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Case Report

The Importance of Technology in the Education of Gifted in the Context of 21st Century Skills

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Abstract

Gifted students have unique educational needs due to their superior cognitive skills. In other words, gifted students learn faster, deeper and consistent than their normally developing peers. Besides, creativity is one of the most important features of gifted students. Thus the properties of gifted students should be taken into account while planning their curriculum. Furthermore, due to rapid changes in science and technology, 21st century requires some new skills such as collaboration, communication, Information and Communication Technology literacy, and social and/or cultural competencies. In this context, educators should create learning environments that enable the gifted students to produce divergent thoughts and unusual solutions to global problems. This paper aims to discuss the change in educational sciences and how this change reflects to the learning process of gifted students to reach 21st century skills. The appropriate techniques used in gifted education in order to develop required new skills are reviewed.

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Introduction

Giftedness has been an important research area especially since the beginning of 20th century. Although giftedness is an important research area in both psychology and education; there is not a consensus on its definition. The scientists studying in psychology tried to define and measure intelligence. Terman (1925) was one of the pioneers studying on intelligence tests and giftedness. Terman translated Binet-Simon Scale into English and adopted this intelligence test to American culture. Furthermore, Terman (1925) conducted a comprehensive longitudinal research about people having high intelligence scores from intelligence tests. Depending on his research, he identified the students scoring in the top 1% as gifted. Terman was named as the 'father of gifted education' owing to his research (Warne, 2019). In the first half of 20th century, giftedness was defined according to "Intelligence Quotient" (IQ) in other words the score gathered from intelligence tests. Likewise Terman, Hollingworth (1942) defined gifted students as able to get a very high

score on the individual intelligence tests. However, giftedness cannot be explained by just getting high scores, otherwise creativity would be missed.

Marland (1972) contributed to the education of gifted with the report which created the federal government's policy on giftedness in 1972. Marland's report was accepted as the minimum of gifted practices in many states in the USA. According to Marland (1972), giftedness can be identified in various areas. These areas are; general mental ability, ability in a particular academic field, creative or thinking, leadership ability, talent in visual and performance arts, and psychomotor ability. Accordingly, it is possible that a person can be gifted in a single area or in many different areas.

Marland Report was criticized by Renzulli, who is a well-known researcher about giftedness. According to Renzulli, the concept of "motivation" was not mentioned while describing gifted individuals in Marland Report. Renzulli (1986) defined giftedness using "Three Ring Model" which contains above average ability, a high level of task commitment (motivation), and a high level of creativity. He claimed that giftedness is in the interaction among these three traits.

Education of Gifted Students

It is a fact that gifted people are precious treasures of the community because they compose 2% of society. Scientists and artists are in this exceptional group. They discover, create, invent and therefore they change the world. Nevertheless, negative attitudes can be seen towards education of gifted students because of some prejudices such as "Gifted are already superior, and there is no need for extra education. They can improve themselves in any environment. Additional education creates an elite class; this creates problems that society cannot overcome. The institutions that chose students are for gifted. Special education should not be concerned with gifted children." Because of these prejudices, negative attitudes can be seen towards education of gifted students (Ataman, 2005).

In this context, Kaya and Tortop (2020) conducted a study to investigate the attitudes and opinions of counselors about education of gifted students with a sample of 250 counselors. "Attitude Scale towards Gifted Education" was used to collect quantitative data. The scale, which consists of 14 items, was developed by Gagné and Nadeau and adapted to Turkish by Tortop. The mean of scores gathered from "Attitude Scale towards Gifted Education" was found 3.6 which is evaluated as slightly positive attitude. Also, the scores

were analyzed according to gender, age, seniority, having gifted students, school type and institution of counselors. Content analysis was used for qualitative data, while t test and ANOVA were used in the analyzing quantitative data. According to the majority of counselors, some problems exist in both education and diagnosis of gifted students.

Gifted students have unique educational needs due to their superior cognitive skills. In other words, gifted students learn faster, deeper and consistent than their normally developing peers. Besides, creativity is one of the most important features of gifted students. Thus the properties of gifted students should be taken into account while planning their curriculum. According to Nugent (2001) gifted students need effective, flexible and student-centered learning environments which encourage independence and innovation while offering various grouping options. Furthermore, due to rapid changes in science and technology, 21st century requires some new skills such as collaboration, communication, Information and Communication Technology literacy, and social and/or cultural competencies.

