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ANALYSIS OF THE ATTITUDES OF PARTICIPANTS IN "A PINCH OF SCIENCE, A WORLD OF FESTIVAL 2024"

"BİR TUTAM BİLİM BİR DÜNYA ŞENLİK 2024" KATILIMCILARI TUTUM ANALİZİ

Hicran Özlem ILGIN[1]

ORCID: H.Ö.I. 0000-0002-0549-0710

Corresponding author/Sorumlu yazar:
[1] Hicran Özlem Ilgın
Çanakkale Onsekiz Mart University, Türkiye
E-mail/E-posta: hicranozlem@gmail.com

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Abstract
Science festivals are organized to disseminate scientific knowledge, increase interest in science, and enhance scientific thinking skills. This research was designed to determine the opinions of students participating in the 'A Pinch of Science, A World of Festivals 2024' project, which was supported by the TÜBİTAK 4007 Program. In the project held in the Ezine district of Çanakkale, 21 different workshops were organized, and 5,000 participants were reached. A sample of 357 participants was selected using the convenience sampling method. The data were collected using a survey form and applied as pre-test and post-test, then analyzed using the SPSS program. According to the analyses conducted within the scope of the study, it was recorded that the science festivals increased participants' interest in scientific knowledge, improved their scientific thinking skills, and positively affected social interactions.

Keywords: Science Festival, TÜBİTAK 4007, Çanakkale, Ezine.

Öz
Bilim şenlikleri bilimsel bilginin yaygınlaştırılması, bilime olan ilginin arttırılması, bilimsel düşünme yetisini arttırma nedenlerinden dolayı düzenlenmektedir. Bu araştırma TÜBİTAK 4007 Programı kapsamında desteklenen Bir Tutam Bilim Bir Dünya Şenlik 2024 projesine katılan öğrencilerin etkinliklere yönelik görüşlerinin tespit edilmesi için oluşturulmuştur. Çanakkale İli Ezine İlçesinde gerçekleştirilen projede 21 farklı atölye düzenlenmiş ve 5000 katılımcı sayısına ulaşılmıştır. Araştırmanın örneklemini oluşturan 357 katılımcıya kolayda örnekleme yöntemi ile ulaşılmıştır. Veriler anket formu kullanılarak ön ve son test olarak uygulanarak SPSS programı kullanılarak analiz edilmiştir. Çalışma kapsamında yapılan analizlere göre bilim şenliklerinin katılımcıların bilimsel bilgilere olan ilgisini artırdığı, bilimsel düşünme yetisini geliştirdiği ve sosyal etkileşimleri olumlu yönde etkilediği kayıt altına alınmıştır.

Anahtar Kelimeler: Bilim Şenliği, Tübitak 4007, Çanakkale, Ezine.

INTRODUCTION

Science festivals are a series of events organized to enhance scientific understanding in the region where they are held, and to increase curiosity, innovation, and interest in science among participants. In Turkey, organizations such as the Scientific and Technological Research Council of Turkey (TÜBİTAK) support the growth and dissemination of scientific activities. In the 9th Science Festivals Support Program Call published by TÜBİTAK in 2024, the purpose of science festivals is defined as *"the dissemination of science culture and communication in society, delivering scientific knowledge to participants, and fostering the interaction between science, technology, and society through activities."* The target audience for these events includes individuals of all ages and from all segments of society. Within this call, festivals are categorized as A, B, and C (TÜBİTAK 4007 Call Text, 2024, p.2). This study documents the results of a survey conducted to evaluate the interest in science among students who participated in the "A Pinch of Science, A World of Festivity 2024" project, which was accepted under category C of the aforementioned program.

The dissemination of the findings obtained within the scope of the study constitutes the concept of science communication. Science communication, which emerged in the 18th century, is a concept that forms a bridge between science and society and underpins the existence of science. It involves the sharing of data and promoting its use, rather than merely beginning at the stage of scientific production (Gelmez Burakgazi, 2017, p. 235; Özdemir & Koçer, 2020, p. 377). In this context, identifying the changes that science festivals bring about in participants, along with the research results, and sharing the evaluation of the festival with the public as well as submitting it to TÜBİTAK will provide valuable data for future projects and festivals. Additionally, sharing the workshops and content included in the project will offer insights to institutions or individuals organizing similar festivals.

