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Evaluating high school students' perspectives on climate change based on their field preferences (Trabzon province sample)

Lise öğrencilerinin iklim değişikliğine bakış açılarının alan tercihlerine göre değerlendirilmesi (Trabzon ili örneği)

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Abstract

This study aims to evaluate high school students' perspectives on the concept of climate change across various dimensions, including sources of information, knowledge level, perception, anxiety, and behavioral intentions, based on their field preferences in science and mathematics, social sciences, mathematics and social sciences, and special skills. In the study, the high schools where the survey would be conducted were selected using a purposive sampling method based on their different curricula, which include fine arts, sports, foreign languages, social sciences, and science and mathematics. A full-area sampling was conducted by administering the survey to the participating students. The survey was conducted face-to-face with 1,905 students across eight high schools in Trabzon Province, covering all grade levels. The survey forms were designed using a 5-point Likert scale, and the reliability of the questions was determined using Cronbach's alpha test. Descriptive statistics, variance analysis, and Duncan's test were used in the data evaluation. The study identified differences in the participating high school students' perspectives on the concept of climate change based on their field preferences, particularly in terms of knowledge level, perception, anxiety, mitigation actions, behavioral intentions, and sources of information. It was found that perspectives on climate change were moderate among the students in special skills and social sciences, whereas they were higher among the students in science and mathematics, and mathematics and social sciences.

Keywords: High school students, climate change, awareness, mitigation actions, behavioral intention

Öz

Bu çalışmada üniversite alan tercihlerine göre *sayısal*, *sözel*, *eşit ağırlık* ve *özel yetenek* alanlarında eğitim alan lise öğrencilerinin bilgiye erişim kaynağı, bilgi düzeyi, algı, kaygı ve davranışsal niyet boyutlarında iklim değişikliği kavramına bakış açılarının değerlendirilmesi amaçlanmıştır. Anket uygulaması yapılacak liseler; güzel sanatlar, spor, yabancı dil, sosyal, fen ve matematik alanında farklı müfredatlarda eğitim verme durumlarına göre bilinçli örnekleme yöntemi ile belirlenmiş ve tüm öğrencilere anket uygulanarak tam alan örneklemesi yapılmıştır. Trabzon ilindeki sekiz lisede ve tüm sınıf kademelerindeki 1,905 lise öğrencisi ile yüz yüze anket uygulanmıştır. Anket formları 5'li Likert ölçeği ile düzenlenmiş ve soruların güvenirliği Cronbach's alfa testi ile belirlenmiştir. Verilerin değerlendirilmesinde betimleyici istatistikler, varyans analizi ve Duncan testi kullanılmıştır. Çalışma ile üniversite alan tercihlerine göre eğitim alan lise öğrencilerinin bilgi düzeyi, algı, kaygı, azaltım eylemleri, davranışsal niyet ve bilgiye erişim kaynakları açısından iklim değişikliği kavramına bakış açılarında farklılıkların olduğu belirlenmiştir. İklim değişikliği kavramına bakış açılarının özel yetenek ve sözel öğrencilerinde orta, *sayısal* ve *eşit ağırlık* öğrencilerinde ise yüksek düzeyde olduğu söylenebilir.

Anahtar Kelimeler: Lise öğrencileri, iklim değişikliği, farkındalık, azaltım eylemleri, davranışsal niyet

1. Introduction

Global climate change is defined as the cumulative shift in climate patterns resulting directly or indirectly from human activities that alter the natural composition of the global atmosphere, beyond the natural climate variability observed over comparable periods (IPCC, 1996). Humanity now lives, produces and consumes in a world where the global ecosystem has undergone radical changes in recent years, and where natural resources are increasingly limited and fragile (IPCC, 2021). Human-induced climate change is currently impacting weather patterns and climate extremes across all regions of the world (IPCC, 2023). The World Meteorological Organization (WMO; wmo.int), in its "State of the Global Climate 2023" report, highlights that extreme weather events continue to have profound socio-economic effects, with extreme heat waves affecting numerous regions globally. The report also notes that wildfires have led to the loss of life, the destruction of homes, and significant air pollution, while flood disasters, exacerbated by Hurricane Daniel, affected countries such as Greece, Bulgaria, Libya and Türkiye (WMO, 2024).