21st Century Skills

The world is changing, rapid changes occur in science and technology. Due to these changes, new goals should be set according to current conditions. Silva (2009) mention that the goals of education should depend on the essential skills needed in academic and life success, in order to adapt globally changing world. Thus educators should create learning environments that enable the gifted students be competitive in 21st century not only in academic field but also in life.

The 21st Century Skills Partnership (P21) which was founded by the Department of Education in 2002 in the United States, identified the skills to be acquired in the 21st century in order to guide schools in our age (Fox, 2011). The 21st century skills partnership have the mission to maintain both information and skills that people need in this century (P21, 2015). In that sense, Silva (2009) stated that interpersonal skills, life skills, professional skills exist within the 21st century skills. Therefore, these knowledge and skills should be coherent with both pedagogy and curriculum, by supporting with appropriate assessments (Pearlman, 2010). 21st century skills are listed under 3 titles. These are;

1. Learning and Innovation Skills
2. Knowledge, Media and Technology Skills

3. Life and Career Skills

Also there are sub-titles under these. The 21st century skills are shown in Figure 1.

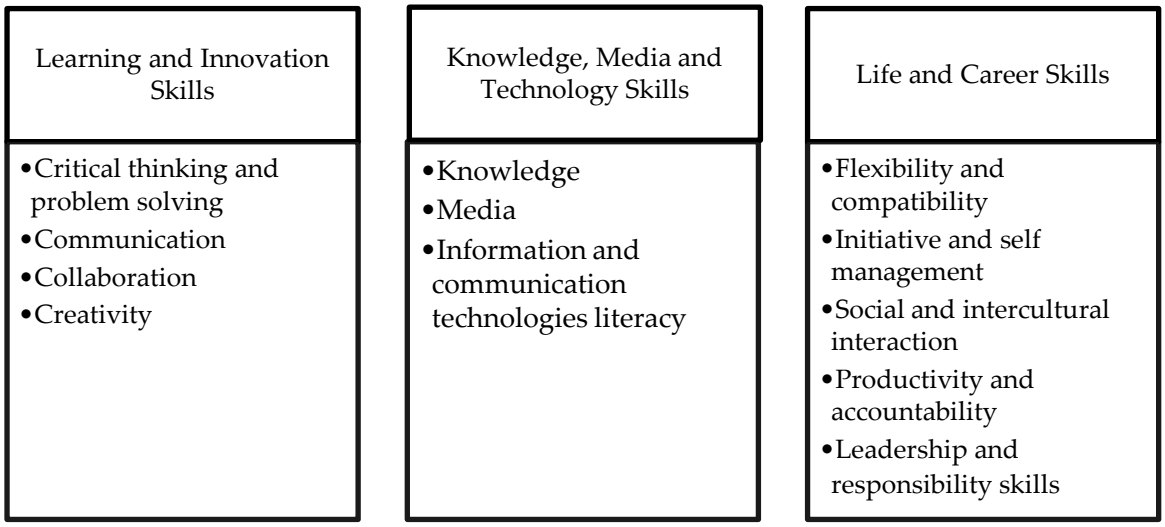

Figure 1. The 21st century skills

Learning and Innovation Skills

Learning and innovation skills include critical thinking and problem solving, communication, collaboration and creativity. According to Li (2016) teachers who have the motivation and awareness of using critical thinking, help their students to learn analyzing, reasoning, and evaluating the tasks. Furthermore, Trilling and Fadel (2009) pointed out that students need more innovative solutions and different perspectives on account of finding unusual solutions for problems, thus develop critical thinking and problem solving skills.

Communication is one of crucial 21st century skills that should be fostered in learning environments (Özkan-Elgün, 2021). In other words, communication skill is crucial in order to show thoughts clearly both orally and written effectively (Wagner, 2008). Parallel to this skill, collaboration is a working practice whereby individuals work together for a common purpose to achieve benefits. Collaboration involves deciding goals together with others, sharing responsibilities, and working together in harmony (Barfield, 2016). Collaboration enables individuals to work together to achieve a defined and common purposes. Thus teachers of gifted students should provide team work such as collaborative problem solving activities, projects etc. This will also help to develop leadership skills of gifted students.

