ORIGINAL ARTICLE

The Effect on Gifted Students' 21st-Century Skills of Supporting Science Teaching with LEGO® Education® BricQ Motion Essential and Student Opinions on this Instruction

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***Abstract**: In many countries, individuals have started to gain 21st-century skills from an early age. In Turkey, the education of gifted students is supported with activities enriched in parallel with these skills in science and art centers. The LEGO® Education® BricQ Motion Essential Set reinforces achievements with hands-on activities in science subjects, while also improving 21st-century skills such as problem solving, critical thinking, creativity, and collaboration. At this point, this study aims to examine the effect of the LEGO® Education® BricQ Motion Essential Set on the 21st-century skills of gifted students in the teaching of the 'Force and Motion' unit and to determine the students' views on the teaching process. The study was carried out in a science and art center in Konya in the spring term of the 2021–2022 academic year. The sample of the study consisted of 21 gifted students studying in Support-2 programmes (4th grade). An explanatory sequential design was preferred in the study. In the quantitative data collection phase of the study, a one-group pre-test/post-test experimental design was used. Interviews were used for the qualitative data collection phase. The quantitative data of the research were analyzed with the SPSS 26 statistical package program. Qualitative data were categorized according to themes and codes in accordance with content analysis. The results of the research showed that the LEGO® Education® BricQ Motion Essential Set was effective for 21st-century learning and the renewal of the skills of the gifted students participating in the research and that the students developed positive opinions about this education set. It is recommended to use LEGO® training sets to develop the 21st-century skills of gifted students.*

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Introduction

THE development of science and technology also changes the characteristics that people should have. People need some skills in order not to fall behind their age. 21st-century skills are the qualities that must be found in the people who can be employed in different business lines. 21st-century skills consist of 3 basic and 13 sub-skills: (i) learning and innovation skills (creative thinking, critical thinking, problem solving, communication, collaboration), (ii) information, media, and technology skills (information literacy, information and communication technology literacy, media literacy), (iii) life and career skills (flexibility and adaptability, self-management, social skills, productivity, and accountability, leadership) (P21, 2020). Schools that prepare children for the future should also provide students with 21st-century skills in addition to the curriculum. Students should acquire skills such as adaptation, communication, social skills, and the ability to solve problems in order to compete in the modern economy (Bybee, 2010). According to the OECD Learning Framework 2030, education should aim at more than preparing young people for the world of work; it should equip them with the skills they need to become active, responsible, and well-equipped citizens (OECD, 2018). Quality education encourages creativity and knowledge; it provides the acquisition of basic skills of literacy and numeracy, as well as analytical, problem solving, and other high-level cognitive, interpersonal, and social skills.

The National Association for Gifted Children (NAGC) has set a new generation of science standards for gifted students. These standards recommend raising the learning levels of students and using teaching strategies appropriate to their skills, such as analytical thinking and problem solving, which have long been advocated in their education (NAGC, 2014). In this context, the activities applied in the science and art centers that gifted students attend should be designed in a way to develop 21st-century skills.

Although the concepts of ‘giftedness’ and ‘highly talented’ are both included in the literature and previous Ministry of National Education of Turkey (MoNET) resources, the term ‘gifted’ is preferred instead of ‘highly talented’ for these children. Gifted students are individuals who have been determined by subject experts to perform at a higher level than their peers in terms of general or special abilities (MoNET, 1991). Special gifted individuals are defined as people who perform at a higher level than their peers in intelligence, creativity, sports, art, leadership capacity, or special academic fields (MoNET, 2013). A gifted individual in the field of science is a person who can successfully deal with “high-level” problems at a very young age (Gilbert & Newberry, 2017). Gifted students in science get bored with the repetition of basic subjects, and they enjoy challenges and problem-solving activities (Taber, 2017). Most mentally gifted children are interested in sci-

ence, and it is emphasised that these students' skills, such as critical thinking, creativity, problem solving, and analytical thinking, are at the forefront (Ercan, 2013). Since gifted students show higher performance than their peers, they receive the gains of the curriculum in their own schools earlier than the activities held in science and art centers. To make continuous progress in their areas of talent, these students need learning experiences that require complex, creative, and innovative thinking and specific problem applications. Therefore, the activities used for gifted students should be very rich in terms of analysis, evaluation, and creativity (Taber & Corrie, 2017). In this context, it is thought that LEGO® Education® sets can be effective in creating the learning environments that gifted students need.