In the Sixth Assessment Synthesis Report of the Intergovernmental Panel on Climate Change (IPCC) in 2023, it is stated that the accelerated implementation of deep, rapid, and sustained mitigation and adaptation actions in the near term (2023-2040) will reduce future losses and damages from climate change for both people and ecosystems (IPCC, 2023). Since young people are the future leaders and decision-makers of society (Pereira and Freire, 2021), it is essential that they possess the competencies and skills necessary to solve future climate change challenges (Chopra et al., 2019). Therefore, education is crucial for enabling youth to cope with this global issue that affects their well-being (MacKay et al., 2020) and shapes their future (Corner et al., 2015), as well as for building climate-resilient sustainable societies. Indeed, Article 6 (6ai) of the United Nations Framework Convention on Climate Change (UNFCCC) emphasizes the importance of developing and implementing education and public awareness programs on climate change and its impacts (UNFCC, 1992), and both the Kyoto Protocol and the European Green Deal address the role of education in combating climate change (UNFCC, 1998; EU, 2019).

In Türkiye, the 2022 Climate Council (iklimsurasi.gov.tr) identified climate literacy and climate- and environment-sensitive consumption habits as key objectives for achieving social behavior change, particularly through educational programs spanning from preschool to higher education (ÇSB, 2022). Similarly, the Workshop on Integrating Climate Change Awareness into Basic Education in Turkey (MEB, 2023a) highlights that climate change education has become a priority educational and investment policy for Türkiye, essential for achieving the country's 2053 Net Zero Emissions Target (netsifirturkiye.org/), facilitating green and digital transformations across all sectors, implementing the Green Deal Action Plan 2021 (TB, 2021), and preparing for climate-induced disasters.

In Türkiye, secondary education institutions affiliated with the Ministry of National Education (MNE; *Turkish*: MEB) include Anatolian High Schools (AHS), Science High Schools (ScHS), Social Sciences High Schools (SSHS), Anatolian Imam Hatip High Schools (AIHHS), Anatolian Fine Arts High Schools (AFAHS), Sports High Schools (SpHS), Vocational and Technical Anatolian High Schools (VTAHS), and Multi-Program Anatolian High Schools (MPAHS). In AHS and ScHS, education is provided in the fields of science and mathematics, while in Social Sciences High Schools, the focus is on literature and social sciences. Fine Arts High Schools aim to equip students with basic knowledge and skills in the fine arts (painting and music), and SpHS focus on physical education and sports. In Imam Hatip High Schools, alongside science and cultural subjects, education is provided in Islamic studies. VTAHS, as well as Multi-Program Anatolian High Schools, focus on developing knowledge and skills related to specific professions. Students enrolled in these high schools, which admit students through centralized exams by MEB or local placement, receive education in curricula that are aligned with the programs they intend to choose in university entrance exams. Based on their talents, interests, and planned future careers, students complete their secondary education by choosing one of the fields of study: science and mathematics, social sciences, mathematics and social sciences, or special skills (arts, music, sports, foreign languages, etc.) (MEB, 2023b; MEB, 2021; MEB, 2018).

It is expected that young people with different talents and interests, who receive high school education in various curricula, will also have differing perspectives on climate change. Therefore, this study aims to evaluate the perspectives on climate change among high school students, who receive education in different fields, based on their field preferences. In this context, the study seeks to assess the perspectives of high school students studying in the fields of science and mathematics, social sciences, mathematics and social sciences,

and special skills, regarding their sources of information, knowledge levels, perceptions, anxieties, and behavioral intentions related to the concept of climate change.

2. Materials and Methods

2.1. Study area and data

The study encompasses high school students who receive education in various fields based on their field preferences, including science and mathematics, social sciences, mathematics and social sciences, and special skills. The data for the study were obtained from the surveys conducted with the participating high school students in Trabzon province. The survey forms administered include questions across six dimensions: knowledge of climate change, perception, anxiety, mitigation actions, behavioral intentions, and sources of information.

2.2. Methods

The methodology of the study is twofold. In the first phase, a survey was conducted to gather information on high school students' knowledge and opinions regarding the concept of climate change, focusing on dimensions such as knowledge, perception, anxiety, mitigation actions, behavioral intentions, and sources of information. In the second phase, the data obtained from the survey forms were analyzed and evaluated using statistical methods.

