Using an Alternative Model in Social Studies Course: Harezmi Education Model

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Abstract

The Harezmi education model is a teaching model that was designed to equip students with various types of skills about various subjects or problem situations in an interdisciplinary manner. The research examined the students' views and the effects of using the Harezmi Education Model for teaching the social studies course on the students in terms of academic achievement, permanent learning, meta-cognitive awareness. The research was carried out using the diversification of (parallel-convergent design) mixed methods. The quantitative dimension of the research was conducted using a quasi-experimental pre-test/post-test control group design. Qualitative research was carried out with case study using a holistic single case design. The study group consists of a total of 54 students studying in the seventh grade of secondary school. Quantitative research data were collected with an Academic Achievement Test and the Junior Meta cognitive Awareness Inventory (Jr.MAI). Qualitative data were collected with student interview forms, self-evaluation forms and Harezmi student activity diaries. Mann Whitney U test, Wilcoxon signed-rank test and Friedman test statistics were used for the analysis of quantitative data. Qualitative data were analyzed using descriptive and content analysis techniques. As a result of the analysis, tables were prepared, and statistical information and some student opinions were presented. It was concluded that using the Harezmi Education Model for the purpose of teaching the social studies course had a significant positive effect on the academic achievement and meta cognitive awareness of the students. However no statistically significant effect of the Harezmi Education Model could be determined on permanent learning. The students described the social studies lessons taught using the Harezmi Education Model as catchy, entertaining, surprising, and useful. In line with the results, suggestions were presented about the dissemination of the Harezmi Education Model and the implementation of the model on different courses.

Keywords

Social Studies Education, Harezmi Education Model, Alternative Education, STEM Education, Science-Technology and Society (STS) Approach.

INTRODUCTION

The common motivation underlying the studies carried out to improve the quality of the teaching processes is the idea of obtaining maximum benefit from the process and getting quality outputs. Accordingly, it should be stated that the triggers in the renewal of education policies and curriculum are the updated needs of the society as well as the experienced technological and scientific advances (Çelikkaya, Kürümlüoğlu, 2018; Kara, 2022). In this context, the social studies curriculum has undergone various amendments over the years within the framework of renewed education policies and objectives (Öztürk & Kafadar, 2020). Today, individuals are expected to be equipped with different skills and be a part of the education process throughout their academic life. Throughout the process, they are required to acquire skills appropriate to the requirements of the age and to receive training in this direction. The requirements of the age, on the other hand, have been constantly changing and updated in a state of motion. In this context, computer science emerges as a learning outcome that is aimed to be acquired by students in accordance with 21st century skills and today's technologies (Fan, S. & Ritz, J. 2014; Öztürk, Yaman & Kara, 2020).

John Dewey, who argued that the most effective way of learning is by doing and experiencing with a pragmatist educational philosophy in the 20th century, stated that the plan should be student-centered, the practice should be emphasized rather than the theory and a student-centered education approach should be designed in the teaching processes (Bender, 2005; Evcimik, 2023). It is possible to state that the foundations of problem-based learning, which is frequently used in teaching social studies, are based on learning by doing and experiencing (Baysal, 2005). Through this approach, in which students encounter different problem situations, reason for solutions, and develop suggestions for solutions, it is possible to ensure that individuals gain experience about taking the problems they will encounter in daily life as normal and focusing on the solution (Kartal-Taşoğlu & Bakaç, 2023). In this context, it is possible to mention that studies on the development of different teaching approaches, models, methods, and techniques in which students will have the opportunity to actively participate in teaching processes continue to be an issue in every period.

In this context, the Harezmi Education Model has been an important study in recent years that can be evaluated within the scope of R&D study or program model proposal, designed to address the development of the currently required skills based on learning by doing and experiencing, in which students can be active learners and to improve the education processes. This model has been developed in line with the requirements identified within the scope of research and development studies that were carried out by the İstanbul Provincial Directorate of National Education.

In the studies carried out, it has been determined that there is requirement for a learning style that enables disciplines from different fields to work together, that students can learn with concrete experiences and gain problem solving skills at the end of all these processes and that can include social sciences, ethics, values, and morality (Uçan, 2019).

The workshop held on the subject has been an important threshold in terms of laying the groundwork for the process to be initiated. The workshop conducted on subjects such as coding and robotics education with the aim to research how computer technology contributes to the academic success of students and how computer technologies can be used in an interdisciplinary way with different fields helped to reveal 5 basic grounds of Harezmi Education Model (MoNE, 2016). These are:

1. Computational thinking (Teaching computer science without using a computer)

2. Teaching computer science with programming and teaching tools

3. Teaching computer science with an interdisciplinary approach

4. Teaching computer science with robotics and game design

5. Teaching computer science with social sciences

For the purpose of the model's application process, practitioner teachers are required to follow the planned schedule, carry out the process in collaboration with teachers from different fields, receive feedback, meet at the end of the lesson and at the beginning of the other lesson to update the plan in accordance with these feedbacks. The basic condition of the model is to ensure the application process to be carried out with different teachers from at least 3 disciplines. These disciplines can be classified as Technology, Science and Mathematics, Social Sciences as well as Arts and Sports Sciences (Ceylan vd., 2020).

For the situation of problem at the basis of the HEM practices, the term, "Problems in Life - PIL" is used. About the specified PIL, teachers from different disciplines are expected to carry out activities, experiments, excursions, designs, etc. to solve the problem with an action plan that will continue throughout the year. There is no obligation to produce a product as a result of the action plans that are carried out in this process. However, designs or experimental products can be created depending on the state of the PIL. On the other hand, rather than a product-oriented plan, HEM emphasizes the instructiveness of the process and in this process, students are expected to develop different perspectives on a problem with teachers from different disciplines and acquire the skills that are required to solve the problem. HEM practices, which are carried out ass exercises excluded from the class hours, can also be carried out by primary school classroom teachers or preschool teachers during class hours. In the plans designed for the practice process of the Harezmi education model, the objectives that arise from the problem and sub-problems are considered primarily. The most important elements of the model are to carry out this process with connections that are established with different disciplines and to structure this plan on 5 grounds. For example, a HEM group that identifies "Unconscious Consumption" as a PIL situation should, first, divide this problem into sub-problems and find which disciplines these sub-problems are related to. The last step for the start of the process of HEM practice is to plan it in line with the relationship of sub-problem - discipline. The plans can be updated according to the requirements of the HEM teachers during the process through meetings held before and after the classes.

When the studies that may be directly or indirectly related to the Harezmi education model are reviewed; a study that was conducted to reveal the metaphorical perceptions of students of the Harezmi Education Model concluded that the most produced metaphors for the model were "life" and "HEM's being a source of information" (Ceylan et al., 2020). A study conducted by Yavuz et al. (2019) revealed that the students who participated in the HEM activities improved in terms of original thinking. The study conducted by Yıldız (2019), the practice of HEM that was carried out in order to gain students self-confidence, improve their original thinking skills and increase their ability to act in cooperation concluded with positive results. Uçan (2019) tried to evaluate the contributions of the model from the perspective of the parents through the interviews he conducted with the parents of the students who participated in the HEM activities and he revealed that the parents of the students had the opinion that HEM activities would contribute to student achievements. In the study by Akın et al. (2019), the effect of the altering physical conditions in terms of learning during HEM practice was investigated and it was reported that improving the physical conditions with HEM or different activity

environments will positively contribute to learning. In the study conducted by Özyıldırım et al. (2019), solutions for people who suffer from forgetfulness were planned with HEM practices and a robot with a timer was designed. In the study conducted by Doğan et al. (2019), it was concluded that the 5 grounds, which are the basis of HEM, contribute positively to the level of awareness of preschool students and the development of teachers. When the related studies are reviwed, it is possible to mention that the Harezmi Education Model could be integrated into the curricula of our country thanks to its structural differences from STEM education and pilot schemes resulted positively (Koçoğlu, 2018; Seçer, 2021; Kıvanç Contuk and Atay, 2021). However, it was thought that limiting the application only to the outside of the classroom constituted an obstacle to obtaining the maximum efficiency from the model. The outcomes of the Harezmi Education Model, which can be applied simultaneously while teaching the course, have been a matter of curiosity (Yıldız, 2019).

Research Objective

The interdisciplinary nature of the social studies course provides important opportunities for interaction with different subject areas. Understanding a subject in depth and creating concrete experiences for students are quite important in terms of permanent learning. The fact that the Harezmi Education Model enables different disciplines to act together on a subject, its activity and process-oriented structure that is practiced in different scopes reveals a systematic planning for the teaching processes of the social studies course.

