be developed or such training can be offered to the teachers.

2.6 The Limitations of the Study

The study's first limitation was the reluctance of three of the parents of the gifted students to participate in the study. Another limitation of the study is related to the data collection tools. The initial aim was to employ observation and document analysis techniques and the interviews, to ensure data variety in the study; however, the fact that documents related to gifted children were kept confidential prevented the collection of rich data for document analysis. Similarly, owing to the lack of classrooms at BILSEM, each student could not be individually observed in a detailed manner. As the formal schools where the students were enrolled were many, the researcher

did not have the opportunity to conduct detailed observations at these schools.

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Adolescents' Perceptions of Exploring Professional Interests and Preferences using a Psychometric Tool

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Abstract

The main objective of this research is to investigate adolescents' perceptions concerning professional interests and preferences. Nowadays, a major problem of the teenager is the choice of career path to follow. Vocational identity is an important aspect of individual identity that adolescents explore and are asked, in high school mainly, to choose an orientation group (general high school) or sector (vocational high school) and consequently the subject of study and field of work. Their decision to choose studies and profession is not easy. The teacher specializing in Counselingand Orientation has the opportunity to help adolescents to understand their personalities and interests, combining Counseling and the use of appropriate psychometric tools. The qualitative research, in which 19 students of the Third Grade of Lyceum participated, showed that they discovered, confirmed and reflected on issues of their professional identity, using the Holland Personality and Vocational Guidance test.

Keywords: Orientation Counseling, Teenager, Holland

Introduction

Professional evaluation is the process of determining the interests, abilities and skills of an individual, in order to identify his professional inclinations, preferences, needs and career opportunities (Dimitropoulos, 1999). It helps the individual to make decisions and make realistic career choices based on his personality and the reality in the job market. In addition,

it helps counselors and employment professionals work more effectively with their clients in their professional development and career preferences.

Almost all career counseling theorists agree that career guidance may at some point include psychometric evaluation combined with non-psychometric methods that lead to the prediction, by chance, of the individual's success in education and careers and in proposals for studies, training or employment (Kantas, 2004; Kantas and Hantzi, 1991). Psychometric methods use various tests in order to quantitatively collect the required information. Non-psychometric methods also collect data on the characteristics or professional preferences of the individual, such as open free discussion in which the expressed interests of the individual for studies or professional preferences are detected (Dimitropoulos, 1999).

The development of professional identity is an integral part of the overall development of adolescents' identity. Although it is well known that professional interests and goals emerge in childhood, in adolescence they crystallize and stabilize and career goals and aspirations become more realistic in terms of adapting to personal and environmental characteristics (Hirschi, 2010). Involving adolescents in building and achieving at least a temporary professional identity is an important decision-making process and promotes their adaptation and positive development in the various career paths that open before them (Hirschi, 2011).

But in the process that aims to implement the above, adolescents need to be helped to get to know themselves, gathering as much individual information as possible. Orientation Counseling aims to help them understand their skills and desires and link them to their professional decisions and choices (Malikiosi-Loizou, 2004; Nkechi, 2016; Nweze & Okolie, 2014). A person according to Holland (Kantas et al., 1991) does not face career decision problems if he has clear interests and sufficient self-knowledge.

In this context, this paper’s main target is to present the results of the application of Holland personality tests to adolescent students in the third grade of general high school in Eastern Thessaloniki, where the researcher teaches, as well as the experience gained. The questionnaire used is specific to Holland's Professional Self-Directed Survey of Professional Interests and Preferences (SDA).

The Professional Self-Guided Questionnaire of Professional Interests and Preferences is based on Holland's theory of professional development, according to which, a person feels pleasure and satisfaction from his professional choice, when the professional environment is more in line with his own personality type (Dimitropoulos, 1998 ; Cantas, 2004; Cantas et al., 1991; Dughi & Patcas, 2015).

In Holland's theory, people are classified into one of six characteristic personality types: the Realistic, the Investigative, the Artistic, the Social, and the Enterprising. and the Conventional. Also, there are six categories of professional environments and each of them corresponds to a type of personality (Dimitropoulos, 1999; Kantas et al., 1991).

According to Dimitropoulos (1999):

- The realistic type includes people who are efficient and methodical, persistent with skills of design, coordination, problem solving, perception of space and usually prefer technical, technological, mechanical and construction professions.

- The research type includes people who have the ability to observe, analyze, methodize, judge, understand data and data and prefer an environment that gives them the opportunity for activities related to systematic and innovative research, understanding and control of phenomena (natural, social, cultural, biological).

- The artistic type includes people who are idealistic, impulsive and imaginative, sensitive and unruly characters and prefer a work environment that allows them to show anti-conformity and independence.

