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Review of Summer School Mathematics Framework Program

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ABSTRACT

In the summer school mathematics framework program, which is prepared while the materials deemed necessary to be used in the teaching process in the programs prepared to date are left to the opinion of the teacher and more concrete materials are used, the digital materials proposed to be used by the teachers in this process are prepared in accordance with the achievements and are included in the program as ready for which goals they will be used. In this context, the aim of the study is to examine the materials in the summer school mathematics framework program prepared to be implemented in the summer school in 2022 and so to evaluate them in terms of their suitability for the goals. In this study, document review method, which is one of the qualitative research methods, was used. The research data were obtained by examining the digital materials in the summer school mathematics framework program prepared for middle schools. When the summer school mathematics framework program and the materials of the program in the learning process in this program are examined, it is revealed that the focus is on mathematics and the e-contents related to the field in the EBA application are included under the title of learning processes in this program and the program is supported by the use of digital materials.

Keywords
21st century skills
Digital material
Document review
Mathematics course
Learning process

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Introduction

It is experienced in an age where technology is developing rapidly and in connection with this, information is spreading rapidly. The rapid development in information and communication technologies has affected countries in various fields such as economy, trade and education, which has required countries to carry out new studies in order to adapt to the new world order [1]-[4]. 21st century skills are targeted in order to raise individuals who are compatible with the age lived in the education system in Turkey. With these skills, it is aimed to raise individuals who can keep up with the age they live in and have the qualifications to respond to the needs of the age [5], [6]. In order to gain these skills, LGS (High School Entrance Exam) exam questions have been changed. The questions are skill-based. Skill-based questions are problems involving reasoning and decision structures [7], [8]. The main reason for the changes made is to raise individuals who are not only those who receive information, but also who can restructure knowledge and are productive [9].

The changes made are not only for the exam questions, but also in the teaching materials used in this process in order to ensure the development of the learning and teaching process by considering global innovations and developments. The use of materials is considered important especially for mathematics lessons, which are seen as difficult by students. Since mathematics is an abstract course, materials that will benefit the student from understanding the subject from every way and that attract his/ her interest should be included in the course process. According to Inan, the materials help teachers and students overcome the difficulties they often face in the problem-solving process, teachers develop the ability to model and use algorithms to solve mathematical problems, and students can develop patterns for solving mathematical problems. From this point of view, mathematics topics should be evaluated from the point of view of students and designed with the necessary materials. In order to eliminate this deficiency, digital transformations in education have started with the FATİH project. This project, known as FATİH for short, titled Movement to Increase Opportunities and Improve Technology, which was announced to the public in November 2010, aimed to transition from the "computer period to every class" period [11]. With this project, smart board technology has been introduced as one of the digital materials that are suitable for the innovations of the age as well as the concrete materials used so far. Within this material, EBA application is a sub-project of EBA, FATİH project and the most vital and important step of the project [5]. With the EBA application, e-content was created for each course and the content was digitized and the teaching process was made more innovative. According to Ersoy, technology is seen as the most influential force in curriculum. In this direction, it has been inevitable to make innovations in the education program and the summer school framework

program has been prepared to be implemented in the summer school of 2022. In the summer school framework program published in order to improve the mathematical thinking skills of the students in particular, the summer school framework program focused on mathematics and the e-content related to the field in EBA was included under the title of learning processes in this program and the program was supported by the use of digital materials.

Purpose of the research

While the materials deemed necessary to be used in the teaching process in the programs prepared to date are left to the opinion of the teacher and more concrete materials are recommended, in this program, which is prepared with the development of technology, the digital materials recommended to be used by the teachers in this process are prepared in accordance with the achievements and in which the targets will be used are included in the program in advance. In this context, the aim of the research is to examine the materials in the summer school mathematics framework program and to evaluate them in terms of their suitability for the purposes.

Method

A. Types of research

In this study, document analysis method, which is one of the qualitative research methods, was used. Document analysis a research method used to analyze the content of qualitative research [13].