2.2.1. Data collection and sampling

To assess high school students' perspectives on the concept of climate change, face-to-face surveys were conducted to gather information on various aspects, including, a) their knowledge of climate change (natural processes/causes of climate change), b) perceptions (effects/indicators of climate change), c) anxieties (individual/familial/environmental concerns, perceived threats, etc.), d) views on climate change mitigation actions, e) behavioral intentions, and f) sources of information on climate change. The high schools where the surveys were conducted were selected using a purposive sampling method (Daşdemir, 2021), based on their provision of education in different curricula, including fine arts, sports, foreign languages, social sciences, and science and mathematics. A full-area sampling method (Kalıpsız, 1988) was employed by administering the survey to all the students in the selected schools.

The survey forms consisted of closed-ended questions structured using a 5-point Likert scale. In developing the survey questions, similar studies in the literature (Leiserowitz et al., 2010; Dijkstra and Goedhart, 2012; DeBono et al., 2012; Rahman et al., 2014; Ezeudu et al., 2016; Chiw and Ling, 2019; Kuthe et al., 2019; Kuthe et al., 2020; Gülsoy and Korkmaz, 2020; Ratinen and Uusiautti, 2020; Ataklı and Kuran, 2022; Agustin, 2022; Gönen et al., 2023) were reviewed, and the questions were developed in line with the study's objectives. The developed survey form was evaluated for content and comprehensibility by five experts: two professors in forestry engineering, a statistician, a geography teacher, and a guidance counselor. Before the survey was conducted, research permission was obtained from the Trabzon Provincial Directorate of National Education (trabzon.meb.gov.tr/), and ethical approval was granted by the Social and Humanities Ethics Committee of Bartın University (etikkurul.bartin.edu.tr).

The suitability of the survey forms was tested through a preliminary survey. The comprehensibility of the survey questions was assessed by conducting a pilot survey with 30 students. The survey forms used in the pilot study were not included in the final analysis. The final survey was conducted in May-June 2023, involving 1,905 high school students from 9^{th}, 10^{th}, 11^{th}, and 12^{th} grades across eight high schools, and the surveys were administered face-to-face under the supervision of guidance counselors.

2.2.2. Data analysis

The reliability and validity of the Likert-scale questions were determined using Cronbach's alpha test. The Cronbach's alpha values for the 5-point Likert-scale questions ranged between 0.954 and 0.958. The overall Cronbach's alpha (α) value, calculated based on the averages of all Likert-scale questions was 0.956 (>0.60), indicating that the scales used in the survey were both reliable and valid (Kalaycı, 2014). The skewness and kurtosis coefficients of the scale items were within the range of (-1) to (+1), indicating that the data followed a normal distribution (Büyüköztürk, 2015). Therefore, parametric statistical methods were employed in the data analysis.

Descriptive statistics such as frequency, percentage, and arithmetic mean were used to evaluate the survey data. Variance analysis was used to identify differences in climate change knowledge, perceptions, anxieties, behavioral intentions, and sources of information based on field preferences. Duncan's test was applied to determine differences between groups (Kalıpsız, 1988; Daşdemir, 2021). Microsoft Excel 2019 and SPSS 25.0 were used for data analysis.

3. Results

3.1. Results related to high school students

Among the students who participated in the survey, 54.1% were female, and 45.9% were male. Based on their field preferences, 44.1% of the students were studying in the science and mathematics field, 24.1% in special skills, 23.3% in mathematics and social sciences, and 8.5% in social sciences (Table 1).

Table 1. Distribution of high school students by gender and field preferences
Tablo 1. Lise öğrencilerinin cinsiyet ve alan tercihi dağılımları

High school students		Scope field				Total	%
		Science and mathematics	Social sciences	Mathematics and social sciences	Special skills (arts, music, sport, foreign language)		
	9th	220	55	141	140	556	29.2
	10th	200	46	105	117	468	24.6
	11th	207	39	108	121	475	24.9
	12th	213	21	91	81	406	21.3
	Total	840	161	445	459	1,905	100
	%	44.1	8.5	23.3	24.1		100
Gender	Female	393	106	308	223	1,030	54.1
	Male	447	55	137	236	875	45.9

3.2. Results on climate change knowledge levels

App. Table 1 presents the levels of agreement with statements/sub-dimensions related to the fundamental causes of climate change and the differences between groups of high school students studying in different fields based on their field preferences. Among the causes of climate change, "Human activities (4.18)" and "Atmospheric changes (3.63)" received the highest average scores from all the students across different fields of study. The cause of climate change with the lowest average score was identified as "Aerosols (2.58)". The average scores for geological processes (such as continental drift, volcanism, geological disasters, meteorite impacts, the Paleocene-Eocene Thermal Maximum, etc.), solar activities, and changes in Earth's orbit and axial tilt remained at a moderate level.