- The social type includes people who are friendly, extroverted, solidarityand helpful, have social skills and are condescending, prefer a work environment that develops their skills for communication and cooperation.

- The business type includes people who have leadership and supervisory skills, are ambitious, energetic and ostentatious, prefer a work environment in which they will feel confident, popular, active.

-The conventional type includes people who are organized, conscientious, obedient, love order, pay attention to detail and perfection and prefer mainly employee professions.

Personality types are schematically classified at the vertices of a hexagon and those that are closer to each other show greater similarities compared to those facing each other in the hexagon (Dimitropoulos, 2004; Kantas et al., 1991). (Figure 1).

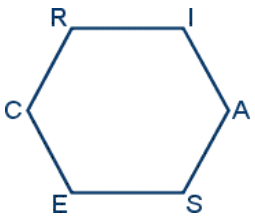

Figure 1. The hexagon of Holland
(R = Realistic, I = Research, A = Artistic, S = Social, E = Business, C = Conventional)

The questionnaire answered by the subjects ranked them in percentage among the six personality types and showed the career choices that best suit them. It is emphasized that in the present work the use of only the masculine gender does not contain or imply any distinction between the sexes, it simply refers, for the sake of ease of reading and space economy, to the human race, that is, to man.

Research Methodology

Participants

The research sample consists of 19 students who are in the last grade of general high school in Eastern Thessaloniki. Their age is 17-18 years. In terms of gender there are 12 boys and 7 girls. Their place of residence is close to the public high school they attend.

Procedure

The sample was selected from a total of 110 students of the third grade of the general high school based on the immediate desire and interest they showed to take the personality and career guidance test, in order to help them better understand their personality and which professions match it or to confirm what they already perceive about their personality and professional preferences (Kantas et al., 1991).

The research was conducted during a week in the school's computer lab, in four phases. In the first phase, the research subjects were interviewed about their professional preferences. In the second phase, they were asked to answer the 214 binomial choice questions ("yes" - "no") in the four fields-sections in the online personality questionnaire and professional guidance "Holland personality test". In the third phase, they carefully studied the conclusions drawn from the online test based on the answers they gave to the questions in the four fields. In the fourth phase, they discussed the results with the teacher-researcher and how they perceived the test results at the level of personality type and proposals for professions. Finally, they got the test results printed for future reference and use.

Before completing the questionnaire electronically, the participants were informed about the research topic, its objectives and the process of its completion was described. They were also informed about some basic elements of Holland's theory, in order to understand the interpretation of the results. It was also mentioned to the subjects that both the test results and the results of the research would be done in secret and would be used both for reflection by the subjects themselves and for counseling discussion between the teacher and the subjects and only with their consent. Finally, the participants were reminded that the test results will be only indications and not an absolute diagnosis, which they can use to further explore their personality and professional interests, in order to decide what is best for them in personal and professional level.

Main questions

In the interview the participants were asked to answer two main questions. The first question: "*What are your professional preferences*?" emerged from the theoretical framework of the research, had the character of introspection by the subjects of the research for their professional preferences and was answered before the completion of the online test. In this way, on the one hand, the subjects of the research would already be prepared to answer the second question more consciously, and on the other hand, the reliability of the

test could be tested (Cohen, Manion & Morisson, 2008). The second question: "*How do you comment on the test results?*", Therefore, had more of a reflective character and was answered after completing the online test.

Professional Assessment Tool

To find a professional assessment tool, the researcher looked at school Vocational Guidance textbooks, on Greek, English and American websites, in order to be initially informed about psychometric instruments that are circulating, their suitability and how to use them properly.

Finally, the tool used in the research was the online personality and professional guidance questionnaire "*Holland personality test*" (Holland Personality and Vocational Guidance test. https://paroutsas. jmc.gr/ iqtest/ orient2. htm), which is specific to the SDS Self-Directed Search tool Search) built by Holland.

The manufacturer points out that it is based on Holland's theory, is a combination and translation of American websites and an attempt was made to adapt to the Greek data, without being an accurate scientific tool (Holland Personality and Vocational Guidance test.
https://paroutsas.jmc.gr/iqtest/orient2.htm). The user of the test completes four fields-sections that refer to: a) Capabilities (1-36: 36 questions), b) Professional interests (37-78: 42 questions), c) Hobby Activities (79-137: 59 questions) and d) Self-Esteem-Character (138-214: 77 questions).

The tool was therefore selected by the researchers based on the following criteria: a) it is easily accessible on the internet, b) it is in Greek, c) it can be completed by many users at the same time, d) it immediately gives the results of matching personality type and professions, without the need for elaboration by the researcher and e), according to Holland the SDS can deal with cases where either the person wants to come up with professional directions that suit him and have the perspective they want or seeks confirmation for an idea he has (Kantas et al., 1991). The researchers were also aware that the reliability and validity of the test was unknown and explained to the participants that the results would be indicative only.