Based on its interdisciplinary nature and its structure consisting of different skill sets, the social studies course was thought to be suitable for the implementation of the Harezmi Education Model; thereby it is aimed to use the Harezmi Education Model in the classroom for the purpose of teaching social studies course. The study was carried out while teaching the subject of "Science, Technology and Society" in the 7th grade social studies course. The objective of this study is to analyse the effects of the in-class teaching process designed with the Harezmi education model in terms of different variables and to reveal the opinions of the students involved in the HEM activities.

Based on this purpose, the research questions were determined as follows:

1. Does using the Harezmi Education Model within the scope of teaching Social Studies have a positive effect on students' scores in terms of academic achievement and permanent learning?

2. What is the effect of teaching Social Studies course in line with a course program designed using the Harezmi Education Model on students' meta-cognitive awareness?

3. What are the students' views on the teaching process and teaching activities with regard to using the Harezmi Education Model for teaching Social Studies?

METHOD

Research Model

Mixed method research provides the opportunity to address the qualitative and quantitative aspects of the problems separately in the context of the multidimensionality and diversity of the problems that are encountered in life and provides the opportunity to draw a rich and holistic framework for the solution of the problem with the data obtained (Yıldırım and Şimşek, 2016, p.323)

This research was conducted with the convergent design, which is a mixed method design. In this research design, it is aimed to use the data obtained from the quantitative and qualitative data collection processes together to find answers to the research questions generated in line with the research, to diversify, compare and integrate data sets by using the quantitative and qualitative methods together. The qualitative and quantitative methods that are used together ensure the compensation of the weaknesses related to the methods and data collection tools by the strengths of the other method (Cresswell, Plano Clark, 2007).

In the quantitative part of the study, a quasi-experimental pretest-posttest control group design was used to reveal the effects of the implementation process, which will be carried out with the Harezmi education model in Social Studies teaching, in terms of academic achievement and metacognition in students. In experimental designs, various practices are carried out to reveal the effects of the variables that are determined in the research process, in terms of cause and effect. In real experimental models, the study groups are created randomly. However, since this study was conducted in a public school, the experimental and control groups were created by the school administration.

The qualitative dimension of the research was carried out in accordance with the case study design, and the holistic single case design, which is a case study type, was used. The structure of case studies that allows in-depth research to be carried out with more than one data collection tool and the fact that the holistic single case design is a design that is used in confirming a theory, in investigating a subject that has not been studied before and in non-standard studies, formed the basis for the design of the qualitative dimension. The research was conducted in accordance with the holistic single-case design in terms of being a pioneer about using HEM for in-class subject teaching. In this dimension of the research, opinions of the students on the use of the Harezmi education model in social studies teaching and the activities carried out during this process were asked.

Study Group

The population of this study consists of secondary school students. The sample group of the study consisted of 54 students who were studying in the classes K and I in a public school in the city center of İzmir. Two classes selected among the seventh-grade classes who were taught by the researcher were selected as experimental and control groups. In selecting the experimental and control groups from the classes in which the researcher worked and taught, easily accessible case sampling, which is a purposeful sampling method, was used. The two classes were randomly assigned as experimental and control groups. Social studies teaching within the scope of the Harezmi education model was carried out with the experimental group students. In the qualitative dimension of the research, the student interviews were conducted with all of the experimental group students without any sampling, in order to provide data richness. The classes K and I, which were included in the study, consisted of 27 students each. There were 13 male and 14 female students in the control group K and 15 male and 12 female students in the experimental group I. The weighted averages of the experimental and control groups, the classes K and I, at the end of 2019-2020 and 2020-2021 academic years were compared and no significant difference was found.

Data Collection Tools

Data collection tools used in the research were explained under two headings, as quantitative and qualitative data collection tools.

Quantitative Data Collection Tools

Academic Achievement Test (AAT): The Academic Achievement Test (AAT) prepared by the researcher with the aim of investigating whether teaching the Social Studies course in line with the Harezmi Education Model has a significant effect on the academic achievement of the students was applied on the study and control groups. This test was also used for the purpose of assessing permanent learning. The items of the draft test were analyzed and its reliability was calculated. KR20 formula was used to calculate the reliability of the draft achievement test. This process was conducted on the Excel program. As a result of the calculations, the KR20 value was 0.79. It was reported that the reliability score of the achievement test, which was calculated with KR20, should not be less than 0.50 for the tests that consist of less than 50 items (Badat et al., 2020). In this respect, it was found that the achievement test had sufficient validity and reliability scores to be used.

Table 1

Item Analysis

Question #	Item Difficulty (p)	Item Distinctiveness (r)	Question #	Item Difficulty (p)	Item Distinctiveness (r)
1	0.63	0.45	11	0.66	0.41
2	0.41	0.37	12	0.56	0.34
3	0.59	0.26	13	0.53	0.33
4	0.61	0.43	14	0.41	0.39
5	0.63	0.39	15	0.48	0.29
6	0.45	0.45	16	0.68	0.33
7	0.39	0.26	17	0.45	0.42
8	0.50	0.43	18	0.48	0.46
9	0.62	0.40	19	0.60	0.37
10	0.66	0.42	20	0.57	0.35

Meta cognitive Awareness Inventory (MAI): The Meta cognitive Awareness Inventory (MAI) was originally developed by Sperling, Howard, Miller, Murphy (2002) under the title of "Measures of Children's Knowledge and Regulation of Cognition". The related scale (JR MAI) was adapted into Turkish by Karakelle and Saraç (2007). The scale was adapted by adhering to the original Versions A and B of the scale. Jr MAI, with Versions A and B, has been prepared addressing two different age groups. Jr MAI Version A was developed including 12 3-point Likert type questions prepared addressing 3rd, 4th and 5th grade students. Therefore, Jr MAI Version A was not used in this study. Jr MAI Version B was prepared addressing 6th, 7th, 8th and 9th grade students. Version B was developed including 18 5-point Likert type questions. The item-total correlations of Version B were found to range between

0.38 and 0.60. The inventory with scores above the threshold values was considered to have distinctiveness. For the purpose of reliability studies, the correlation value of the test was calculated as 0.72. The Cronbach alpha value was further calculated as 0.80. The lower-upper group method was used to evaluate the validity of the scale and the difference between the scores of the 27% participants in the lower and upper groups was examined using the t-test (t=46.11, p<0.001) The mean score obtained from the scale was calculated as 70.8. The mean score obtained from the scale was calculated as 73.92 for the 6th graders, 68.99 for the 7th graders, 70.59 for the 8th graders and 69.58 for the 9th graders whereas the lowest score was and the highest score were recorded as 38 and 90 respectively. The data obtained during the adaptation process revealed that both versions of the scale are measurement tools that can be used to evaluate the meta-cognitive awareness levels for the age ranges they covered (Karakelle, Saraç, 2007, p.101).

Qualitative Data Collection Tools

In the qualitative part of the study, three data collection tools were used to collect data. These tools were student opinion form, student self-evaluation form and student activity diaries.

Student opinion form: As one of the data collection tools for the qualitative dimension of the research, the student opinion form was prepared as two seperate forms for the students and applied in the classroom environment before and after the practice. The opinion forms consisted of five questions each. The students filled in the form, which was distributed to them in written form, in the classroom environment and the questions they had were answered during this process. For the draft version of the questions in the form, the opinions of five field experts were received. At the end of the interviews, the required corrections were made and two Turkish teachers were asked for their opinions to improve the clarity of the questions in the form and the forms were finalized. The questions asked to the students before the HEM-designed social studies teaching process are as follows;

1. Can you explain the meaning you attribute to the social studies course? What does this course mean to you?

2. What is your opinion about the Social Studies course being taught through different methods? How have your ideas changed compared to before the practice?

3. What would you like to say about the Harezmi Education model?

4. What do you think about multiple teachers act together in teaching a class or subject?

5. What do you think about the activities we performed during the process? Which activity was your favourite? What is your opinion about being proposed such activities during the classes?

The questions directed to the students at the end of the HEM-designed social studies teaching process are as follows;

1. At the end of the Harezmi education model implementation process, have your opinions changed compared to the opinions you had before the implementation? If so, what are they?

2. What are your observations about the effect of the Harezmi education model on the classroom atmosphere and student behavior?

3. What do you think about the advantages and disadvantages of the Harezmi implementation process? What are your recommendations to overcome the disadvantages, if there is any?

4. What do you think about the process in which more than one teacher act together in teaching a subject and plan the classes together?