According to Durant (2013, p. 2681), science festivals are celebrations of science that offer communities exhibitions, carnivals, workshops, panels, and arts events that can last for weeks. These festivals are practices that enhance and support participants' self-efficacy and performance in fields such as mathematics and science (Mbowane et al., p. 73). Science festivals, which increase interest in science, also foster scientific awareness and support psychological and physical competencies among participants (Aksoy, 2022, p. 30). Therefore, these activities are crucial, especially for sparking and increasing the interest of disadvantaged children in science.

When examining the studies on TÜBİTAK 4007 science festivals in the literature, there are articles containing findings that the projects carried out have had positive outcomes on participants and increased their interest in science. The study by Ilgın and Kurtulmuş (2023, p. 1035) aims to determine the opinions of children who participated in a science festival held in Hatay. In the context of the study, a survey form was administered to 300 participating students as a pre-test and post-test. As a result of the study, it was recorded that there was a positive difference between the pre-test and post-test scores of the students who participated in the science festival, and their curiosity about science increased.

Bulut and his (2024, p. 414) aimed to determine the attitudes and approaches of participants affected by disasters toward science through their study. Within the scope of the study, a survey was administered to 116 participants, and interviews were conducted with 15 participants. As a result of the study, the importance of science festivals was emphasized, and the view was presented that the number of such events should be increased.

In the study conducted by Özhan and Yalçıntaş (2023, p. 673), the opinions of preschool teachers who participated in a science festival in Bursa were sought. In this context, 120 preschool teachers were asked eight open-ended questions through Google Forms online. Based on the data analyzed using the NVIVO software package, it was concluded that the events held as part of the festival provided social interaction for both preschool students and teachers.

Kilci and his (2023, p. 188) conducted a study aimed at determining the epistemological beliefs of middle and high school students and administered a survey form to 215 participants. In the context of the study, it was found that there were differences in belief levels between the fields of mathematics and

science. Öztürk and his (2023, p. 467), in their comprehensive study, aimed to evaluate the impact of the festival on teachers, workshop leaders, and individuals participating in the events. In this context, qualitative research methods were preferred, and as a result of the study, it was concluded that the festivals had positive effects and supported the dissemination of scientific knowledge

The study by Başar and his (2021, p. 122) was conducted to determine participants' opinions about the science festival. A survey form was administered to 578 people, and interviews were conducted with 20 participants. As a result of the study, significant changes were observed among the scale dimensions, and it was found that the enjoyment of the festival supported these changes. Aksoy (2022, p. 29), in his study, administered pre-tests and post-tests to students who participated in workshops related to science fields during the festival. According to the results of the study, it was recorded that there was a positive increase in participants' opinions regarding the science festivals.

In a study conducted to determine the attitudes of participants towards technology at a science festival, Ali Bozdemir and his (2021, p. 40) administered a survey to 274 participants. The survey, conducted among middle and high school students, revealed that female students had lower levels of participation in technology compared to male students. It was also found that as participants' educational levels increased, their participation in technology also increased. Bostan and his (2022, p. 48) aimed to determine the satisfaction levels of individuals who participated in the science festival. A mixed-method approach was applied to 290 participants, and it was found that the satisfaction levels of the festival participants were high. However, participants expressed negative opinions regarding issues such as insufficient space and crowding during the event. Gülgün and his (2019, p. 52) included students and workshop leaders who participated in the festival in their study using the survey method. The study findings revealed that both workshop leaders and students had high levels of satisfaction, and it was concluded that the festival enhanced their perspectives towards science, made it more engaging, and was an important project for learning.

The study conducted by Kuruöz et al. (2022, p. 71) aimed to identify the attitudes of participants towards the 4007 science festival they organized, as well as changes based on demographic characteristics. The results of the study revealed that participants' attitudes toward science festivals did not vary according to demographic characteristics, but there were positive differences among the subdimensions of the scale.

Demiral's (2022, p. 132) study was conducted to determine participants' views on the science festival. The findings indicated that participants who attended the festival experienced a positive development in their attitudes towards science as a result of the event.

As indicated by the research findings listed above, science festivals have a significant impact on children's interest in science. In this context, this study was created by evaluating the results of face-to-face surveys conducted with children who participated in the "A Pinch of Science, A World of Festivity 2024" project, held in Ezine in 2024.

A PINCH OF SCIENCE, A WORLD OF FESTIVAL 2024 PROJECT WORKSHOPS

Under the TÜBİTAK 4007 Science Festivals Support Program, the “A Pinch of Science, A World of Festival 2024” project features 21 workshops. These workshops aim to increase the interest of children from different age groups in science. This section provides details on the workshops, which span various fields and utilize different tools for various age groups.