According to the results of the Variance analysis, at the 95% and 99% confidence levels, the field preferences show statistically significant differences in knowledge levels related to the causes of climate change for geological processes ($F= 3.001$; $p= 0.03<0.05$), aerosols ($F= 2.584$; $p= 0.05\leq0.05$), atmospheric changes ($F= 4.231$; $p= 0.01<0.05$), and human activities ($F= 43.821$; $p= 0.00<0.05$). Duncan's test results indicate that, based on knowledge levels, geological processes, aerosols, and atmospheric changes formed two homogeneous groups, while human activities formed three homogeneous groups (App. Table 1).

3.3. Results on perceptions of climate change effects and indicators

When examining the statements posed to the high school students to determine their perceptions of climate change effects and indicators, along with the responses received (App. Table 2), it was observed that the highest average score among all the students was for "Shrinking of glaciers and rising sea levels (4.09)" as an effect and indicator of climate change, while the lowest level of agreement was for "Decreased fertility of agricultural lands and challenges in food supply (3.86)".

There are statistically significant differences in perceptions of the effects and indicators of climate change based on field preferences regarding the following aspects: warming of the Earth's surface ($F= 32.118$; $p= 0.000$), warming of the oceans and atmosphere ($F= 29.312$; $p= 0.000$), changes in precipitation patterns ($F= 34.699$; $p= 0.000$), shrinking of glaciers and rising sea levels ($F= 39.727$; $p= 0.000$), extreme weather events ($F= 30.311$; $p= 0.000$), depletion of water resources ($F= 30.324$; $p= 0.000$), decline in biodiversity ($F= 36.151$; $p= 0.000$), and decreased fertility of agricultural lands and challenges in food supply ($F= 31.770$; $p= 0.000$). According to the results of Duncan's test, the effects and indicators were grouped into homogeneous categories: a) "the warming of oceans and atmosphere", b) "changes in precipitation patterns", and c) "decreased fertility of agricultural lands and challenges in food supply" formed a pair, while d) "the warming of the Earth's surface", e) "shrinking of glaciers and rising sea

levels", f) "extreme weather events", g) "depletion of water resources", and h) "decline in biodiversity" formed a trio (App. Table 2).

3.4. Results on climate change anxiety

As shown in App. Table 3, which evaluates high school students' anxieties regarding climate change, the statement "Viewing climate change as a natural process of the Earth" received the lowest score (2.94) from all the students. In contrast, the highest average scores among the students were given to the statements "Viewing climate change as the most important issue for future generations (4.03)" and "Viewing climate change as a global issue (4.02)".

The statements related to climate change anxiety, based on field preferences, show statistically significant differences for the following: a) feeling the effects of climate change in daily life (F= 8.761; p= 0.000), b) viewing climate change as a global issue (F= 24.461; p= 0.000), c) viewing climate change as the most important issue for future generations (F= 24.172; p= 0.000), d) perceiving climate change as a threat to personal health and safety (F= 19.327; p= 0.000), e) seeing climate change as a threat to the health and safety of family, friends, and close ones (F= 17.593; p= 0.000), f) viewing climate change as a threat to the future of plants, animals, and all living organisms (F= 22.657; p= 0.000), g) increased mortality rates due to the effects of climate change (F= 13.813; p= 0.000), h) concern about rising climate-sensitive health issues (infectious diseases, UV radiation, etc.) (F= 15.908; p= 0.000), i) increased zoonotic diseases and pandemics due to climate change (F= 18.695; p= 0.000), j) perceiving climate change as a threat to water security (F= 27.453; p= 0.000), k) viewing climate change as a threat to food security (F= 21.568; p= 0.000), l) viewing climate change as a threat in terms of natural disasters (F= 18.481; p= 0.000), m) viewing climate change as a threat to energy security (F= 19.930; p= 0.000), and n) perceiving climate change as a threat in terms of migration (F= 23.065; p= 0.000). The statement "Viewing climate change as a natural process of the Earth" does not show a statistically significant difference (App. Table 3).