5. What do you think about the future, popularization and continuity of the Harezmi education model?

Student Practice Self-Assessment Form: As a data collection tool in the qualitative dimension of the study, a student self-evaluation form was developed to enable the students to evaluate the implementation process as a whole. In order for the students can give more comprehensive answers to the questions, the number of questions was limited and questions that allowed the students to define the process in their own opinions were prepared. There are three questions in the form. With the data collection tool, the opinions of the students about the social studies teaching with the Harezmi education model and the parts they had difficulties during the process were tried to be revealed in depth. The draft of the student self-assessment form was presented to five academicians who are experts in the field and their opinions were received. The sentence forms were edited in line with their suggestions. These edits are expected to enable the students to express their opinions more frankly and sincerely. The draft form, on which the expert opinion was received, was finalized after receiving the opinions of two Turkish Language teachers. The draft student self-assessment form was presented to five academicians who are experts in the field and their opinions were received and the sentence forms were edited in line with their suggestions. These edits are expected to enable the students to express their opinions more frankly and sincerely. The draft form, on which the expert opinion was received, was finalized after receiving the opinions of two Turkish Language teachers. The questions in the form are as follows;

1. What are the most important elements that make teaching social studies with Harezmi education model different from your other courses?

2. Could you benefit from the social studies lesson designed with HEM? Would you like to be taught this way again? Can you write the reasons?

3. Were there any moments when you had difficulty or got bored during the social studies practice class designed with HEM? If so, can you explain the reasons?

Harezmi Student Activity Diary: The main purpose of the form is to get the opinions of the students about the activities carried out after the weekly practice and to determine the good-bad or positive-negative and easy-difficult aspects of the activities, and to find out about the feelings of the students during the activity processes. The form was filled in by the experimental group students at the end of each three-hour social studies class with Harezmi. Unlike the student interview form, in which student opinions were asked before and after the practice, and the student self-evaluation form, which was structured to evaluate the process as a whole; the form contributed to the renewability of the implementation process in terms of revealing the positive and negative situations regarding the weekly activities, determining the precautions to take for the activities of the following week and the situations to consider during the activities and revealing the reasons why students mention an activity as memorable and the feelings it creates. The questions in the form are as follows;

1. What is the most important practice you remember from today's activities? Can you explain it with reasons?

2. Can you explain how you felt during the practice? Which emotions did you feel intensely?

3. Were there any difficulties, negativities or shortcomings you experienced in today's practice? If so, can you explain?

Implementation process

The research process took 11 weeks in total. Apart from the weekly face-to-face implementation process, 2 sessions of online training were offered through Zoom application. The research process was conducted by the researcher who is also a social studies teacher at the school the study was conducted. However, due to the research topic and principles, teachers from three different disciplines, who were also working at the same school, were included in the study. The teachers were a science teacher, an information technologies teacher and a visual arts teacher. Except for the teachers of other disciplines, who were included in the experimental group implementation process, no external observer was included in the process in terms of data collection. Pre-service teachers who were at the school for teaching practice and were allowed, were present in the classroom to observe the activities, however, no external observer report was kept.

Experimental group implementation process

In the research process, the experimental group students who will be taught social studies in accordance with the Harezmi education model were informed that an 11-week implementation schedule was prepared. Before the students were informed about the important components of the application process and the Harezmi education model, the planned pretests were conducted. The metacognitive awareness scale and the 20-question academic achievement test prepared by the researcher within the scope of "Science, Technology and Society" learning field, were applied to the students as pretest.

Following the preliminary applications, the Harezmi education model was introduced to the students, and the steps of deciding on the problem situation for the relevant learning field, clarifying the sub-problems, and creating relationships with different disciplines were carried out. In the ongoing process, the planned activities were carried out for 7 weeks. Following the activities, the Harezmi activity diary prepared by the researcher was applied to the students. The students filled 7 activity diaries in this process. At the end of the implementation schedule, the tests applied to the students as pretests at the beginning of the research process were applied as posttests. In addition, a self-evaluation form was applied in order to evaluate the feelings and thoughts of the students about the process as a whole.

About the activities prepared in this direction, the opinions of the social studies field experts were received regarding the achievements of the activities and their consistence with the relevant unit. In line with the opinions received, the necessary arrangements were made in the activities. When all necessary arrangements are made, the planning was finalized. After the organization of the process as a flow, teachers from other disciplines, who were involved in the process and the researcher prepared the 7-week weekly implementation plans.

Table 2

The Implementation Process in the Study Group

Week	Activity Performed
1. Week (7-11 February 2022)	Application of the Pre-tests and Other Forms
2. Week (14-18 February 2022)	Presentation of the Harezmi Education Model
3. Week (21-25 February 2022)	Problem Statement, Sub-Problems, Problem Scenario, Life Problem (HIS) Sentence
4. Week (28 February- 4 March 2022)	Quiz Game Design (Puzzlermaker)
5. Week (7-11 March 2022)	"Scientists" Painting Activity
6. Week (21- 25 March 2022)	Preparing Infographics (Canva)
7. Week (28 March- 1 April 2022)	Ink Making Experiment
8. Week (4- 8 April 2022)	Water Clock Experiment
9. Week (11-15 April 2022)	Steam Turbine Test
10. Week (18-22 April 2022)	Metaphor of Free and Scientific Thinking Terrarium Activity
11. Week (25-29 April 2022)	Application of the Post-tests and Other Forms

Week 1:

The students were informed that the implementation process would be an 11-week practice that will be carried out within the scope of the research and the pretests were carried out. The questions of the students were carefully attended and it was aimed to increase the interest and excitement of the students about the practice.

Week 2:

The model was introduced and presented to the students and the teachers from other disciplines, who will be involved in the practice of the Harezmi education model. The components of Harezmi were defined with examples, and examples of practice of the Harezmi education model were shared. The activities, photographs, etc. from the former Harezmi practices the researcher conducted in their previous institutional studies were presented. The questions of the students and the teachers were also tried to be answered carefully and in detail and were recorded by the researcher.

Week 3:

The information that the practice would be carried out for the "Science, Technology and Society" learning field was shared. The subject about the scope of the practice was shared and the unit was

introduced. At the end of the introduction, the unit as a whole was tried to be turned into a problem situation through question-answer and brainstorming techniques. Following the evaluation of the unit as a problem situation, this problem situation was expressed as a problem sentence. Then, a scenario writing activity was carried out with the guidance and ideas of the students. Following the the creation of the scenario, the students were divided into 5 different groups and asked to divide the problem situation in the scenario into sub-problems and define the relationships of these sub-problems with various courses. In this process, cardboards and pencils in different colors were distributed to the students and they were asked to show the sub-problem and discipline relationship they decided as a group by using the fishbone technique and concept maps. The fishbone technique was defined and examples were shown prior to the activity. When the groups completed their tasks, they presented the results as a group and when all the groups completed their presentation, a common problem statement, sub-problems and discipline relationships were decided. In line with the decisions, the students were asked for their opinions on what the activities could be, taking the 5 grounds of the sub-problem - outcome - HEM into account. The activities were determined as a result of the ideas shared and the feedbacks of the researcher and other teachers. The activity calendar was finalized by taking expert opinions about the activities.

Week 4:

In line with the acquisition, "Analyzes the change and continuity in the protection, popularization and transfer of the knowledge", the subject was introduced with the question-and- answer technique about what knowledge is and how knowledge has transformed from past to present. Visuals of the materials that were used to record information in the history were shared (clay tablets, papyrus plant, etc.). After the evaluation of the prior knowledge of the students about the subject, a slide presentation prepared for the class was shared by the social studies teacher about the invention of writing, types of writing, Sumerians, Egyptians, Phoenicians to cover the missing subjects. Following the presentation, the visual arts teacher drew some hieroglyphics and introduced them to the students and gave information about the development process of the alphabet through drawings. Then the students were divided into 5 different groups and each group was given a text written in hieroglyphics. Since the texts distributed to the students were parts of a full text, the students were asked to read the texts correctly in each group and then combine the group texts and answer the question written on the board in hieroglyphics. Then A4 sized papers were distributed to the students and they were asked to cut these papers to the size of hand cards. The students were asked to write information about different scientists on the prepared cards using their textbooks and reference books. The cards were passed from hand to hand and each student added a new characteristic of the scientist on the card. When the cards were prepared, the students were divided into groups and played the know and tell game. Thus, the students were introduced to the next week's topic, Turkish Islamic scholars. In the 3rd class, the puzzlemaker application was introduced to the students by the information technologies teacher in the information technology laboratory and they were asked to solve sample puzzles. In order to finalize the related acquisition activity, it was decided to add a 4th hour on the Zoom platform, except for the school hours and in this Zoom session, students were asked to develop puzzles related to the subject they have learned on the puzzlemaker application.