LEGO® sets are more intelligible and miniature abstractions of reality; they create a common language for the physical representation of abstract ideas and practical thoughts (Shores, 2017). When LEGO® is mentioned, the first thing that comes to mind is the toy, but especially today, LEGO® is also used for educational purposes. The LEGO® programme parallels elementary science content. Students can recognise LEGO® machines and mechanisms and simple machines such as gears, pulleys, and wheels, and produce projects on energy, force, and motion by combining them with software, motors, and receivers. The communication and engineering skills of students who participate in subject-based interdisciplinary activities together begin to develop (Bender, 2018). LEGO® Education® increases student engagement with experiences that encourage children to learn through physical and digital creation. At the core of this approach are the 4Cs (communication, collaboration, critical thinking, creativity) of the 21st century (LEGO®, 2022a). According to the LEGO® Play Well Report (2018), parents state that their children who spend time with LEGO® develop different and important skills. 95% of the parents participating in the research stated that they contributed to the development of skills such as problem solving, 96% creativity, 96% cooperation, socialisation, and communication. Studies of secondary school science education with LEGO® Education® sets have investigated the effects of LEGO® applications on academic achievement (Boyraz, 2019; Cavas, Kesercioğlu, Holbrook, Rannikmae, Özdoğru, & Gökler, 2012; Kılınç, 2014; Marulcu & Barnett, 2013; Uğuz, 2019), metacognition (Atmatzido, Demetriadis, & Nika, 2018; Cruz, 2019; Gibbon, 2007; Mojica, 2010), scientific process skills (Cavas, Kesercioğlu, Holbrook, Rannikmae, Özdoğru, & Gökler, 2012, Çayır, 2010; Koç Şenol, 2012; Kurtuluş, 2019; Okkesim, 2014; Özdoğru, 2013), problem solving (Atmatzido, Demetriadis, & Nika, 2018; Uğuz, 2019; Varnado, 2005), scientific creativity (Cavas, Kesercioğlu, Holbrook, Rannikmae, Özdoğru, & Gökler, 2012; Kurtuluş, 2019), computational skills (Uğuz, 2019), and attitude, interest, and motivation (Gürevin, 2019; Hinton, 2017; Kurtuluş, 2019; Kuş, 2016; Okkesim, 2014; Özdoğru, 2013; Uğuz, 2019). While studies on physics are at the

forefront of the researchers' interest (Kılınç, 2014; Kurtuluş, 2019; Kuş, 2016; Marulcu & Barnett, 2013; Özdoğru, 2013), there are also studies on chemistry (Boyraz, 2019; Okkesim, 2014), biology (Cuperman & Verner, 2019; Çakır, 2019) and STEM (Coxon, 2011; Hinton, 2017; Kurtuluş, 2019). It is noteworthy that the studies involving LEGO® MINDSTORMS®-supported applications, especially with gifted students at the primary education level, are extremely limited (Coxon, 2011; Gibbon, 2007; Jamali, 2020). When the relevant literature is reviewed, there is no study examining the effect of the LEGO® Education® BricQ Motion Essential Set on 21st-century skills. To fill this gap, this study focuses on the effect of the LEGO® Education® BricQ Motion Essential Set on the 21st-century skills of gifted students. This study aims to examine the effect of the LEGO® Education® BricQ Motion Essential Set on the 21st-century skills of gifted students in the teaching of the Force and Motion Unit and to get students' views on the teaching process carried out with this educational set.

Methods

Research Model

In this study, the research model called a mixed method, in which quantitative and qualitative research methods are used together, was chosen in order to obtain the data for the purpose of the research. An explanatory sequential design mixed method, one of the mixed methods experimental designs, was used in the research. In this design, it is interpreted as how findings obtained from quantitative data help to explain qualitative data (Creswell & Plano Clark, 2018). A single-group pre-test/post-test experimental design was used to collect the quantitative data of the study. In the single-group pre-test/post-test design, the researcher first makes a pre-test measurement for a single group, then applies the experimental procedure, and finally performs the post-test (Creswell, 2017). The qualitative data of the study were collected using semi-structured interview questions. Semi-structured interviews emerge as a technique frequently used in educational science research, as they provide both standardisation and flexibility to predetermined questions (Türnüklü, 2000).