Quality research tool

Interviewing as a qualitative research tool is one of the most common practices for generating knowledge in social sciences, it allows the collection of data in greater depth than in the case of other methods with direct impact and communication between interviewer and interviewee as well as the possibility for clarifications and explanations (Cohen et al., 2008; Given, 2008; Dimitropoulos, 2001).

The interview in the present study was semi-structured with predefined open-ended questions, so that on the one hand there is more control over the interview issues by the researcher than in an unstructured interview, and on the other hand there is flexibility for the researcher to go deeper or clarify, without limiting the specific percentage of responses to each question (Given,

2008; Iosifidis, 2008). In combination with the results of the professional evaluation test, it contributed to a better understanding of the research problem and its approach in a global way (Creswell, 2012 · Mason, 2002).

Results

The processing of the recorded answers to the first question "*What are your professional preferences*?" based on the type of personality that won the majority in the three-digit code Holland (Self-Directed-Search. https://www.acer.org/files/SDS _ Sample _ Report.pdf; http://www.wiu.edu/ advising /docs/ Holland_ Code.pdf), the which was attributed to each profession declared by the participants. Participants belong to the social type (S) at a rate of 32% (2 girls and 4 boys), to the business type (E) at a rate of 42% (3 girls and five boys), to the realistic type (R) at a rate of 10.5 % (1 girl and 1 boy), in the conventional type (C) 5% (1 boy), in the research type (I) at a rate of 10.5% (1 girl and 1 boy) and in the artistic type (A) no child (0%). (Figure 2).

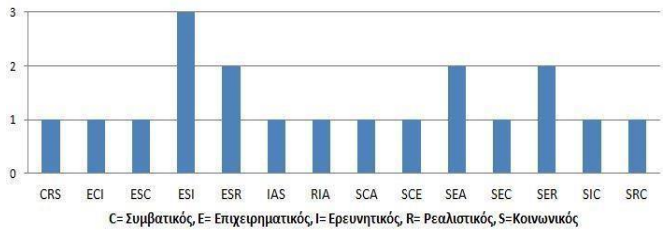

Figure 2. Distribution of personality types of research subjects in the hexagon of Holland (E = Business, S = Social, A = Artistic, I = Research, R = Realistic, C = Conventional)

The results largely agree with those given by the online test based on the first personality type. Therefore, in the social type (S) were classified 3 girls and 6 boys, i.e. 47% of the participants. In the business type (E) were classified 3 girls and 4 boys, i.e. 37%. In the realistic formula (R) was classified 1 boy, i.e. 5% of the participants, in the conventional formula (C) was also classified 1 boy, i.e. 5% of the participants, in the research formula (I) was classified 1 girl, i.e. 5% of the participants and in the artistic type (A) no children.

Taking into account the three highest scores in the respective formulas, the three-digit Holland letter code (https://www.acer.org / files / SDS _Sample_Report.pdf; for each participant was obtained (Chart 1).

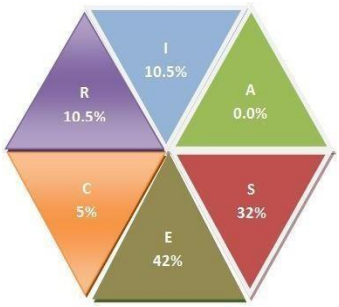

Chart 1. Distribution of students based on the three-digit Holland code

(Guide to Holland Code. http://www.wiu.edu/advising/ docs/Holland_Code.pdf)

To process the recorded answers to the second question, the content analysis technique was used, since the question asked was open-ended. The categories of analysis were defined, the reports were measured and quantified, so that the qualitative data can be converted into quantitative (Iosifidis, 2008). From the thematic analysis of the qualitative data of the answers to the 2nd question "How do you comment on the test results?" the following three categories emerged: a) category 2.a. "Test evaluation" with subcategories 2a1. "duration", 2a2. "completeness", 2a3. "formulation of questions" and 2a4. "utility", b) category 2b. "Acceptance of the test by the student in relation to the type of personality", with subcategories 2b1. "I strongly agree", 2b2. "I agree a little" and 2b3. "Acceptance of the test in relation to the profession", with subcategories 2c1. "I agree a lot", 2c2, "I agree a little" and 2c3. "I do not agree at all."

The counting of reports in each subcategory for categories 2.b. and 2.c. respectively, shown in Tables 1 and 2.