Week 5:

Within the scope of the acquisition, "Discusses the contributions of the scholars raised in Turkish-Islamic civilization to the process of scientific development", the social studies teacher shared

information about El Harezmi, Farabi, İbn-i Sina, El Hazini, El Cezeri, İbn-i Haldun, Ali Kuşçu, Piri Reis and Kâtip Çelebi under the title of Turkish-Islamic scholars. During the social studies teacher's presentation, the science teacher mentioned İbn-i Sina's contributions to the world of medicine, the "Scales of Wisdom" developed by El Hazini, his work on the barometer and his book Kitabü Mizani'l Hikme (Book of the Balance of Wisdom) on gravity. Following the informative presentation on the subject in the first class, in the second class, the visual arts teacher distributed a selection of representative pictures of the aforementioned twelve Muslim scientists to the students and asked them to review the pictures. Then, the students were divided into groups of 2 and given the painting materials. Each group chose one of the representative pictures and started working after they decided to whether draw a portrait or use a different painting technique. The activity continued with the visual arts teacher's warnings and corrections on different subjects.

Figure 1

"Scientists" Painting Activity- "The Sun Will Rise in the East" Exhibition

Since the activity could not be completed during the 2nd class, the activity of drawing scientists continued in the 3rd class.

Week 6

In the related acquisition activity, an infographic was prepared by transferring the representative paintings of the scientist pictures from the 5th week to Canva. The process of photographing or scanning the paintings of the students and transferring them to the digital environment was conducted by the information technologies teacher prior to the class. Students designed different infographics and brochures by using their paintings on Canva, under the guidance of the information technologies teacher. The activity was conducted in the information technologies laboratory. During the preparation process of the infographics, the social studies teacher and the science teacher made the necessary corrections regarding the information included in the design. The visual arts teacher answered the questions of the students about the layout, color, and font choices of the designs.

Week 7

Within the scope of the acquisition of "Analyzes the impact of the developments in Europe between the XV-XX. centuries on the development of today's scientific knowledge", the subjects of the invention of the printing press, the refutation of the flat earth theory, the law of gravity and the effect of steam engines on industrialization were determined. In this context, the invention of the printing press was covered first. The social studies teacher defined the invention of the printing press through the presentation and visuals they prepared. Through question and answer and brainstorming activities, they asked the ideas of the students about the effects of the invention of the printing press on social life and the development of people. In the 1st class, an ink making experiment was conducted with the students about ink, which is an important component in the process of using the printing press. The science teacher mentioned the different ingredients in ink with their reasons and stated that different alternative methods could be used to make natural ink. In the 2nd class, after the science teacher's definitions about making ink, the materials required for natural ink, which were prepared in the 3rd class were distributed to the students by dividing them into 3 different groups. The students were asked for their opinions on the order in which they should use the materials of red beet, purple cabbage, water, coal pieces, oil, the mixing container, heater and strainer and they were asked to show this order with a diagram. The science teacher helped with the misorder and the required corrections, and then the experiment process started. At the end of the class, the students wrote with the ink they made, by using a dip pen.

Week 8

The science teacher explained how the flat earth theory was refuted and what the law of gravity is, to the students. The visual arts teacher drew different shapes on the board in order for the students to understand the refutation of the Flat Earth Theory. The science teacher demonstrated how the law of gravity would work if the earth was flat and how the force of gravity would affect people through the shapes they drew on the board. Then, the students were asked for their opinions about what the visual on the cover of the 7th grade social studies textbook could be. The students reflected various ideas and it was revealed that it was a clock made by El Cezeri. The students were shown a video that deals with the operating principles of the clock in detail and they were asked what kind of a relationship the different movements on the clock during the video may have with the law of gravity. Upon the answers received, the science teacher explained which movements were actually decided by taking into account the law of gravitation in El Cezeri's clock. After giving the theoretical information on the subject to the the students, the water clock experiment was carried out with the students in the 3rd class. The students were divided into three different groups and given 2 identical sized bottles, silicone, scissors, water, oil and pipettes. They were asked to express ideas on how they could explain the law of gravitation, density and time with these materials. Different ideas from each group were written on the board and how the design could be was determined. After determining the design ideas and the order of the design process, the water clock design was created.

Week 9

After the 7th and 8th week activities carried out within the scope of the acquisition, "Analyzes the impact of the developments in Europe between the XV-XX. centuries on the development of today's scientific knowledge", the subject about the effect of steam engines on industrialization and how could it effect the social life was explained to the students through the slide prepared by the social studies

teacher. The opinions of the students were received through the questions directed to the students by the teacher, about the subject. The questions of the students were answered. It was found that the focus of the questions were about the working principle of steam engines. After two lectures and question and answer sessions about steam engines and their effects on a global scale, the students were divided into 3 different groups and as materials, a metal juice box, thin metal pipe / needle tip, ayran cup, silicone glue, heater, injector and water were distributed to the students in the 3rd class. The students were asked to express their ideas on how to make a steam tribune with these materials and they presented their various designs of ideas in groups. Various designs and ideas were received from the groups and they were explained how to conduct the design process in a healthy way under the guidance of the science teacher. When the design was determined, the students carried out the steam tribune experiment by using the materials distributed.

Week 10

Within the scope of the acquisition, "Evaluates the contribution of free thinking to scientific developments", worksheets prepared by the researcher on the subjects of reform, renaissance, French revolution, scholastic thinking, Catholic church and the first age civilization, Ionian civilization were distributed to the students. After the activity carried out with the worksheet, the students were reminded of the scientific developments in the Turkish world in the same century and their opinions were asked about their reasons. Then, the article in the constitution about the freedom of science and art was mentioned and the opinions of the students on it were asked. In the 2nd class, the students were divided into 3 groups and each group received a glass jar, soil and living meadow plants, briers, dry branches, chop sticks and stone pieces. Students were asked how they could transform the expressions of free thinking and scientific thinking into a design with these materials and were given time to produce ideas as a group. At the end of this time, it was observed that the students produced different metaphors and each metaphor was defined by the groups and different designs were drawn on the board with the support of the visual arts teacher. A common decision was made as a class and each group preferred to reflect a thinking environment. The 1st group reflected free thinking, the 2nd group reflected the scientific thinking and the 3rd group reflected the suppressed thinking environment and the scholastic thinking in the jars. At the end of the activity, each group explained how they approached to the thinking they aimed to reflect in their jar in groups by taking turns on the board and answered the questions.

Figure 2

Creating a Thinking Jar-Terrarium Activity

At the end of the class, two groups of students were picked from the students who volunteered to participate in the debate activity, which would be held in the classroom, for the 3rd class, which would take place on another day. Then they were informed that one group would defend free thinking and the other would defend scientific thinking. In this process, the students conducted extracurricular activities with their Turkish language teacher and were informed about the rules and the important points of the debate. Upon finalizing their preparations, the groups supported the ideas they had prepared for, with various materials, visuals and posters in the 3rd class. The debate was moderated by the Turkish language teacher who had provided the necessary information to the students during their preparations.

Week 11

The three-week preliminary preparation stage and the seven-week activity schedule for the Science, Technology and Society learning field were summarized to the students and the teachers of other disciplines through a slide show prepared by the researcher. Then, posttests were applied to the students, and Student Self-Assessment form and student interview form were applied as the final questionnaire. During the 7-week implementation process, the students filled out a Harezmi Student Activity Diary for each activity. The activities and experimental practices that were conducted are presented in the Appendix section as visuals.

Control group implementation process

The teaching process of the control group included in the study was carried out in line with the annual plan decisions taken at the teacher council meeting that was held with the social studies teachers of the school. The 4-week period that had been assumed for the Science, Technology and Society learning field in the annual plan was decided to be implemented as 7 weeks by taking the opinion of the teacher council. The final decision about the annual plan is made by the teacher council of the school. The teacher council can decide to extend the implementation period for learning fields in line with different variables. Although the plan of the experimental group lasts 11 weeks, the number of weeks in which practices were carried out in line with the related learning field were 7 weeks, just as in the control group. The reason why the experimental group process was specified as 11 weeks is that, 4 weeks were added for pretests, introduction of the model and posttests. As a result, the experimental group and control group students included in the study received a training within the scope of "Science, Technology and Society" learning field for 7 weeks. No external observer was involved in the implementation process, and the teaching process was carried out by the researcher, who was also the social studies teacher of the class.