Working Group

The study group of the research consists of 21 gifted students attending the Support-2 (4th grade) groups in a science and art center in Konya in the spring semester of the 2021–2022 academic year. Participants were selected according to the convenience sampling method. The convenient sampling method allows the researchers to select individuals who are easily accessible

in the selection of the participants, and also saves time and effort (Miles & Huberman, 2019). After the implementation process, seven of the volunteer students were selected at random, and semi-structured interviews were conducted with these students.

Data Collection Tools

Two different measurement tools were used to collect the quantitative and qualitative data of this study.

Quantitative Data Collection Tool

Quantitative data for the research were collected with the 21st Century Learning and Renewal Skills Scale developed by Belet Boyacı and Atalay (2016) and consisting of 39 items. The scale, which is a triple Likert-type scale, has 20 items about creativity and innovation skills, 12 items about critical thinking and problem-solving skills, and 7 items about cooperation and communication skills. The Cronbach's alpha reliability coefficient of the scale was calculated as 0.95.

Qualitative Data Collection Tool

Semi-structured interview questions developed by the researchers were used to collect the qualitative data for the study. The interview questions prepared by the researchers were presented to three faculty members in the field of science education and measurement and evaluation, and the necessary arrangements were made in line with the suggestions. The interview questions in which the qualitative data of the research were collected are given below.

1. What topics and concepts did you learn in the science class you used in BricQ Motion?
2. How did you feel during the lessons where you did these experiments?
3. Would you like to use LEGO® in all units of science lessons?

Data Collection Process

The data collection process of this research continued for 13 class hours (8 weeks). The application steps followed in the application and data collection processes are given in **Table 1**.

In the first lesson hour, the students, who were determined as the application group, were given information about the course and the application process. Then, the 21st-century learning and renewal skill scale was applied as a pre-test. In the next lesson, the application process was started and Free Throw, Bobsled, Hockey Practice, Tightrope Walker, and Gravity Car Derby

Table 1. Application process

Application	Hour
Pre-test	1 hour
Free Throw	2 hours
Bobsled	2 hours
Hockey Practice	2 hours
Tightrope Walker	2 hours
Gravity Car Derby	2 hours
Post-test	1 hour
Interview	1 hour

activities were held with the students using the LEGO® Education® BricQ Motion Essential Training set. These activities aim for students to gain the following skills:

- Planning and conducting research on the causes and effects of push and pull forces
- Gaining an understanding of 'Force and Motion'
- Conducting research on the effects of balanced and unbalanced forces
- Investigating patterns in an object's movement, predicting its next move
- Generating designs with the aim of changing the speed or direction of an object by pushing or pulling
- Actively participating in various discussions throughout the process
- Developing collaborative speaking skills
- Asking and answering questions
- Data analysis
- Discovering how to present their ideas

The LEGO® Education® official website was used for the lesson plans of the activities used in the lessons (LEGO®, 2022b). The training standards for the activities used and the explanations of the content are listed below.

Hockey Practice (NGSS-P2-1; ISTE 7c; CCSS.ELA-LITERACY.SL.1.2): In this activity, students will explore how different push and pull forces help to take and block penalty shots with mini figures of a hockey player and a goalie. They will also determine how the rack and pinion mechanism they have created will work to convert a linear pulling force into rotational thrust.

Tightrope Walker (NGSS-P2-1, ISTE 7c, CCSS.ELA-LITERACY.SL.1.2): In this activity, students will discover the force of gravity to keep a rope and mini figure of a tightrope walker in balance and protect the center of gravity with the help of bricks so that it does not fall.

Free Throw (NGSS-PS2-2; ISTE 4c,7c; CCSS.ELA-LITERACY.SL.1): In this activity, students will model a basketball court where they can shoot three points at a time with the mini figure of a basketball player, making use of levers and gears for the perfect basket.

Bobsled (NGSS 3-PS2-2, ISTE 4c, 6a, 7c, CCSS.ELA-LITERACY.SL.3.1): In this activity, students will explore how gravity affects the movement of the sledge by changing the mass of the sledges on which the mini figures ride, leaving them off the inclined plane. Students will also understand the mass–volume difference by making predictions.