Dream Patterns Workshop: This workshop is designed to enhance children's self-confidence and encourage a multi-dimensional perspective through the art of marbling (ebru).

Foamy Hands Workshop: Using creative drama techniques, this workshop aims to teach participants basic hygiene, the concept of germs, and fundamental cleaning rules.

In the Light of Science Workshop: The objective of this workshop is to spark participants' curiosity in

science and increase their interest through various experiments.

Mind Games Workshop: This workshop is designed to develop participants' thinking skills, foster self-confidence, enhance time management, and improve focus and concentration.

From Old to New, From World to Good Workshop: This workshop aims to promote recycling by using waste materials to create artistic objects. It also seeks to stimulate participants' imagination and develop fine motor skills.

Paper Dreams Workshop: This workshop focuses on developing algorithmic thinking and problem-solving skills through pattern exercises. Participants will create patterns using cut-and-paste methods with craft paper, enhancing their computational thinking. Additionally, origami will be incorporated to improve participants' manual dexterity and motor skills.

Traveling Suitcase Museum Workshop: Organized in collaboration with the Çanakkale Troy Museum, this workshop aims to provide children with hands-on experiences with museum artifacts. Participants will conduct archaeological excavations in sandboxes, uncovering symbols from the Troy Museum.
Fun Faces Workshop: This workshop includes face painting and balloon activities, offering participants both fun and educational experiences.

Active Chess Workshop: Designed to develop strategic thinking, planning, concentration, and problem-solving skills, this workshop also aims to foster a focus on success, time management, and openness to innovation.

Game Station Workshop: This workshop aims to develop participants' fine and gross motor skills, speed, strategy, and teamwork abilities.

Carry Your Energy to the Future Workshop: In collaboration with UEDAŞ, this workshop aims to raise awareness about energy efficiency, environmental conservation, and the importance of resource-saving. Participants will receive 3D savings training using VR goggles.

VR Journey to the Planets Workshop: Using augmented reality goggles, this workshop introduces participants to the planets. Models are used to explain the planets, and participants can view them through augmented reality technology.

Spinning Cups Workshop: This workshop aims to introduce participants to Turkish folk songs, demonstrating how music is organized through rhythm and sound. Participants will also explore the interdisciplinary aspects of music and learn how everyday objects can be used as musical instruments.

Tongue Twister in My Hand Workshop: This workshop aims to help participants recognize the presence of music in everyday speech through tongue twisters, highlighting how rhythm and sound are organized in music.

Mathematics with Scratch Workshop: Participants will learn to visualize designs with Scratch, fostering an understanding of the relationship between mathematics and computer science. The workshop aims to teach participants how to create the correct algorithm to achieve a given goal and apply algorithmic thinking to problem-solving.

Multi-Dimensional Science Workshop: This workshop provides participants with knowledge about 3D printing. They will also paint 3D-printed objects, such as bird cages, which will be placed in nearby trees. The workshop aims to promote environmental awareness and a love for animals.

Predict-Observe-Explain Workshop: The aim of the workshop is to guide participants on a scientific journey, enabling the dissemination of scientific knowledge.

There's a Festival in the Street Workshop: This workshop aims to revive traditional games, helping participants enhance their balance, hopping, and coordination skills through these nearly forgotten activities.

My Score in the Digital World Workshop: This workshop allows children to have fun using PlayStation 5. The event includes playing football on digital game consoles, providing participants with enjoyable experiences.

Digital Media Literacy Training: This workshop addresses information security on social media, introducing participants to social media applications. It provides information on accessing reliable information, as well as methods for protecting against cyberbullying.

Flying Ideas: UAV Inventor Workshop: Participants in this workshop will develop skills and attitudes by building wooden drones. At the end of the workshop, they will experience real drone flights and gain knowledge and experience related to unmanned aerial vehicles (UAVs).

RESEARCH METHOD

This study was designed to determine the opinions of students participating in the 'A Pinch of Science, A World of Festivals 2024' project, which was supported by the TÜBİTAK 4007 Science Festivals Support Program, regarding the events. The project took place from May 31 to June 2, 2024, at the Ezine Nation's Garden in the Ezine District of Çanakkale Province. To ensure the inclusion of participants from both the central area of Ezine and surrounding villages, cooperation protocols were signed, and students from village schools were transported to the project site by shuttle services. Organizing a science festival for children living in rural areas, who are considered disadvantaged, is significant within the context of the principle of equal educational opportunities. The project secured 3 cooperation protocols and 4 letters of support. The project, consisting of 21 different workshops, successfully reached its target of 5,000 participants. The target audience of the project was participants aged 4-18 years. Data were collected from participants aged 7-18 years by evaluating their educational levels. Ethics committee approval was obtained within the scope of the study.