B. Data collection

For the summer school applications to be held between 4 July and 28 August 2022 based on the existing curriculum in the relevant courses in order to strengthen the mathematics literacy of the students, to make them associate with daily life skills by making them love mathematics, and to encourage analytical thinking by reading the data in order to have an entertaining learning process with the activities in which the students will actively participate in the summer school application by the Ministry of National Education "Summer School Mathematics Framework Program" has been prepared [14] . Within the framework program, suggestions for the learning process and sample materials that can be applied in each group in Summer School education are presented [14]. The research data were obtained by examining the secondary school mathematics education program and the summer school mathematics framework program prepared for middle schools. The acquisition and learning process in the program are tabulated. In this program, the digital materials under the title of learning process were examined by opening links.

C. Data Analysis

The aim of the study is to examine the materials involved in the learning process in the summer school mathematics framework program and to evaluate them in terms of their suitability for the purposes. For this purpose, by clicking on the material links under the title of learning processes in the summer school mathematics framework program, screenshots were taken about the relevant material and the visuals were analyzed.

The summer school mathematics framework program is coded as the curriculum of mathematics applications course and objectives in the program are expressed "MU"[15]. When the links in the program are clicked, these links direct the user to the EBA login page. This page is opened after entering the required username and password.

The objectives of the program and the learning process in the summer school framework program and the learning process were tabulated and the digital materials in the learning process were examined. The objectives of the program and the materials in the learning process are tabulated. See Table 1.

Table 1. Mathematics Applications Course Curriculum

Objectives	**Learning Process**
MU. 6.1. 3.1. Relates the basic concepts of clusters to everyday life situations.	Cluster examples encountered in daily life are discussed and modeling studies are carried out. Activities that will reveal the relationship between sets and numbers are included. **Material** http://meb.ai/sYy6Yi

The image of the material prepared in accordance with the acquisition related to the clusters above is given in Fig 1.

Fig. 1. EBA-6. Material on the Topic of Class Clusters

When the details of the material are examined, in order to realize that "It relates the basic concepts about clusters to daily life situations", students were made aware that they could create a cluster related to objects that exist in daily life. In addition, a video was added to the learning process of the course and the course offered multiple learning environments to the students. Since video is a visual and audio tool, it can easily attract the attention of students [16]. Digital video makes students more enthusiastic about the topics they are learning, and videos provide the information they contain very quickly, ensuring that the learning process is efficient for both students and teachers [17]. In the learning process of the program, video materials were included to make the learning process interesting for the students.

Table 2. Mathematics Applications Course Curriculum

Objectives	**Learning Process**
MU.5.2.1.1. Uses spatial relationships to determine position. a) The guidelines used in sports such as admiral sunk, chess, etc. games and orienteering are used. b) Applications for finding places or directions are included. c) In spatial relations, direction and unit expressions are limited.	Orienteering tracks are created in the school, around or in any area deemed appropriate and sports activities are carried out. **Material** http://meb.ai/fAigmx

The image of the material prepared above about spatial relationships as mention in Table 2 is given by Fig. 2.

Fig. 2. EBA-5. Material on the Subject of Class Spatial Relationships

In geometry courses, where visuality is of primary importance, only the writing board and chalk are taught and thus, the spatial thoughts of the students are expected to develop [18]. This will not be possible without using materials. Digital materials increase students' creativity, and students use different solution methods to solve geometry problems [19].

Table 3. Mathematics Applications Course Curriculum

Objectives	**Learning Process**
MU.5.2.3.1. Develops strategies to use time effectively and efficiently in daily life. Applications for recognizing the relationship between the sizes of time measurement units are included.	Students create a "Time Diary". The time allocated to daily activities is noted, at the end of the week an assessment of daily and weekly time use is made. **Material** http://meb.ai/eABLmd

To implement the curriculum based on Table 2 towards the introduction of time units, the above "Develops strategies for using time effectively and efficiently in daily life." Its gain can be shown as an example. When clicking on the link about this acquisition, a video with the content of the problem called "Parking Timetable" is published from the daily life below. See Fig. 3