Gravity Car Derby (NGSS 3-PS2-1, ISTE 4c, CCSS.ELA-LITERACY.SL.3): In this activity, students will design a safe gravity-powered car. They will conduct research by collecting evidence of the effects of balanced and unbalanced forces on the motion of a car using an inclined plane.

Photographs of the application of LEGO® activities in the lesson using the lesson plans are given below (**Figure 1**).

After the implementation process of the research ended, the 21st-century learning and renewal skill scale was applied to the same group as a post-test. Then, taking into account the randomness among 21 students, 7 volunteer students were determined. Semi-structured interviews were conducted with these students, and the application process was concluded.

Analysis of Data

The SPSS 26 package program was used in the analysis of the quantitative data obtained from this research. The Shapiro–Wilk test was applied to investigate whether the data collected from the 21st-century learning and renewal skill scale showed normal distribution. The Wilcoxon Signed Ranks test was used to determine whether there was a difference between the measurements made before and after the application. Content analysis, one of the qualitative data analysis methods, was used in the analysis of the qualitative data obtained from the study. Qualitative data was transferred to the computer environment after obtaining the permission of the participants. For the data that was turned into a written document, a coding key was created by three experts (two expert science educators and one science teacher). The expressions containing the codes were grouped according to their similarities and differences and turned into themes. After the themes were obtained, tables were created that included the theme, code, and frequency of students using the codes. The reliability of the codes was determined by calculating the inter-coder agreement. This ratio was found to be 0.83, and it was decided that the codes were consistent (Miles & Huberman, 2019). Since the students' own words would be quoted verbatim in the findings, each student was given a code name: S1, S2, S3, etc.

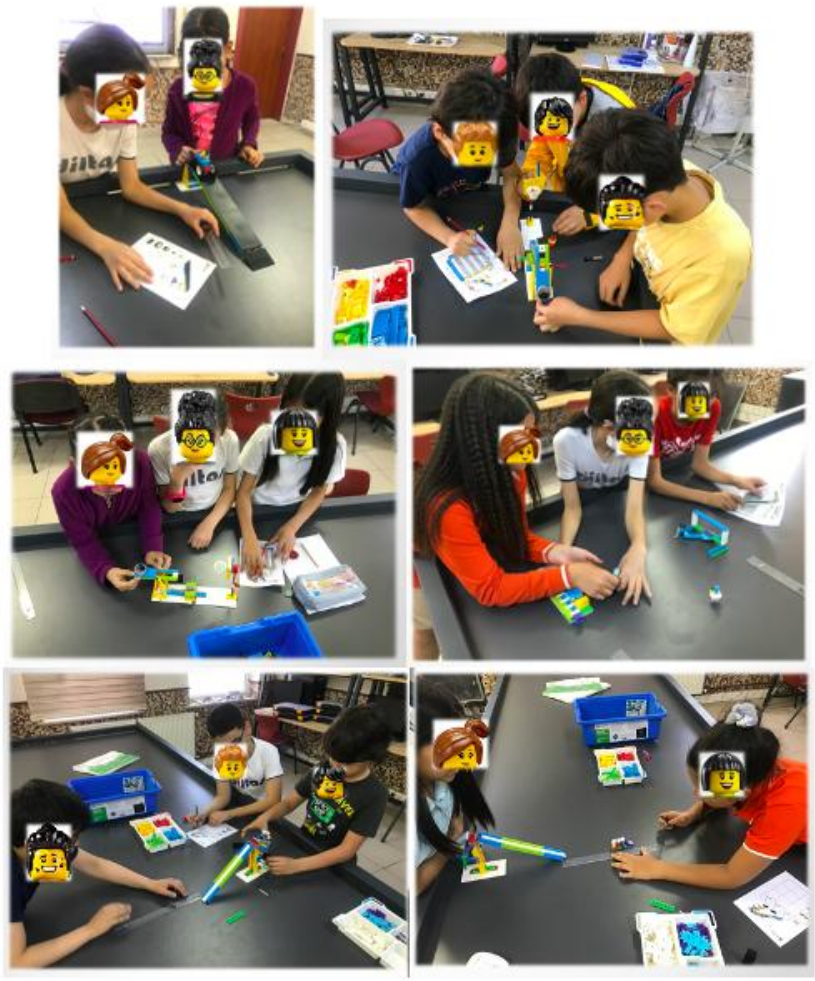

Figure 1. Images of the Application Process.