Population and Sample of the Study

The population of the study consists of 5,000 individuals who participated in the science festival held in the Ezine district of Çanakkale, while the sample consists of 357 participants. In determining the sample size, a confidence level of 95% and a margin of error of 5% were used. Pre-tests were administered to participants before the festival, and post-tests were conducted after the festival to examine changes in their scientific attitudes and knowledge levels.

Data Collection Tools

In the study, the Personal Information Form and the Science Festival Attitude Scale were used as part of the pre-test and post-test administered to students participating in the project. The Science Festival Attitude Scale, developed by Keçeci, Kırbağ Zengin, and Alan (2017), consists of 22 questions. The personal information form was created by the researchers and consists of 4 questions. The data obtained from the study were analyzed using SPSS software.

Hypotheses

H1: Is there a significant difference between the pre-test and post-test scale scores of students participating in the TÜBİTAK 4007 science festival?

Ethical Approval

In this study, ethical approval was obtained from the Ethics Committee of Çanakkale Onsekiz Mart University (ÇOMÜ) Graduate Education Institute on 30.05.2024, with the decision number 08/58.

FINDINGS

Within the scope of the project, a survey form was administered to participants as a pre-test before the project and as a post-test after the project. The findings obtained from the analysis of the data are

presented below. The reliability of the applied scale was tested, and its internal consistency was determined. A scale reliability of 0.70 or above indicates that the scale is at a reliable level (Kula Kartal and Mor Dirlik, 2016: p. 1870).

Table 1. Reliability Analysis of Scale Scores

	Cronbach's Alpha
Science Festival Attitude Scale Pre-Test	0,760
Science Festival Attitude Scale Post-Test	0,781

The reliability analysis of the scale scores shows that the scale is at an acceptable/high reliability level. The Cronbach's Alpha value was 0.760 for the pre-test and 0.781 for the post-test.

Table 2. Demographic Characteristics

Variable	Group	n	%
Gender	Female	177	49,58
	Male	180	50,42
Age	7-10 years	120	33,61
	11-14 years	124	34,73
	15-18 years	113	31,65
Grade	1st Grade	16	4,48
	2nd Grade	25	7,00
	3rd Grade	45	12,61
	4th Grade	51	14,29
	5th Grade	24	6,72
	6th Grade	28	7,84
	7th Grade	23	6,44
	8th Grade	27	7,56
	9th Grade	50	14,01
	10th Grade	49	13,73
	11th Grade	11	3,08
	12th Grade	8	2,24

School Levels	Primary School	138	38,66
	Middle School	100	28,01
	High School	119	33,33

Demographic findings indicate that 49.58% of the participants are female (n=177) and 50.42% are male (n=180). Age distribution shows that 33.61% are 7-10 years old (n=120), 34.73% are 11-14 years old (n=124), and 31.65% are 15-18 years old (n=113). Grade distribution is 4.48% in 1st Grade (n=16), 7.00% in 2nd Grade (n=25), 12.61% in 3rd Grade (n=45), 14.29% in 4th Grade (n=51), 6.72% in 5th Grade (n=24), 7.84% in 6th Grade (n=28), 6.44% in 7th Grade (n=23), 7.56% in 8th Grade (n=27), 14.01% in 9th Grade (n=50), 13.73% in 10th Grade (n=49), 3.08% in 11th Grade (n=11), and 2.24% in 12th Grade (n=8). School level distribution shows 38.66% in primary school (n=138), 28.01% in middle school (n=100), and 33.33% in high school (n=119).

Table 3. Descriptive Statistics

	n	Min	Maks.	Ort.	S.sapma	Çarpıklık	Basıklık
Contribution to Personal Development (Pre-Test)	357	9,00	40,00	25,92	7,26	-0,24	-0,36
Contribution to Personal Development (Post-Test)	357	15,00	40,00	30,14	5,43	-0,33	-0,29
Belief in Attractiveness of Science Festivals (Pre-Test)	357	11,00	35,00	23,09	5,53	-0,10	-0,48
Belief in Attractiveness of Science Festivals (Post-Test)	357	13,00	35,00	26,26	4,72	-0,66	0,13
Social Impact of Science Festivals (Pre-Test)	357	11,00	34,00	21,56	5,51	0,16	-0,75
Social Impact of Science Festivals (Post-Test)	357	7,00	35,00	22,53	5,49	-0,17	-0,29
Science Festival Attitude Scale General (Pre-Test)	357	38,00	106,00	70,57	14,57	0,12	-0,03
Science Festival Attitude Scale General (Post-Test)	357	51,00	105,00	78,93	12,12	0,00	-0,73

Descriptive statistics for the Science Festival Attitude Scale and its sub-dimensions are presented in Table 3. Skewness and kurtosis values are within the ±2 range, indicating that the data does not deviate significantly from normal distribution, and thus, parametric tests were used for analysis.