According to the results of Duncan's test, the anxiety-related statements formed distinct homogeneous groups. The statements a) "Feeling the effects of climate change in daily life", b) "Perceiving climate change as a threat to personal health and safety", c) "Seeing climate change as a threat to the health and safety of family, friends, and close ones", d) "Concern about rising climate-sensitive health issues (such as infectious diseases and UV radiation)", e) "Viewing climate change as a threat in terms of natural disasters", f) " Viewing climate change as a threat to energy security", and g) "Perceiving climate change as a threat in terms of migration" were grouped together as pairs. In contrast, the statements h) "Viewing climate change as a global issue", i) "Viewing climate change as the most important issue for future generations", j) "Viewing climate change as a threat to the future of plants, animals, and all living organisms", k) "Increased mortality rates due to the effects of climate change", l) "Increased zoonotic diseases and pandemics due to climate change", m) "Perceiving climate change as a threat to water security", and n) "Viewing climate change as a threat to food security" formed a trio, creating another homogeneous group (App. Table 3).

3.5. Results on mitigation actions for the effects of climate change

When examining the levels of agreement among the students regarding actions to mitigate the effects of climate change (App. Table 4), the highest average score was given to the statement "Preservation of green spaces and increased afforestation efforts (4.07)". The second highest scores were given to the statements "Use of alternative energy sources (4.06)" and "Ensuring conservation of electricity and water consumption (4.06)" as mitigation actions.

The statements related to climate change mitigation actions based on field preferences show statistically significant differences for the following: a) preservation of green spaces and increased afforestation efforts (F= 36.668; p= 0.000), b) use of alternative energy sources (F= 33.908; p= 0.000), c) preference for low-energy-producing products (F= 18.260; p= 0.000), d) strengthening thermal insulation (F= 28.432; p= 0.000), e) ensuring conservation of electricity and water consumption (F= 30.569; p= 0.000), f) reduction of household waste (F= 36.560; p= 0.000), g) prevention of urban population growth (F= 28.754; p= 0.000), and h) support for sustainable agriculture (F= 30.890; p= 0.000).

According to the results of Duncan's test, the mitigation actions were grouped as follows: a) "preference for low-energy-producing products" formed a pair; b) "preservation of green spaces and increased afforestation efforts", c) "strengthening thermal insulation", d) "ensuring conservation of electricity and water consumption", e) "reduction of household waste", f) "prevention of urban population growth", and g) "support for sustainable agriculture" formed a trio; and h) "use of alternative energy sources" formed a group of four (App. Table 4).

3.6. Results on behavioral intentions related to the concept of climate change

The students were asked to indicate their level of agreement with various statements regarding their behavioral intentions related to climate change in their daily lives and the responses are presented in App. Table 5. The statements "Behaviors exhibited regarding climate change should set an example for the environment (3.15)", "Believing to have sufficient knowledge about climate change (3.07)", "Engaging in discussions about climate change with family, friends, close ones and teachers (2.76)", and "Willingness to participate in any activity related to climate change (2.87)" received moderate levels of agreement. The statement "Feeling responsible for reducing the effects of climate change (3.68)" received the highest level of agreement among all the students, while the lowest level of agreement was for the statement f) "Engaging in discussions about climate change with family, friends, close ones, and teachers (2.76)".

The statements related to behavioral intentions towards climate change based on field preferences show statistically significant differences for the following: a) knowing and carrying out tasks related to climate change mitigation actions ($F= 16.272$; $p= 0.000$), b) contributing to climate change mitigation actions through daily behaviors ($F= 25.465$; $p= 0.000$), c) feeling responsible for reducing the effects of climate change ($F= 23.002$; $p= 0.000$), d) continuously following current information on climate change ($F= 20.150$; $p= 0.000$), e) believing to have sufficient knowledge about climate change ($F= 5.333$; $p= 0.000$), and f) believing in being climate-friendly ($F= 3.806$; $p= 0.01$). However, there are no statistically significant differences in the statements regarding g) setting an example for the environment with behaviors related to climate change, h) engaging in discussions about climate change with family, friends, close ones, and teachers, and i) willingness to participate in any activity and education related to climate change (App. Table 5).