Findings and Interpretation

Findings related to the research were analyzed under two headings: quantitative findings and qualitative findings.

Quantitative Findings and Interpretation

The quantitative data of the research were obtained from the 21st-century learning and renewal skill scale applied to the students. Before proceeding to the analysis of quantitative data, it was investigated which statistical method would be used to analyze the data obtained from the relevant scale. In the

analysis of data collected with the help of scales in quantitative research, parametric or non-parametric analyzes can be used according to the characteristics of the data set. To apply parametric tests in the analysis of the data, the entire data set must have a normal distribution. In this respect, the data obtained from the measurement tools should be analyzed with the appropriate normal distribution test, and it should be examined whether it provides the assumption of normality. According to the findings obtained, the use of parametric or non-parametric tests should be decided (Ghasemi & Zahediasl, 2012; Sim & Wright, 2002). In this study, normality analysis was performed on the data obtained from the scale used as a data collection tool, and the analysis method to be applied to the data set was selected according to the findings. The Shapiro–Wilk test was used to determine whether the data collected from the scale showed normal distribution. The Shapiro ‑ Wilk test is used when $n < 50$ (Ghasemi & Zahediasl, 2012; Sawyer, 2009). The results of the analysis are given in **Table 2**.

Table 2 shows that when the students' 21st-century learning and renewal skills scale pre-test and post-test mean scores are examined, it is seen that the students' post-test mean scores are $p < 0.05$. This indicates that the data are not normally distributed. For this reason, it was decided to use non-parametric tests in the analysis of the data.

The Wilcoxon Signed Ranks test was used to reveal whether there is a difference between the pre-test and post-test mean scores of the 21st-century learning and renewal skills scale of gifted students who were taught science with the support of LEGO® BricQ Motion Essential. The analysis results are given in the table below (**Table 3**).

According to the results of the Wilcoxon Signed Ranks test in Table 3, there is a significant difference between the 21st-century skills scale total scores of the students participating in the research ($z = -2.420$, $p < 0.05$). The fact that the difference scores are in favour of negative ranks indicates that teaching has a significant effect on 21st-century skills.

Qualitative Findings and Interpretation

The qualitative data of this study were collected from seven students selected from the application group in order to explain the results obtained from the analysis of the quantitative data and illuminate the reasons for these results. Three semi-structured interview questions were asked of the students. The answers given by the students to the questions posed to them were reviewed in detail, and the codes and themes related to each question were extracted. As a result of the analysis of the codes and themes obtained, separate findings were obtained for each question, and direct quotations from the answers of the students were included in the findings. The answers given by the students to the first interview question are given in **Table 4**.

Table 2. Normality Distribution Of Gifted Students' 21st-Century Learning and Renewal Skills Total Scores.

		Shapiro–Wilk		
		Statistic	**df**	**p**
21st-century learning and regeneration skills	Pre-test total score	0.942	21	0.233
	Post-test total score	0.890	21	0.022*

**p < 0.05.*

Table 3. Wilcoxon Signed Rank Test Results of 21st-Century Learning and Renewal Skills Total Scores of Gifted Students.

Post-Test / Pre-Test	**N**	**Rank Average**	**Rank Total**	**z**	**p**
Negative Rank	4	11.50	46.00		
Positive Sequence	17	10.88	185.00	-2.420	0.016*
Ties	0				

**p < 0.05.*

Table 4. Theme, Code, and Frequency Values for the First Question.

Theme	**Code**	**Frequency**
Force and Motion	Frictional force	7
	Gravity	5
	Effects of force (acceleration, deceleration)	5
	Speed	4
	Balance	3
	Weight	1

According to **Table 4**, when the themes and codes that emerged regarding the answers given by the students to the first question are examined, it is seen that the answers belonging to the theme 'Force and Motion' emerged. When the codes of this theme were categorized, the students mentioned the codes of friction force (f = 6), gravity (f = 5), effects of force (f = 5), and speed (f = 4). In addition, some students' answers included the codes of balance (f = 3) and weight (f = 1). In general, it was determined that the students explained the experimental setups in detail while answering the questions. Direct quotations from the answers given by the students to the first question are presented below.

Table 5. Theme, Code, and Frequency Values for the Second Question.