Data Analysis

Analysis of Quantitative Data

The quantitative data of the study were derived from the data collected by the academic achievement test and the meta-cognitive awareness inventory. Tests and normality assumptions were performed with the SPSS program. The skewness and kurtosis values were taken into consideration for the measurements on the normality of the data obtained from the scales and the academic achievement test. The skewness and kurtosis coefficients within ±1 point limits indicate that the scores obtained from the tests and scales show a normal distribution and there is no significant deviation in the context of the normal distribution (Büyüköztürk, 2011). The analysis carried out to determine whether or not the data showed a normal distribution revealed that at least one of the data pairs, which was

considered as a variable, did not show a normal distribution. Comparisons of the pre-test and post-test scores of the study and control groups were performed using the Mann Whitney U (MWU) test. Wilcoxon Signed Ranks test was used to compare the pre-test and post-test scores within the groups. The scores of the post-test-permanence tests performed for the assessment of the permanence of the academic achievement test scores obtained in the control and study groups were compared using the Friedman test. The confidence interval and the significance level in the tests performed were determined respectively as 95% and 0.05 ($p < 0.05$).

Analysis of Qualitative Data

The qualitative data of the study were obtained from the study group students. Data were collected using the student interview form, Harezmi Student Activity Diaries and Student Self-evaluation Forms. Content analysis method was used to analyze the qualitative data.

For the purpose of the data analysis, the data obtained were organized by codes and a frequency table was created with regard to the codes determined to be attributable to similar discourses expressed by different students. Codes and frequency table were presented in the "Results" section. Some of the answers provided by the students were presented as sections.

The reliability calculations put forward by Miles and Huberman (1994) were performed in order to ensure the post-analysis reliability of the data. Opinions of 3 different experts were taken with regard to the codes, sub-categories and themes developed by the researcher in the analysis process of this study. The issues on which there was consensus and disagreement were further submitted to the expert opinion. The results of the calculations made in accordance with the relevant formula indicated the reliability score as 81%, thus the research was accepted as reliable.

Ethical Principles

Ethics committee permission for this study was obtained from Marmara University Institute of Educational Sciences Scientific Research and Publication Ethics Committee with the decision dated 02.12.2021 and numbered 163472.

FINDINGS

Findings Related to the Effect of Using Harezmi Education Model in Social Studies Teaching on the Academic Achievement and Permanent Learning of Students

Table 3 exhibits the descriptive statistics with regard to the students' scores in the pre-test, post-test and permanent learning tests applied in the study group.

Table 3

Descriptive Statistics for the Study Group Test Scores

Scale/Test	Timing of the Test	n	Min.	Max.	$\overline{X}$	SD	Skew.	Kurt.
	Pre-test	27	0	20	13.00	2.92	-0.45	-0.08
ACADEMIC ACHIEVEMENT	Post-test	27	0	20	17.22	1.99	-1.03	1.04
	Permanence test	27	0	20	16.00	2.27	-0.70	0.43

Table 4 exhibits the results of the Friedman Repeated Measures Test for the academic achievement test, pre-test, post-test and permanent learning tests applied in the study group.

Table 4

Comparison of Study Group Academic Achievement Test Pre-Test- Post-Test- Permanence Test Scores

Timing of the Test	n	Mean	sd	X^2	p
Pre-test	27	1.24			
Post-test	27	2.78	2	36.27	0.000
Permanence test	27	1.98			

Friedman Repeated Measures Test revealed a significant difference between the pre-test and post-test applications and the academic achievement permanence test scores of the study group (X2=36.27; p<0.01). Wilcoxon signed-rank test was performed to determine which tests caused the difference between the measurements.

Tables 5, 6 and 7 exhibit the results of the Wilcoxon signed-rank test with regard to the comparison of the study group's pre-test, post-test and permanence test scores.

Table 5

Comparison of Study Group Pre-Test and Post-Test Scores

Scale/Test		n	Mean	Ranks Tot.	Z	p
ACADEMIC ACHIEVEMENT Post-Test/Pre-Test	Negative Ranks	1	3.50	3.50	-4.29	0.000
	Positive Ranks	24	13.40	321.50		
	Equality	2				
	Total	27				

A significant difference was determined between the academic achievement post-test and pre-test scores of the study group (Z=-4.29; p<0.01). The academic achievement test scores of 24 students were determined to increase after the implementation of the Harezmi Education Model while only 1 student's academic achievement test score decreased. In other words, it was concluded that the Harezmi Education Model has a significant positive effect on the academic achievement of students.

Table 6

Comparison of Study Group Permanence Test and Post-Test Scores

Scale/Test		n	Mean	Ranks Tot.	Z	p
ACADEMIC ACHIEVEMENT Permanence Test/Post-Test	Negative Ranks	19	10.00	190.00	-3.90	0.000
	Positive Ranks	0	0.00	0.00		
	Equality	8				
	Total	27				

A significant difference was determined between the academic achievement permanence-test and post-test scores of the study group (Z=-3.90; p<0.01). The comparison of the academic achievement post-test scores applied after the implementation of the Harezmi Education Model and the scores of the academic achievement permanence tests applied 1 month after the implementation revealed that the academic achievement scores of 19 students decreased whereas the scores of 8 students did not change. In other words, it was concluded that the Harezmi Education Model did not have significant positive effect on the permanence of the academic achievement of students.

Table 7

Comparison of Study Group Permanence Test and Pre-Test Scores

Scale/Test		n	Mean	Ranks Tot.	Z	p
ACADEMIC ACHIEVEMENT Permanence Test/Pre-Test	Negative Ranks	3	5.50	16.50	-3.82	0.000
	Positive Ranks	21	13.50	283.50		
	Equality	3				
	Total	27				

A significant difference was determined between the academic achievement permanence-test and pre-test scores of the study group (Z=-3.82; p<0.01). The comparison of the academic achievement permanence test scores applied 1 month after the implementation of the Harezmi Education Model and the scores of the pre-tests applied before the implementation revealed that the academic achievement scores of 21 students increased, the academic achievement scores of 3 students decreased whereas the scores of 3 students did not change. In other words, it was concluded that the Harezmi Education Model did not have significant positive effect on the permanence of the academic achievement of students however the academic achievement of students was found to be significantly higher than that of the levels before the implementation.

Table 8 exhibits the descriptive statistics with regard to the students' scores in the pre-test, post-test academic achievement tests and permanent learning tests applied in the control group.

Table 8

Descriptive Statistics for the Control Group Test Scores

Scale/Test	Timing of the Test	n	Min.	Max.	$\overline{X}$	SD	Skew.	Kurt.
ACADEMIC ACHIEVEMENT	Pre-test	27	0	20	11.74	2.49	0.48	-0.57
	Post-test	27	0	20	15.00	2.37	-0.90	1.42
	Permanence test	27	0	20	13.74	2.65	-0.56	0.11

Friedman Repeated Measures Test was used for the analysis of the data with regard to the re-test, post-test academic achievement test and permanent learning tests applied in the control group. The relevant results are demonstrated in Table 9.

Table 9

Comparison of Control Group Academic Achievement Test Pre-Test- Post-Test- Permanence Test Scores

Timing of the Test	n	Mean	sd	X2	p
Pre-test	27	1.30			
Post-test	27	2.70	2	31.05	0.000
Permanence test	27	2.00			

Friedman Repeated Measures Test revealed a significant difference between the pre-test and post-test applications and the academic achievement permanence test scores of the control group (X2=31.05; p<0.01). Wilcoxon Signed-rank Test results regarding the tests which caused the difference between the measurements were exhibited in Table 10, Table 11 and Table 12.

Table 10

Comparison of Control Group Pre-Test and Post-Test Scores

Scale/Test		n	Mean	Ranks Tot.	Z	p
	Negative Ranks	2	7.75	15.50	-3.97	0.000
ACADEMIC ACHIEVEMENT	Positive Ranks	23	13.46	309.50		
Post-Test/Pre-Test	Equality	2				
	Total	27				

A significant difference was determined between the academic achievement post-test and pre-test scores of the control group (Z=-3.97; p<0.01). It was found that the academic achievement scores of 23 students increased, the academic achievement scores of 2 students decreased and the scores of 2 students did not change after the education provided to the control group.

Table 11

Comparison of Control Group Permanence Test and Post-Test Scores

Scale/Test		n	Mean	Ranks Tot.	Z	p
ACADEMIC ACHIEVEMENT Permanence Test/Post-Test	Negative Ranks	18	9.94	179.00	-3.42	0.001
	Positive Ranks	1	11.00	11.00		
	Equality	8				
	Total	27				

A significant difference was determined between the academic achievement post-test and permanent learning test scores of the control group (Z=-3.42; p<0.01). The comparison of the academic achievement post-test scores applied after the implementation of the Harezmi Education Model and the scores of the academic achievement permanence tests applied 1 month after the implementation revealed that the academic achievement scores of 19 students decreased, the scores of 1 students increased whereas the scores of 8 students did not change.