Table 1. Category 2.b. "Acceptance of the test by the student in relation to the type of personality"

Subcategories	Frequency	Percentage (%)
2β1. I strongly agree	16	84.2
2β2. I agree a little	3	15.8
2β3. I do not agree at all	0	0.0
Total	19	100.0

Table 2. Category 2.c. "Acceptance of the test by the student in relation to the profession

Subcategories	Frequency	Percentage (%)
2c1. I strongly agree	14	73.7
2c2. I agree a little	5	26.3
2c3. I do not agree at all	0	0.0
Total	19	100.0

From the answers given by the students regarding their acceptance in relation to the type of personality and in relation to the profession, it appears that the majority of students, in percentages of about 84% and 74% respectively, perceive the test as reliable. Indicative answers for subcategory 2b1: "*According to the test I am a more practical and research type, which I believe represent me*." (Code 1) / "I consider that the results in terms of personality type were successful." (Code 8) / "The characteristics of my personality are mostly what is written ..." (Code 15) / "At the same time, I believe that the results in the personality types correspond to the idea I have of myself. (Indicative answers for subcategory 2c1.: "*As for the results it was something I expected, but also in terms of the professions that suit me*." (Code 2) / "*The test recognized the job I would like to follow* "(Code 6) /" *The test results were exactly with the professions I would like to follow in the future* "(Code 10) /" *The test largely agreed with my (professional) desires ...* " (Code 11).

It should be noted that for the boy with Code. 17, although he does not recognize that he has the type of personality "social" that the test showed, but observing his behavior in school, it is found that he leads group activities (choir leader) and is polite and compassionate, according to the teachers who cooperate with him, as he is also responsible for his obligations. He also agreed a little with the professional choices shown by the test. In a discussion that the researcher had with the student of his own free will, it was found that he accepts influences from his family environment regarding his professional choices (Clutter, 2010; Dughi et al., 2015; Oymak, 2018). He added: "*I do not think I am that social, but as the test says, I like leading group activities, I am responsible, polite and compassionate. I do not strongly agree with the possible professions I can pursue [according to the results of test], because I am more interested in professions of a more research type*".

Also, a girl (Code 16) and a boy (Code 1) stated that although the test achieved their personality type, the professions suggested by the test do not

consider them suitable. They testified: *"... I believe that the results in personality types correspond to the idea I have of myself. But in my opinion a large percentage of the professions he took out (the test) is not based on what I want to do in my life*." (Code.16) / "*The test approached my preferences to a satisfactory degree. According to the test I am a more practical and research type, which I believe represent me. However, there are other activities (professions) that interest me that are not classified in the perfectly suited (professions), a fact that causes me concern*. " (Code 1).

Conclusions

Choosing a career remains a constant challenge for adolescent high school and college students, who will either study and then pursue a career or receive vocational training, but also for teachers / counselors who can provide counseling. support (Kouni & Koutsoukos, 2019). Together counselors and counselors seek a career decision-making process, as choosing a career through a large and challenging set of opportunities is a problem for young people (Geldard, Geldard & Yin Foo, 2019; Kimongo, Kindiki & Misigo, 2016).

The 19 students came willingly to take the personality and career guidance test either because they wanted to find out more about their personality type and the professions that suited them or because most wanted to confirm their ideas for career choices.

Participants showed no anxiety during the test, as they were informed about what they were going to do and what kind of results were expected. They asked the teacher for help only when they did not understand some terms (idealist, conformist, structured, insightful) in the questions more than the 4th field "Character". They showed as much attention as needed to understand the questions, as they wanted to have results as reliable as possible. They showed the same attention in reading the results concerning their type of personality and the professions that suit him.

The majority of participants were satisfied with the process and agreed that the results for their personality type were what they expected, as well as many of the proposed professions agreed that it was their choice. Still, some of the participants were satisfied that the test helped them to add other professions to their choices. Two of the participants asked to discuss further with the researcher, to help them more in their educational and professional decisions based on the test results.

Research implications

The test of the personality test and professional guidance, gave the participants the opportunity to discover, to confirm, to reflect on elements of their personality and professional choices. The personality of the adolescent secondary school student and his needs not only should not be overlooked or underestimated, but should be a pole of respect and their promotion and satisfaction should be sought with the support of the teacher in a role of Counseling and Orientation.

Also, the results of the present research confirm that the state and the school need to take a closer look at the concerns of adolescents about their educational and professional future, and help them in self-knowledge, understanding the labor market and making good decisions by operating structures and Vocational Guidance programs.

Suggestions for future research

In school, the adolescent must, on the one hand, acquire basic skillsand abilities that will be adapted to any future situation and will facilitate his professional prospects, and on the other hand, must be prepared psychosocially, in order to cope with difficult and uncertain conditions. In this context, it is useful to investigate whether the school meets this role.

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