Theme	Code	Frequency
Emotional states	Excitement	4
	Fun	3
	Happiness	3
	Curiosity	2
	Surprise	1
Learning states	Identifying concepts	1
	Observing concepts	1

Table 6. Theme, Code, and Frequency Values for the Third Question.

Theme	Code	Frequency
Positive evaluations	I would like to play in the lessons	7
	It's great to play with LEGO®	4
	A better understanding of science lessons	2
	I like to design LEGO®	1
	Science lessons are more fun	1
Criticism	I don't want to use LEGO® robots	1

S14: "We ensured that the weights were balanced on the rope while doing acrobatics. We made a ramp and learned the relationship between speed and weight. We learned the concepts of friction and gravity." (02.06.2022).

S20: "We learned about the forces used by the car, gravity, and friction. The less frictional force there is between the wheel and the ground, the faster the car goes." (02.06.2022).

The classification of the answers given by the students to the second interview question according to the themes and codes is shown in **Table 5**.

When the answers of the students to the second question were examined, the themes of 'emotional states' and 'learning states' were determined (**Table 5**). It was seen that the excitement (f = 4) code came to the fore the most in the 'emotional states' theme, which describes the feelings while experimenting with LEGO® training sets. In addition, codes such as fun (f = 3), happiness (f = 3), curiosity (f = 2), and surprise (f = 1) were also determined. The statements in which the students evaluated their own learning in their response were examined under the theme of 'learning situations'. In this theme, the codes for identifying concepts (f = 1) and observing concepts (f =

1) were determined. Direct quotations from the answers given by the students to the second question are presented below.

S14: "I am having fun. I am getting excited. Frankly, I am happy when I build LEGO®." (02.06.2022).

S1: "I am happy to learn something new, sometimes to be surprised when I understand the subject, to be happy." (02.06.2022).

S2: "I learned that I identified the concepts myself, I felt that I was observing them and getting to know the concepts closely." (02.06.2022).

The answers of the students to the third interview question are shown in **Table 6**.

According to **Table 6**, all of the students (f = 7) who answered the third question took part in the 'positive evaluations' theme. These students stated that they would very much like to use LEGO® in all units of the science course. Their comments are: very enjoyable (f = 4), a better understanding of science lessons (f = 2), enjoy designing things with LEGO® (f = 1), and science lessons are more fun (f = 1), indicated by codes. In addition, the answer of one of the students was evaluated under the theme of 'criticism'. This student mentioned that he was not willing to use LEGO® robots (f = 1). Direct quotations from the answers given by the students to the third question are presented below.

S14: "I would like to. Because by making LEGO®, science lessons are more fun and I understand better." (02.06.2022).

S15: "I would love to, but I would also like to use LEGO®'s robots." (02.06.2022).

S18: "Yes. Because playing with LEGO® is very nice. I like to design things out of LEGO® blocks." (02.06.2022).

Conclusion and Discussion

According to the quantitative findings after the research, it was observed that the 21st-century skills of the gifted students who were taught science with the support of LEGO® Education® BricQ Motion Essential in the 'Force and Motion' unit increased during the post-test. When the studies in which LEGO® training sets are used in the 'Force and Motion' unit are examined; Koç Şenol (2012) determined that the 7th-grade students participating in the study showed a significant difference in the science process skills of the students and their motivation for the science lesson with the LEGO® MINDSTORMS®-supported applications compared to the students in the control group. Kuş (2016) stated that LEGO® MINDSTORMS® 6th grade activities, which include the integration of science, technology, and design, are an ef-

fective approach for increasing students' academic success, attitude, and motivation. This study reveals that, unlike LEGO® educational robots, LEGO® Education® BricQ Motion Essential-supported science teaching is effective in the development of 21st-century skills of gifted students. In the literature, LEGO® training sets have been used in studies that examine sub-dimensions, although not directly on 21st-century skills. Cruz (2019), in his research with secondary school students, determined that LEGO® training sets have a significant effect on critical thinking skills, one of the 21st-century skills. Jamali (2020), in his study with 15 gifted female students, revealed that LEGO® robots had a positive effect on developing their creative thinking skills. Kurtuluş (2019) stated that the activities carried out with LEGO® improved students' scientific creativity and problem-solving skills. In the LEGO® Play Well Report (2018), parents stated that their children who spend time with LEGO® contribute to the development of skills such as problem solving, creativity, cooperation, and communication.