Table 12

Comparison of Control Group Permanence Test and Pre-Test Scores

Scale/Test		n	Mean	Ranks Tot.	Z	p
ACADEMIC ACHIEVEMENT Permanence Test/Pre-Test	Negative Ranks	3	10.67	32.00	-3.24	0.001
	Positive Ranks	20	12.20	244.00		
	Equality	4				
	Total	27				

A significant difference was determined between the academic achievement permanence-test and pre-test scores of the control group (Z=-3.24; p<0.01). The comparison of the academic achievement permanence test scores applied 1 month after the implementation of the Harezmi Education Model and the scores of the pre-tests applied before the implementation revealed that the academic achievement scores of 20 students increased, the academic achievement scores of 3 students decreased whereas the scores of 4 students did not change.

The results of the pre-test applied before the education provided to the study and control groups with different methods and the results of the post-test performed at the end of the implementation were compared using the Mann Whitney U test. Table 13 and Table 14 present the statistics with regard to this comparison.

Table 13

Comparison of Pre-Test Scores of Study and Control Groups

Scale/Test	Groups	N	Mean	Ranks Total	MWU	Z	p
ACADEMIC ACHIEVEMENT	Study	27	31.39	847.50	259.50	-1.83	0.068
	Control	27	23.61	637.50			

There was no significant difference (p>0.01) between the pre-test academic achievement scores applied to the study and control groups.

Table 14

Comparison of Post-Test Scores of Study and Control Groups

Scale/Test	Groups	N	Mean	Ranks Total	MWU	Z	p
ACADEMIC ACHIEVEMENT	Study	27	34.89	942.00	165.00	-3.50	0.000
	Control	27	20.11	543.00			

A significant difference was found between the post-test academic achievement scores applied to the study and control groups (Z=-3.50; p<0.01). Post-test academic achievement scores of the study group students were found to be significantly higher than the post-test scores of the control group students. In other words, the academic achievement of the students who were taught with the Harezmi Education Model was significantly higher than the academic achievement of the control group students.

Findings Related to the Effect of Social Studies Course Teaching Process Designed with Harezmi Education Model on the Metacognitive Awareness of Students

Table 15 exhibits the descriptive statistics with regard to the scores of the meta-cognitive awareness inventory applied to the Study Group students.

Table 15

Descriptive Statistics with regard to the Meta-cognitive Awareness Inventory Scores of the Study Group

Scale/Test	Timing of the Test	n	Min.	Max.	$\overline{X}$	SD	Skew.	Kurt.
META-COGNITIVE AWARENESS	Pre-test	27	1	90	67.81	10.13	-0.02	-1.17
	Post-test	27	1	90	78.78	10.26	-0.43	-1.43

Friedman Repeated Measurements Test results revealed a significant difference between the pre-test and post-test applied to the study group. Pre-test and post-test scores were compared using the Wilcoxon Signed-ranks test. The findings regarding the test results are demonstrated in Table 16.

Table 16

Comparison of Study Group Meta-Cognitive Awareness Inventory Pre-Test and Post-Test Scores

Scale/Test		n	Mean	Ranks Tot.	Z	P
META-COGNITIVE AWARENESS Post-Test/Pre-Test	Negative Ranks	3	2.83	8.50	-4.24	0.000
	Positive Ranks	23	14.89	342.50		
	Equality	1				
	Total	27				

A significant difference was determined between the meta-cognitive awareness inventory post-test and pre-test scores of the study group (Z=-4.24; p<0.01).

The meta-cognitive awareness inventory post-test score of the study group was found to be significantly higher than the pre-test scores. It was concluded that the teaching process carried out with the Harezmi Education Model has a significant effect on the students' meta-cognitive awareness level.

Table 17 exhibits the descriptive statistics with regard to the scores of the meta-cognitive awareness inventory applied to the Control Group students.

Table 17

Descriptive Statistics with regard to the Meta-cognitive Awareness Inventory Scores of the Control Group

Scale/Test	Timing of the Test	n	Min.	Max.	$\overline{X}$	SD	Skew.	Kurt.
META-COGNITIVE AWARENESS	Pre-test	27	1	90	68.70	10.9	-0.65	-0.10
	Post-test	27	1	90	74.56	7.42	-1.00	1.64

Findings derived from Friedman Repeated Measurement Test results indicated that there were significant differences between pre-test and post-test scores. The comparisons for these differences were analyzed using the Wilcoxon Signed-rank Test. The findings regarding the test results are demonstrated in Table 18.

Table 18

Comparison of Control Group Meta-Cognitive Awareness Inventory Pre-Test and Post-Test Scores

Scale/Test		n	Mean	Ranks Tot.	Z	p
META-COGNITIVE AWARENESS Post-Test/Pre-Test	Negative Ranks	7	9.79	68.50	-2.72	0.007
	Positive Ranks	19	14.87	282.50		
	Equality	1				
	Total	27				

A significant difference was determined between the meta-cognitive awareness inventory post-test and pre-test scores of the Control group (Z=-2.72; p<0.05). The meta cognitive awareness inventory scores of 19 students increased, the scores of 7 students decreased and the score of 1 student did not change following the education provided with traditional methods. It was concluded that the education provided by adhering to the curriculum and books of the Ministry of National Education has a significant positive effect on the students' meta-cognitive awareness level.

Table 19

Comparison of Meta-Cognitive Awareness Inventory Pre-Test Scores of Study and Control Groups

Scale/Test	Groups	N	Mean	Ranks Total	MWU	Z	p
META-COGNITIVE AWARENESS	Study	27	26.46	714.50	336.50	-0.48	0.628
	Control	27	28.54	770.50			

There was no significant difference (p>0.05) between the meta-cognitive awareness inventory pre-test scores of the study and control groups.

The data on the meta-cognitive awareness inventory which was applied as a post-test at the end of the teaching practices carried out in the study and control groups were subjected to the Mann Whitney U test. The findings derived from the test results are demonstrated in Table 20.

Table 20

Comparison of Meta-Cognitive Awareness Inventory Post-Test Scores of Study and Control Groups

Scale/Test	Groups	N	Mean	Ranks Total	MWU	Z	p
META-COGNITIVE AWARENESS	Study	27	33.99	891.50	231.50	-2.18	0.044
	Control	27	23.69	639.50			

A significant difference (p= 0.044, p<0.05) was found between the meta-cognitive awareness inventory post-test scores of the study and control groups. Based on these results, it is concluded that the teaching process implemented in the study group using the Harezmi Education Model is more effective in terms of raising meta-cognitive awareness compared to the teaching processes carried out in the control group adhering to the textbooks and curriculum of the Ministry of National Education.

Findings Related to the Opinions of the Students, Who Participated in the Implementation Process of Social Studies Teaching with Harezmi Education Model, about the Model, the Research Process and the Activities Performed During the Process

When the student opinions, which were used as qualitative data collection tools, were evaluated including the student responses in the interview forms, self-evaluation forms and student diaries, it was observed that the most frequently used expressions for the model in the responses were "fun, productive, assigns responsibility, instructive, innovative, memorable, beneficial, demanding and extraordinary". There were 44 positive codes in the positive responses of the students and the codes were combined under 3 themes.

Table 21

Student Opinions on Harezmi Education Model

Themes	Codes	*Frequency of Coding*
Expressions on the Porcess	Fun	8
	Assigns Responsibility	3
	Demanding	3
Expressions on the Quality of the Practice	Instructive	5
	Productive	7
	Memorable	4
	Beneficial	5
Expressions on the Distinctness of the Practice	Innovative	4
	Extraordinary	5
Total		44

Some student responses regarding the themes and codes are as follows;

S1: The Harezmi Education Model is important for our personal development and raising awareness of responsibility. I think this education model should be implemented in all schools.

S11: I think that teaching Social Studies course with a different method was lovely. As there are many subjects in the Social Studies course, experiments, visual arts and painting helped us understand the subject better.

S3: Since the classes are more fun, everyone listens to the class by having fun. We learn two different information at the same time, through one subject. For example, the activity with social studies and visual arts was fun. Thus, there is a big difference. In my opinion, the most important reason is that the lessons are fun and engaging. It is more entertaining to learn this way.

S2: I quite liked the Harezmi practice. I think it was very beneficial for me and I would like to be taught with this technique again as when you have fun, everything is more memorable. It is so good to have fun and learn at the same time. A fun day is not easily forgotten. I have a lot of fun during the experiments.

When the answers of the students under different questions in 3 different data collection tools were analyzed, 9 different codes were generated for the research process in line with the activities carried out during the process and these codes have been combined under 3 different themes.

Table 22

Student Opinions on the Practice and Model in Line with the Activities

Themes	Codes	Frequency of Coding
Functionality	Combining different classes in one class	8
	Combining different subjects under one class	5
	Multiple information at a time	5
Interdisciplinarity	Experiments	8
	Applied course	3
	"Similar to science class"	3
	Inventions	2
Originality	Multiple teachers	6
	Game	2
	TOTAL	42

Some student responses related to the themes and codes are as follows;

S1: It was more beneficial to combine a class with different classes. A class taught with two different teachers was more fun than the other classes.