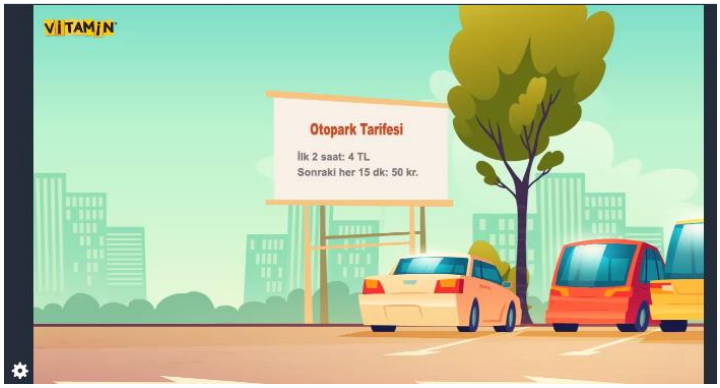

Fig. 3. EBA-5. Material on the Subject of Class Time Measurement Units

Freudenthal states that in the learning process of mathematics, the process starts with real-life problems and mathematical formulas and concepts are finally reached [20]. When exams such as PISA and TIMSS are examined, it is revealed that the questions in these exams are created in the form of problems with daily life content. Therefore, this program also included problem-style content from daily life, making it easier for students to make sense of the subject and facilitating teachers to prepare problem situations related to the subject.

Table 4. Mathematics Applications Course Curriculum

Objectives	**Learning Process**
MU. 5. 2. 5.1. Develop different designs by making use of the models of the prism.	**Material** http://meb.ai/vd87oH http://meb.ai/UQio2d

Objective in the Table 4 should be implemented. The first image of the material prepared in accordance with the acquisition of the prism of rectangles above is given in Fig. 4.

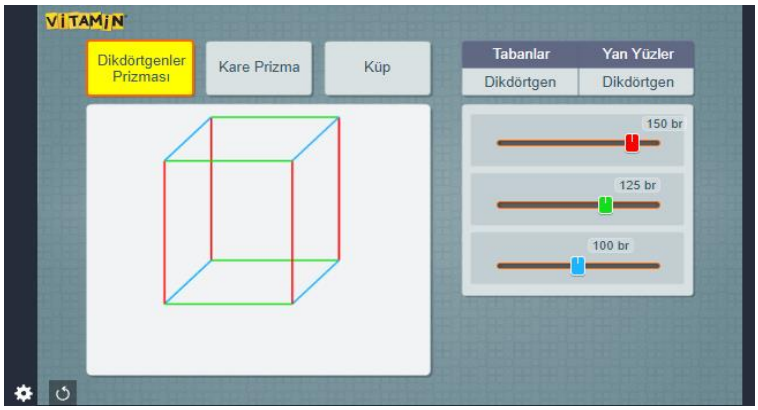

Fig. 4. EBA-5. Class Rectangles Prism Material

The link provided contains images related to prisms. With this content, students have the opportunity to access the features related to the prism of rectangles, square prism and cube at the same time. Images of the second link to this achievement are given in Fig. 5.

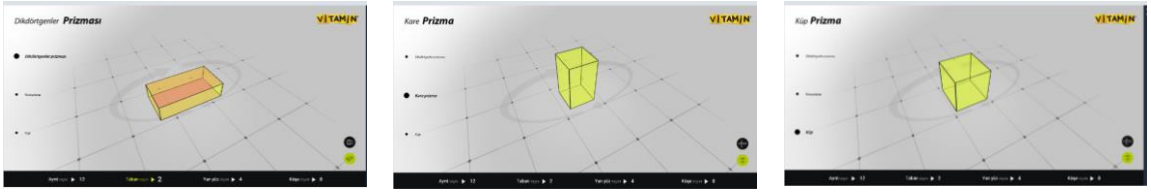

Fig.5 EBA-5. Class Rectangles Prism Material

The link provided contains images related to prisms. With this content, students have the opportunity to access the features related to the prism of rectangles, square prism and cube at the same time. This content offers ready-made geometric software implementation. With the development of technology in geometry lectures, many software such as geogebra have been offered to the application of teachers. Geogebra is a dynamic mathematics software that combines geometry algebra and analysis [21]. This software provides dynamic relationships between these concepts, including concepts such as point, line part, lines and conic sections, and facilitates the teaching of concepts [22]. It is unlikely that such software will be integrated into the learning process due to the inadequacies in teachers' use of technology. This deficiency is eliminated by the e-content existing in the EBA application. These contents include interactive videos on geometry and these studies include the necessary technological guidance for teachers and students. One of these contents is the "Rectangles develop different designs by making use of the models of the prism" in the summer school mathematics framework program. It is included in the second link from the materials involved in the learning process of the acquisition. See Table 5 and Fig. 8.