The LEGO® Education® BricQ Motion Essential Set can be used in STEM education due to its feature of bringing different disciplines together. Considering the studies on this subject, studies have found that the 21st-century skills of students who receive STEM education are improved (Bircan, 2019; Benek, 2019). In his research conducted with 34 primary school students, Bircan (2019) determined that the activities he prepared for STEM education had a significant effect on the students' attitudes towards STEM and 21st-century skills. In addition, he stated that the 21st-century skills such as communication, cooperation, creativity, and critical thinking of the 4th-grade students who participated in the research developed. Benek (2019) stated that STEM activities prepared on socio-scientific issues have positively affected the attitudes of 7th-grade students towards STEM and their 21st-century skills, and have improved them permanently. In his study, Açışlı Çelik (2022) concluded that the STEM activities he designed using the LEGO® Education® Spike Prime Set are beneficial in improving the problem-solving skills of 6th-grade students. The researcher also stated that these students approached the problems they faced in a solution-oriented manner with their critical thinking skills, and this situation positively affected their critical thinking skills. To explore the potential of the First LEGO® League (FLL) tournament to teach 21st-century skills, Ma and Williams (2013) examined the experience of a team participating in this league. They found that the tournament, in which LEGO educational robots were used, provided opportunities for team members to learn many 21st-century skills such as decision-making, problem solving, teamwork, flexibility, and self-management. It is predicted that gifted students will be able to develop their 21st-century skills and grow up to be useful individuals for their country if they are supported by an appropriate environment considering their qualifications (Şahin Çakır et al., 2021). Özcelik and Akgündüz (2018)

found that STEM activities applied to gifted students improve 21st-century skills such as creativity, critical thinking, collaboration, and communication, and educational achievements in science and mathematics.

When the qualitative findings were examined as a result of the semi-structured interviews with the gifted students participating in the research, it was seen that they were able to express the concepts related to the 'Force and Motion' unit. Bender (2018) stated that students using LEGO® can recognise simple machines and produce projects on force and motion. When gifted students have control over what they will study, how they will study, and how they will show what they have learned, their motivation and desire increase (Kimball, 2001; Zimlich, 2012). The gifted students who participated in this research stated that they had fun while doing experiments with LEGO® and that they wanted to use LEGO® in other science units. Koç Şenol (2012) and Cameron (2005) found that their students developed positive opinions by reaching similar results in their studies using LEGO® sets. In addition, Kurtuluş (2019) stated that the activities implemented with LEGO® increased the motivation of students to learn science. In his study using LEGO® sets, Zengin (2016) revealed that his students were willing to use coding and robotic technology and developed a positive view toward computing. According to Silva (2008), the use of LEGO® sets in physics subjects enables students who have difficulty concentrating to improve their participation and motivation in the lesson.

While LEGO® was once just a toy for researchers and educators, today it is seen as an innovative way of teaching science and mathematics concepts with the development of technology (Kazez & Genç 2016). Williams, Ma, Prejean, Ford, and Lai (2014) concluded that middle school students who participated in the summer camp where LEGO® robots were used improved their physics content knowledge. Students learn better by participating in experiments, role play, and building (Dodson, 2011). Children also develop their problem solving, creative, and critical thinking abilities to improve their engineering skills. (Kazez & Young, 2016). In addition to covering these features, being able to be used repeatedly and being durable are the reasons why LEGO® Education® BricQ Motion sets are preferred. The only downside to this set is that it is costly. Similarly, Bender (2018) interpreted the expense of LEGO® Education® products as a disadvantage.

When the findings obtained from quantitative and qualitative data are evaluated together, it can be seen that LEGO® Education® BricQ Motion Essential training sets contribute to the development of the 21st-century skills of gifted students, and they have positive opinions about these sets. For countries to have a place in the global economy, and for the success of children and society, it is vital to meet the needs of the 21st-century job market, and to inspire them by planning career goals at a young age (Ensign, 2017). LEGO® training sets help students make sense of career-oriented experi-

ences and encourage their career awareness through an interdisciplinary approach (Holmquist, 2014). In this context, it is recommended to use LEGO® training sets to develop the 21st-century skills of gifted students. This research can be expanded by using LEGO® Education® sets for gifted students at different grade levels and students attending primary and secondary schools.

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