According to the results of Duncan's test, the behavioral intention statements formed the following homogeneous groups: a) "Believing in being climate-friendly" formed a pair; b) "Knowing and carrying out tasks related to climate change mitigation actions", c) "Feeling responsible for reducing the effects of climate change", d) "Continuously following current information on climate change", and e) "Believing to have sufficient knowledge about climate change" formed a trio; f) "Contributing to climate change mitigation actions through daily behaviors" formed a group of four (App. Table 5).

3.7. Results on sources of information access related to climate change

To determine the sources through which high school students access information related to the concept of climate change, the participating students were asked to indicate their level of agreement with various statements regarding these sources. The responses are presented in App. Table 6. The statement "Learning about climate change through visual and written media, documentaries, science fiction films, and scientific publications" received the highest average score (3.41) from the entire student group. The statements that received the lowest scores were "Learning about climate change through environmental organizations/associations (2.22)" and "Learning about climate change through educational/awareness activities by public institutions (2.31)". Meanwhile, the statements "Learning about climate change through teachers and school courses (2.81)" and "Learning about climate change through family, friends, and close ones (2.76)" received moderate levels of agreement.

The statements related to sources of information access about climate change based on field preferences show statistically significant differences for the following: a) "Learning about climate change through environmental organizations/associations" ($F= 4.301$; $p= 0.01$), b) "Learning about climate change through visual and written media, documentaries, science fiction films, and scientific publications" ($F= 3.273$; $p= 0.02$), and c) "Learning about climate change through educational/awareness activities by public institutions" ($F= 5.957$; $p= 0.000$). However, no statistically significant differences were observed in the statements "Learning about climate change through teachers and school courses" and "Learning about climate change through family, friends, and close ones" (App. Table 6).

According to Duncan's test results, the sources of information statements formed the following homogeneous groups: a) "Learning about climate change through environmental organizations/associations" and b) "Learning about climate change through visual and written media, documentaries, science fiction films, and scientific publications" formed a pair, while c) "Learning about climate change through educational/awareness activities by public institutions" formed a trio (App. Table 6).

3.8. Results on the dimensions of the concept of climate change and the overall concept

When examining the average scores of the students having different field preferences for each dimen-

sion of the concept of climate change (Table 2), it was observed that the students in the science and mathematics field had the highest average scores across all dimensions, except for the source of information access. The lowest average score for knowledge level was found among the students in mathematics and social sciences, while the lowest scores for perception, anxiety, mitigation actions, and behavioral intention were among those special skills students. The science and mathematics students had the lowest score in the source of information access dimension. Significant differences between the dimensions of climate change based on field preferences were also observed. These differences were statistically significant for knowledge level ($F= 6.865$; $p= 0.00$), perception ($F= 42.559$; $p= 0.00$), anxiety ($F= 22.522$; $p= 0.00$), mitigation actions ($F= 38.740$; $p= 0.00$), behavioral intention ($F= 10.143$; $p= 0.00$) and source of information access ($F= 3.990$; $p= 0.01$).

According to the Duncan's test, the dimensions of climate change formed the following homogeneous groups: a) knowledge level, behavioral intention, and source of information access formed pairs, while b) perception, anxiety, and mitigation actions formed trios (Table 2).

Table 2. Results of the analysis of variance and Duncan's test based on dimensions of climate change awareness
Tablo 2. İklim değişikliği farkındalık boyutlarına göre varyans analizinin ve Duncan testinin sonuçları

Dimension	Mean*	Level**	Scope field	F	p	Homogeneous groups
Knowledge level	3.09	Moderate	Special skills (arts, music, sport, foreign language)	6.865	0.000	a
	3.02		Mathematics and social sciences			b
	3.22		Social sciences			b
	3.28		Science and mathematics			b
Perception	3.64	High	Special skills (arts, music, sport, foreign language)	42.559	0.000	a
	3.67		Social sciences			a
	4.01		Mathematics and social sciences			b
	4.15		Science and mathematics			c
Anxiety	3.55	High	Special skills (arts, music, sport, foreign language)	22.522	0.000	a
	3.57		Social sciences			a
	3.78		Mathematics and social sciences			b
	3.94		Science and mathematics			c
Mitigation actions	3.71	High	Special skills (arts, music, sport, foreign language)	38.740	0.000	a
	3.79		Social sciences			a
	3.99		Mathematics and social sciences			b
	4.21	Very High	Science and mathematics			c
Behavioral intentions	3.18	Moderate	Special skills (arts, music, sport, foreign language)	10.143	0.000	a
	3.20		Social sciences			a
	3.33		Mathematics and social sciences			b
	3.40		Science and mathematics			b
Sources of information access	2.65	Moderate	Science and mathematics	3.990	0.008	a
	2.70		Mathematics and social sciences			a
	2.74		Special skills (arts, music, sport, foreign language)			ab
	2.85		Social sciences			b