Table 5. Mathematics Applications Course Curriculum

Objectives	**Learning Process**
MU.6.3.1.1. Relate angles and the state of the angles relative to each other with everyday life. a) Concrete materials or information and communication technologies are used. b) Class limitations shall be maintained.	**Material** http://meb.ai/sKdqWf

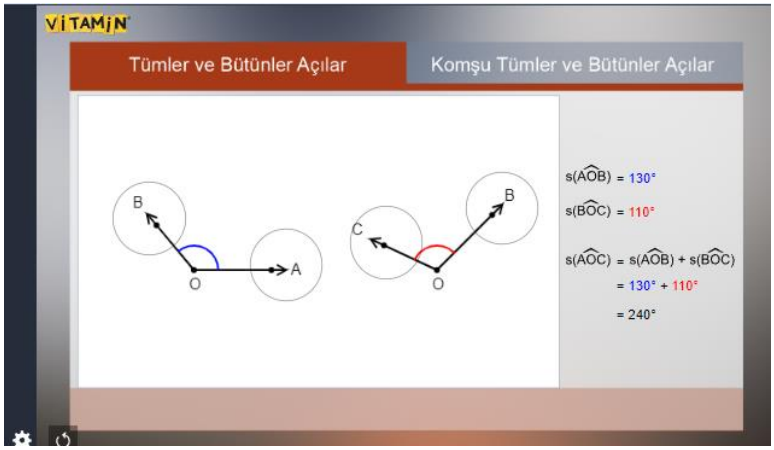

Fig. 8. EBA-5. Class Rectangles Prism Material

Since the concept of angle is an abstract concept, it is among the subjects that are difficult to understand in geometry. Teaching the subject of geometry angles in an environment enriched with technology and using materials was seen as advantageous for students to achieve their achievements [23]. The concept of whole and wholes, which is the sub-title of this subject, is difficult to learn if the concept of angle is not created in individuals. The material in the program is given in the image above. This material visually presents the concept of whole and wholes. The angle arms in the material are mobile, and the angle values on the right side change at the same rate as these arms are moved. Thus, thanks to this material, individuals can observe the concept of a large number of whole and wholes.

Conclusion

When the objectives of the summer school mathematics framework program are examined, these objectives include developing a confident approach to mathematics, ensuring the greater use of mathematical concepts in daily life, supporting metacognitive knowledge and skills, expressing concepts with different forms of representation, ensuring more use of mathematical concepts in daily life and supporting metacognitive knowledge and skills to express concepts in different ways. These objectives generally consist of objectives aimed at developing 21st century skills. In line with the purpose of the research, when the materials of

the summer school mathematics framework program and the learning process in this program are examined, it is concluded that the materials consist of technology-based materials related to daily life, which enable the development of individuals' spatial abilities in mathematics and increase the individual's interest and motivation towards mathematics. Learning environments enriched with computer-aided teaching materials positively affect students' academic success in mathematics. In this program, which is prepared while the materials that are required to be used in the teaching process in the programs prepared so far are left to the opinion of the teacher and more concrete materials are proposed, the materials recommended to be used by the teachers in this process are prepared in accordance with the achievements and the goals will be used in the program in advance. In this respect, technological materials save time for the teacher in the preparation of the learning process.

Suggestions

In some areas, teachers state that they are inadequate in preparing e-content. As in the prepared summer school mathematics framework program, e-content in other areas can be prepared for the use of teachers in accordance with the goals. Research mostly shows that teachers are inadequate in the use of technology. Digital materials prepared during the learning process can guide teachers in this regard. Digital materials used in the learning process can be useful in keeping students with learning disabilities and hyperactivity focused, supporting attention maintenance behaviors and increasing the motivation of these students towards mathematics.

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