Creativity is not only an important trait of gifted students, but also one of the key skills of 21st century. Senemoğlu (1999) defined creativity as thinking in a different, original,

flexible, fluid, and unusual way. Although there are some myths about creativity such as creativity is an innate property that cannot be taught; in fact, everybody is more or less creative, unless they are hindered or restricted. Furthermore, if creativity is restricted, this skill can be developed by training (Sungur, 1997). Creativity of the gifted students can be fostered by the teachers using various techniques including brainstorming to generate new ideas, or arranging information to create original ideas and analyzing them. Moreover, Loveless (2002) mentioned that digital tools could be used to foster creativity skill in educational settings.

Knowledge, Media and Technology Skills

Knowledge, media and technology skills include knowledge, media, information and communication technologies literacy. Teachers can both provide differentiated instruction for gifted children and adolescents, and serve as an educational and creative outlet for some of the best and brightest minds in the world by using technology. Since gifted students are surrounded by technological tools in 21st century, they should know how to benefit from technology in order to reach different sources and how to use media tools. Besides, media literacy helps the students not only to practice about their culture, but also communicate people from other cultures, show the skills of team working and creativity (Bialik et al., 2015). Technology facilitates self-learning in terms of providing access to information resources for gifted students with high learning motivation (Zimlich, 2017).

Life and Career Skills

Life and career skills entail mostly intrapersonal skills: flexibility and adaptability, initiative and self-direction, productivity and accountability, and leadership and responsibility (Kylonen, 2012). These skills are required not only in educational settings but also in in the workplaces. Moreover, Kivunja (2015) claim that equipping the gifted students with these skills make them better citizens. According to Trilling and Fadel (2009) everybody need adjusting and adapting strategies for fast-changing times. In this context, reinforcing and balancing feedback help to develop flexibility and adaptability of the students (O'Connor & McDermott, 1997). Leadership skills are especially essential for gifted students. Therefore, they should be taught how to uncover strengths of team members to achieve a common goal and leadership skills by appropriate examples (Trilling & Fadel, 2009). Also, they need activities and projects to gain responsibility.

Discussion and Conclusion

Today, changes in technology, social life and economic fields all over the world make change inevitable in education. In other words, due to the expectations of social and business life change day by day, the education systems should prioritize the competencies needed in today's world. The 21st Century Skills Partnership (P21) defined the skills that are required in 21st century. 21st century skills include (1) Learning and Innovation Skills, (2) Knowledge, Media and Technology Skills and (3) Life and Career Skills. Eryandi and Nuryanto (2020) mention that various countries have actualized 21st century skills into their country's education system. Since these skills are essential both in educational settings and workplaces, education system should focus on developing them, starting from preschool to higher education. Furthermore, all the components of educational systems including teachers, parents, students and educational settings, should keep pace with 21st century.

Educational stakeholders discuss the list of skills presented in the context of the particularities of an interdependent, heterogeneous, diverse, global environment (Chalkiadaki, 2018). Furthermore, Lemke (2010) mention that educators have the responsibility to provide actual techniques to live, learn, work, and thrive in this high-tech, global, highly participatory world. Thus, educators should create learning environments that enable the gifted students to produce divergent thoughts and unusual solutions to global problems. Depending on the research findings, Periathiruvadi and Rinn (2012) reported that gifted students have positive perceptions about technology usage in various areas, such as math, science, and literature. Finally, education of gifted students should be planned considering current conditions.

Recommendations

Since gifted students compose 2% of society, they are as precious treasures of the community. While designing their education, both their unique educational needs and 21st century skills should be taken into consideration. In this context, the education should focus on constructing the information, not recalling it. In order to construct the information, the gifted students should be active in configuring information with the experiences. Active learning applications also positively affect self-directed learning skills (Aydede & Kesercioğlu, 2012). Furthermore, the technological tools should be integrated to enrich the learning environment.

Another important point is the teachers' approaches towards novelties. Since teachers play an important role in education of gifted, the novelties cannot reach their goals unless the teachers adopt them. Thus, teachers should be trained about adapting 21st century skills into curriculum. Furthermore, parents of gifted students should help their children to develop skills needed in 21st century.

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Author Contribution Statement

Nisa Gökden KAYA : *Conceptualization, literature search, writing - review and editing*

Hüseyin MERTOL: *Literature review, writing and manuscript revisions.*

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