*The averages for each dimension were calculated based on the mean scores of the statements provided on the Likert scale.
** 1: Strongly disagree (1.00-1.80); 2: Disagree (1.81-2.60); 3: Neutral (2.61-3.40); 4: Agree (3.41-4.20); 5: Strongly agree (4.21-5.00)

To evaluate the overall perspective of the high school students on the concept of climate change based on different field preferences, the averages of their responses in the dimensions of knowledge level, perception, anxiety, behavioral intention, and source of information access were taken. The overall climate change scores for those students in the science and mathematics, mathematics and social sciences, social sciences, and special skills fields are 3.60; 3.50, 3.38, and 3.32, respectively. The students from the mathematics and social sciences group, science and mathematics group, and special skills and social sciences groups formed different homogeneous groups in their perspectives on the concept of climate change (Table 3).

Table 3. Results of the analysis of variance and Duncan's test based on all dimensions of the concept of climate change

Tablo 3. İklim değişikliği kavramının tüm boyutlarına göre varyans analizi ve Duncan testi sonuçları

	Mean*/Level**	Scope field	F	p	Homogeneous groups
Concept of climate change	3.32 (moderate)	Special skills (arts, music, sport, foreign language)	31.670	0.000	a
	3.38 (moderate)	Social sciences			a
	3.50 (high)	Mathematics and social sciences			b
	3.60 high)	Science and mathematics			c

*The averages for all dimensions (knowledge level, perception, anxiety, behavioral intention, source of information access) were calculated based on the mean scores of the statements provided on the Likert scale.
** 1: Very low (1.00-1.80); 2: Low (1.81-2.60); 3: Moderate (2.61-3.40); 4: High (3.41-4.20); 5: Very high (4.21-5.00)

4. Discussion and Conclusion

In light of the findings from the study, it was determined that there were differences in the high school students' perspectives on the concept of climate change based on their field preferences, specifically in terms of knowledge level, perception, anxiety, mitigation actions, behavioral intention, and sources of information access. The study found that the students' overall knowledge of climate change was at a moderate level. It can be stated that the participating students did not have sufficient theoretical knowledge about the fundamental causes of climate change. However, those students across all groups, particularly those in the science and mathematics and mathematics and social sciences fields, agreed that human activities were the most significant cause of climate change. This finding aligns with the studies by Harker-Schuch et al. (2021), Shealy et al. (2019), Atik and Doğan (2019), Azeiteiro et al. (2018), and Harker-Schuch and Bugge-Henriksen (2013), which also indicate that high school students perceive human activities as a major cause of climate change.

The students' knowledge about the natural processes contributing to climate change, such as geological processes, aerosols, solar activities, and changes in Earth's orbit and axial tilt, remained insufficient. The knowledge level of those special skills students was lower compared to the other groups, while the science and mathematics students had a higher knowledge level. This can be attributed to the emphasis on science courses in the curriculum for science and mathematics students, whereas special skills students focus more on arts, sports or foreign language courses. Similar differences in knowledge levels were observed in studies conducted by Şahin and Durkaya (2023), Yıldırım and Utkugün (2023), Aydın (2014), and Rahman et al. (2014), who found variations in knowledge levels among high school students attending different types of schools and curricula.

Students studying in different fields also exhibit variations in their perceptions of the effects and indicators of climate change. Despite their insufficient theoretical knowledge about the fundamental causes of climate change, they tend to have a better grasp of its effects and indicators. In fact, Harker-Schuch and Watson (2019) highlighted that while students focused more on the impacts and consequences of climate change, they often remained distant from the physical causes and mechanisms underlying climate science.