Table 4. Comparison of Pre-Test and Post-Test Scale Scores

Scale and Sub-Dimensions		Mean	Std. Dev.	Difference (Post-Test- Pre-Test)	t	p
Contribution to Personal Development	Pre-Test	25,92	7,26	4,22	-8,90	0,01
	Post-Test	30,14	5,43			
Belief in Attractiveness of Science Festivals	Pre-Test	23,09	5,53	3,17	-7,97	0,01
	Post-Test	26,26	4,72			

Social Impact of Science Festivals	Pre-Test	21,56	5,51	0,97	-2,44	0,02
	Post-Test	22,53	5,49			
Science Festival Attitude Scale General	Pre-Test	70,57	14,57	8,36	-8,34	0,01
	Post-Test	78,93	12,12			

t: Dependent sample t-test

A statistically significant difference was found between the pre-test and post-test scores for the contribution to personal development (t: 4.22; $p < 0.05$). The average post-test scores (30.14 ± 5.43) were higher than the pre-test scores (25.92 ± 7.26).

A significant difference was also found in the belief in the attractiveness of science festivals (t: 3.17; $p < 0.05$). The post-test scores (26.26 ± 4.72) were higher than the pre-test scores (23.09 ± 5.53).

The social impact of science festivals also showed a significant difference (t: 0.97; $p < 0.05$), with post-test scores (22.53 ± 5.49) being higher than pre-test scores (21.56 ± 5.51).

Overall, a significant difference was observed between the general pre-test and post-test scores of the Science Festival Attitude Scale (t: 8.36; $p < 0.05$). Post-test scores (78.93 ± 12.12) were higher than pre-test scores (70.57 ± 14.57).

CONCLUSION

This research was conducted to determine the opinions of students participating in the workshops of the 'A Pinch of Science, A World of Festivals 2024' project, which was supported by the TÜBİTAK 4007 Science Festivals Support Program, regarding the project and the festival. Based on the analyses conducted, it was found that there was a significant positive relationship between the scale scores of the students before and after the workshops. Significant relationships were also found between the sub-dimensions of the scale.

According to the findings, the majority of participants in the festival were male students, aged between 11-14, and attending primary school. When examining the sub-dimensions of the scale, positive changes were observed in all sub-dimensions, with the post-test score in the sub-dimension of the festival's contribution to personal development being higher than the pre-test score (difference of 4.22). In this context, it is evident that the science festivals contributed to the personal development of participants. When examining the sub-dimension regarding the belief that science festivals are interesting, the difference between the post-test and pre-test scores was 3.17, with the post-test score being higher. This indicates that the science festivals were perceived as interesting by the participants. When examining the sub-dimension of the social impact of science festivals, the post-test scores were higher, with a difference of 0.97. This result shows that the science festivals had a positive effect on participants' social lives. Considering all sub-dimension results together, it can be concluded that the science festivals had a positive impact on the participants and fostered curiosity towards science.

When examining the hypothesis that forms the basis of the research, 'H1: Is there a significant difference in the science festival attitude scale scores of participants before and after the TÜBİTAK 4007 science festival?', it was found that there were significant positive differences among the sub-dimensions of the scale, as well as in the overall scale scores. In this context, it was observed that students who participated in the workshops developed a positive attitude toward science, and the project achieved its objective. As a result, it was determined that the participants' personal development was supported, the workshops reached their goals, and positive thoughts about scientific knowledge were developed.

In conclusion, the science festivals were found to enhance participants' interest in scientific knowledge, improve scientific thinking skills, and positively affect social interactions. These findings highlight the educational and social contributions of science festivals and support the importance of expanding and diversifying such events. It is anticipated that increasing the prevalence and variety of these activities within the educational system and societal awareness processes will strengthen the connection between

science and society and increase access to scientific knowledge. The expansion and diversification of these activities are crucial for fostering a strong interaction between science and society.

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