S2: I quite liked the Harezmi practice. I think it was very beneficial for me and I would like to be taught with this technique again as when you have fun, everything is more memorable. It is so good to have fun and learn at the same time. A fun day is not easily forgotten. I have a lot of fun during the experiments.

S7: Social studies course is already totally different than other courses. It is more different now with the Harezmi education model. For example, in mathematics class, only mathematic and in science class, only science is taught. However, in social studies, the subject is taught by multiple teachers and there are fun experiments.

S11: I think that teaching Social Studies course with a different method was lovely. As there are many subjects in the Social Studies course, experiments, visual arts and painting helped us understand the subject better.

In the Harezmi education model, multiple teachers are expected to act in an interdisciplinary manner in solving a problem or teaching a subject. Thus, in the research process, the teaching process was planned in an interdisciplinary context. At the end of the weekly activities, the reminiscences of the

students, their feelings and the difficulties, negativities and deficiencies they experienced during the process were tried to be revealed by using the student diary form. Diagrams were prepared in line with the answers of the students and some student opinions were presented.
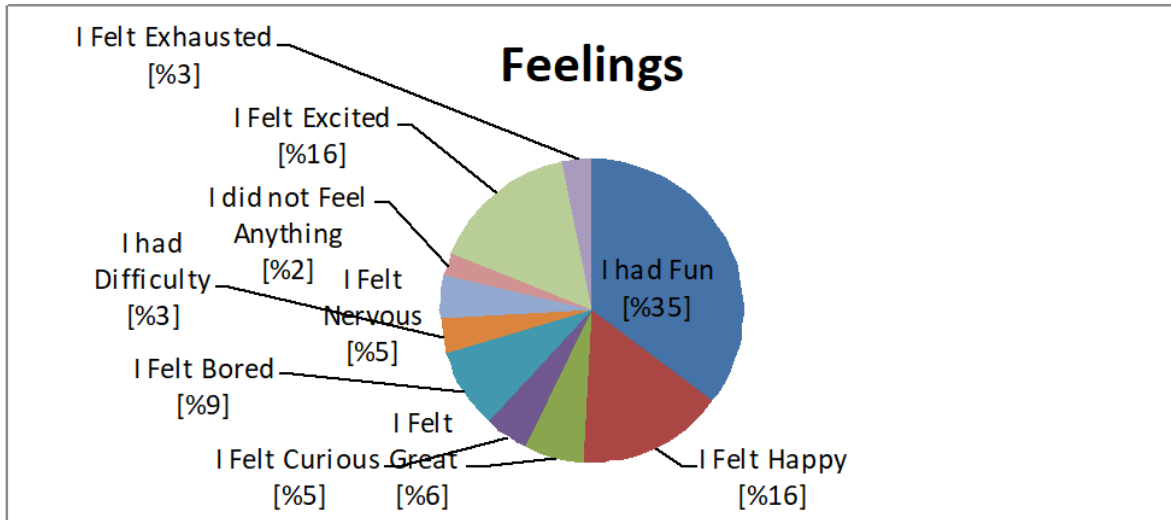
Diagram 1

Reminiscences from the Related Unit
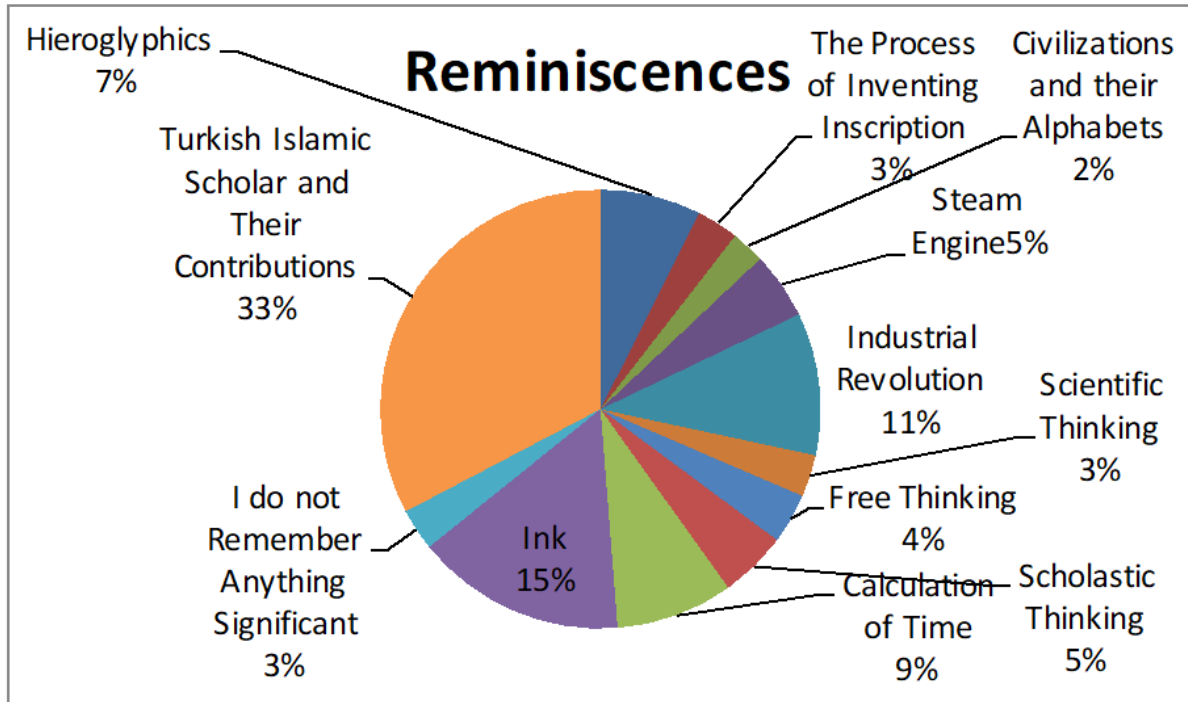
Based on the information obtained in order to reveal the feelings of the students during the 7-week practice, their feelings during the implementation period has been presented as a diagram.

Diagram 2

Feelings During the Implementation

The answers of the students to the 3rd question, "What are the difficulties, negativities or deficiencies you have experienced?" asked in the Harezmi student activity diary, which was filled in weekly at the end of each practice for 7 weeks are presented in the Diagram 3.

Diagram 3

The Difficulties, Negativities or Deficiencies Experienced During the Practice
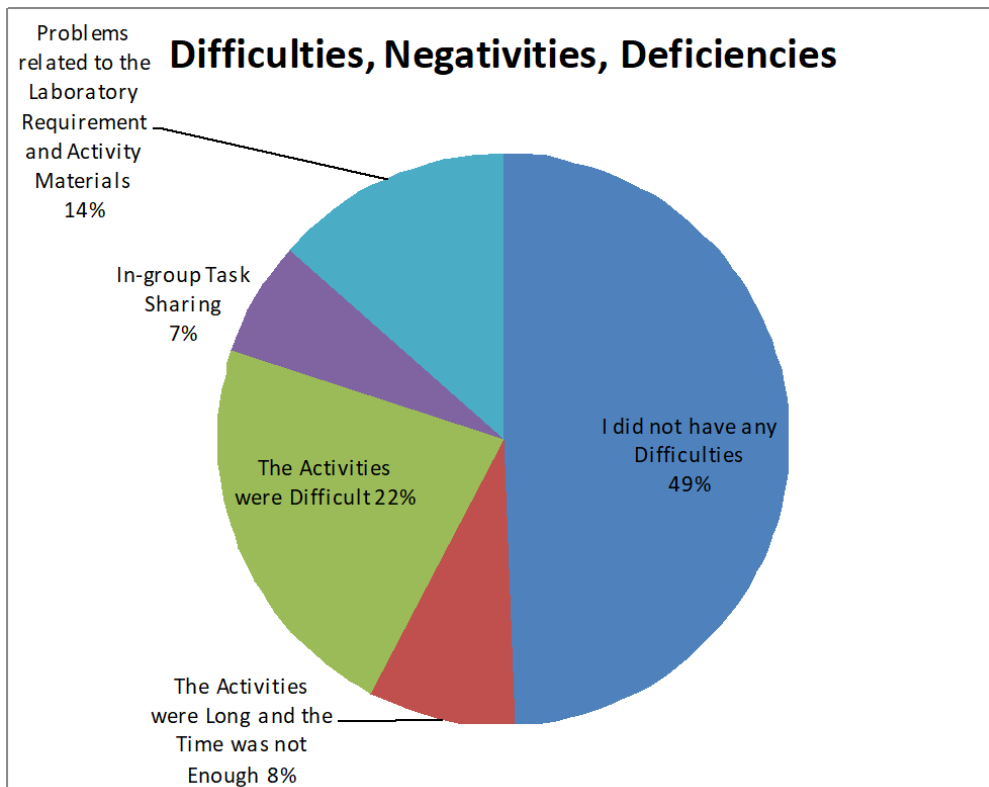
During the 7-week in-class implementation process carried out with the students based on different activities, the opinions and thoughts of the students were asked through the Harezmi student activity diary in 3 questions. When the answers given by the students for 7 weeks were evaluated as a whole; it was discovered that the reminiscences of the related unit were related to the acquisitions of the unit. The analysis of the feelings of the students during the implementation process revealed that the students mostly spent the process with positive emotions. The 62% of the answers of the students about their feelings demonstrate that they spent the process in positive feelings. When the answers to the question asked to reveal the difficulties, negativities or deficiencies experienced by the students during the process were evaluated as a whole, it was found that 49% of the students did not experience any difficulties.

Answers of some students are as follows;

S7: Time spent in classes became more entertaining. Lessons were more engaging. Most of the time we didn't even hear the bell ring during the activities.

S5: Activities were really entertaining. The activity I liked the most was the idea jar-terrarium and ink making because we developed different ideas with our friends and it was really beautiful. I think these activities are more educative and memorable. These activities were great, I hope we have the opportunity to repeat them.

S16: In general, there were no negative incidents, everything was good. There were groups but we actually worked as a class and everyone had a task.

S24: We could not distribute the tasks equally in the group during the activities. The experiments were great, I did not have any difficulty in general.

S4: Although I did not have much difficulty in drawing, we needed more time. I could not complete mine and had to complete it at home.

S16: Sometimes I still cannot believe how much Turkish Islamic scholars actually contributed. We have a lot of achievements in the past, but today we are known as if we do not have any.

S8: I can no longer forget Harezmi. I painted his picture, I worked with it on the Canva program, and the name of the practice is Harezmi.

RESULTS, DISCUSSIONS, AND SUGGESTIONS

In accordance with the results of this study, it was concluded that the Social Studies courses taught using the Harezmi Education Model contributed positively on the academic achievement of the students. There is no other study in the literature examining the effect of the Harezmi Education Model on the academic achievement of the students. However, for the purpose of this study, other researches examining different problem-based and project-based education approaches enriched and differentiated with different methods similar to the Harezmi Education Model and STEM education were reviewed and it was concluded that the results overlap. Öteleş (2019), who investigated the effects of teaching Social Studies course with project-based learning method on students as part of a PhD thesis, found that the academic achievement of the students improved significantly in a teaching environment where the students were divided into groups and carried out a problem-based project in

cooperation similar to the teaching process designed with HEM. When the local studies conducted at different levels of education and in different subject scopes and the studies that investigate the effects of STEM-based teaching practices in the foreign literature are reviewed, it was revealed that the teaching processes that are carried out using STEM education also contribute positively to the academic achievement. In the foreign literature, the studies that reached the conclusions that the digital game-based STEM activities contribute positively to the academic achievement of students, the augmented reality applications will contribute to the teaching process to support STEM activities in higher education, the STEM-based mobile learning contributes positively to cognitive development of students and the studies that concluded that the project-based teaching practices contribute to the teaching process, can be cited as examples in this context (Wang et al., 2022; Kayan-Fadlelmula et al., 2022; Mystakidis et al., 2022; Chen et al., 2023: Zen & Ariani, 2022; Elfeky et al., 2022; Benninga et al., 2006; Olivarez, 2012; Lovat et al., 2011; Park & Yoo, 2013). Keser (2008), who investigated the effect of the project-based learning approach on the achievement, attitude and permanent learning of student, revealed that the project-based teaching method had a positive effect as a teaching method, in terms of permanent learning. When the studies that investigated the effects of STEM education in different dimensions at different teaching levels and subjects are reviewed, there are local studies that concluded that the activities and teaching processes that are carried out within the scope of STEM education have a positive effect on permanent learning (Karadeniz, 2019; Gökçe, 2019; Biçer, 2019; Sarıcan, 2017).

In addition to academic achievement and permanent learning, a different dimension of this study which is carried out using the Harezmi Education Model for the purpose of teaching Social Studies was to examine whether the model had any effect on the students' meta-cognitive awareness skills. The results of this study revealed that Social Studies course designed and conducted in accordance with HEM created a positive difference in the meta-cognitive awareness skills of the student group to which the model was applied compared to the other group. Although no other study examining the effects of the Harezmi Education Model on meta-cognitive awareness was found in the literature, there are studies in which the effects of teaching processes carried out with similar activities and methods on meta-cognition are examined. Studies that investigated the effects of web-based teaching, research-oriented learning, problem extension activities and research-inquiry oriented teaching on metacognition can be cited as examples of these studies (Çakar Özkan & Talu Bümen, 2014; Alan, 2017; Varlı & Sağır, 2019; Baltacı & Akpınar, 2011). Pekince (2022) who investigated the effect of participation-based education program on children's meta cognitive skills implemented the Children's Participation-Based Education Program developed by Koran (2017). The curriculum of the above mentioned program that allows amendments in the educational processes in line with the curiosity and interests of children has similarities with the Harezmi Education Model with its active and participation-based structure. Pekince concluded that the education program implemented in this study contributed positively to the meta-cognitive awareness skills of the students. In their study on disaster education, Kara and Özdemir (2020) stated that the use of active and participatory teaching methods rather than theoretical approaches is important for obtaining effective learning outcomes.

For the purpose of the qualitative research in this study, the activities implemented throughout the process were assessed by the students along with the HEM process as a whole. It was reported that the students were satisfied with the activities implemented for 7 weeks within the scope of the relevant unit. It was observed that the students most frequently expressed their satisfaction with the HEM process with concepts such as entertaining and happiness etc. The pre-implementation inference

of the students about the Social Studies course was characterized by analogies such as "a lesson that requires listening the lecture, and memorizing the content" or "history lesson". When they were asked about their post-implementation views, students told that they did not want the Social Studies courses designed in accordance with HEM to end, what they learned in these lessons were more permanent and that their general perceptions towards Social Studies course changed.

Students' feeling happier in collaborative learning environments where they can evaluate their own ideas with concrete experiences and their thoughts that such experiences had a positive impact on their learning are considered to be significant findings in terms of the achievement of the study.

When the studies in the literature on the Harezmi education model are reviewed, results that support the results of this study were encountered. In the study conducted by Çimşir et al. (2022), it was reported that the students and the parents stated that HEM practices contributed to the collaborative working and problem-solving skills of students. In the study conducted by Yavuz et al. (2019), it was concluded that the HEM practices significantly contributed to the improvement of the creativity skills of gifted students. In the study conducted by Tokmak et al. (2022), it was revealed that the teaching processes organized with HEM contributed positively to the computational thinking skills of students. In the study conducted by Seçer (2021), it was observed that HEM produced positive results on solidarity and cooperation values of students. In addition, there are various studies in the literature examining the multi-dimensional effects of learning environments enriched with different methods on the students. The most striking point in these studies was that teaching processes that include different teaching approaches that are not limited to the content of the textbook, where students can use their own ideas, created positive results (Arslan, 2021; Topal, 2020; Duman, 2019; Uyun, 2021; Bülbül & Yılmaz, 2019; Damopolii, Lumembang & İlhan, 2021).

In the Harezmi education model, the process carried out with the cooperation of different disciplines around a problem situation or a problem scenario, offers students an activity or activity and design-based learning environment in which they can learn by doing and experiencing. The most important point that distinguishes the model from the other methods and techniques is that, multiple teachers from different disciplines act together throughout the practice. It is considered that acting with multiple teachers from different disciplines in terms of evaluating different ideas and addressing the subject in depth has been influential in the students' positive evaluation of the process. The comments of the students who participated in the HEM activities revealed that the process carried out with multiple teachers from different disciplines could sometimes be confusing, however, it was an extraordinary and qualified practice in terms of distinctness, utility, and memorability.

As a result, it was concluded that the views of the students on the social studies teaching process carried out with the Harezmi education model design were positive and that the social studies course conducted with the Harezmi education model positively affected the academic achievement and metacognitive awareness of the students.

In line with these results, the following suggestions can be made;

- This study, which was conducted within the scope of social studies course, can be planned for other courses,

- This study, which was conducted within the scope of the learning field of "Science, Technology and Society", can be practiced in other learning fields within the social studies course,

- The results of practicing the Harezmi education model can be investigated in terms of other effects.

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