In this study, in terms of climate change perception, the students in special skills and social sciences formed one distinct group, while those in science and mathematics and mathematics and social sciences formed another. The perception of climate change effects and indicators among the students was generally higher than their knowledge levels. Among the student groups, the lowest perception of climate change was found in the special skills students, while the highest was observed in the science and mathematics students. Yıldırım and Utkugün (2023) found that the perceptions of students in fine arts (special skills) and SSHS were lower and significantly different from other groups. Similarly, Şahin and Durkaya (2023) also found differences in

climate change perceptions among students based on their school types.

It can be stated that climate change anxiety is generally high among student groups. All students feel the effects of climate change in their daily lives, a finding consistent with the Chiw and Ling (2019). All students view climate change as a global issue and are concerned that it will be the most significant problem for future generations. Antronico et al. (2023), Han et al. (2022), Hickman et al. (2021), Clayton and Karazsia (2020), Chiw and Ling (2019), and Corner et al. (2015) also emphasize that young people are anxious about climate change.

Similar to the perceptions of climate change, the students' climate change anxiety groups also formed two distinct categories: special skills and social sciences students formed one group, while science and mathematics and mathematics and social sciences students formed another. Among these groups, the lowest level of anxiety was observed in the special skills students, while the highest was in the science and mathematics students. The higher anxiety levels among the science and mathematics students may be attributed to their higher levels of knowledge and awareness of climate change compared to the other groups.

All the student groups moderately agreed with the idea that climate change was a natural process of the Earth. This could be explained by the fact that students predominantly view human activities as the primary cause of climate change. Similarly, Ezeudu et al. (2016) found that students did not perceive climate change as a natural process.

In the dimension of climate change mitigation actions, the students were divided into three groups: the special skills and social sciences students formed one group, while the science and mathematics and mathematics and social sciences students formed two separate groups. Despite the fact that students from different fields of study may not have sufficient knowledge levels, it can be stated that they are more conscious about actions aimed at mitigating the effects of climate change.

Among the sub-dimensions of mitigation actions, the action of "preserving green spaces and increasing afforestation efforts" was highly valued by the students in this study, as was also observed by Kilinc et al. (2008) and Gülsoy and Korkmaz (2020). This emphasis on afforestation could be attributed to the effectiveness of awareness-raising activities carried out in schools across Türkiye by the General Directorate of Forestry (ogm.gov. tr) as part of official initiatives such as the "11 November National Afforestation Day" and the "Breath for the Future Campaign", and the activities of civil society organisations such as TEMA (The Turkish Foundation for Combating Soil Erosion, for Reforestation and the Protection of Natural Habitats), the Aegean Forest Foundation, and TOD (The Foresters' Association of Turkey).

When evaluating the behavioral intentions developed by the students from different fields of study regarding climate change, it can be observed that although the science and mathematics students were ahead of the other groups in developing behavioral intentions, it can be pointed out that none of the student groups developed sufficient behavioral intentions towards climate change. Similar to the findings of this study Ezeudu et al. (2016) also found that students' attitudes towards climate change were low. In the dimension of behavioral intention, the special skills and social sciences students formed one group, while the science and mathematics and mathematics and social sciences students formed another. The students in the science and mathematics and mathematics and social sciences fields believed that they were more climate-friendly compared to the special skills and social sciences students. All the student groups believed that they possessed a moderate level of knowledge about climate change, a finding consistent with the results of Azeiteiro et al. (2018).

Despite feeling responsible for knowing and implementing actions aimed at mitigating climate change and expressing that they have a moderate level of knowledge, all the student groups exhibited only moderate willingness to participate in activities and education related to climate change. Similarly, although the students believed that their behaviors in daily life set an example for their environment to some extent, their lack of sufficient discussions with family, friends, close ones, and teachers about climate change, and the influence of the habits of the social environment in which they live could be as some of the reasons why they did not develop adequate behavioral intentions towards addressing climate change.

Another finding of the study is that high school students do not have sufficient access to sources of information on climate change. It can be stated that the students in all groups did not access climate change information through environmental organizations/associations or through educational/awareness activities conducted by public institutions. Access to climate change information through school courses/teachers and close social circles was at a moderate level. Particularly among the mathematics and social sciences students, the

most significant sources of information on climate change for all the student groups were identified as visual/written media, documentaries, science fiction films, and scientific publications. This aligns with the Yıldırım and Utkugün (2023), which also found that the internet, TV, visual media, and scientific publications were the primary sources of information on climate change for high school students, while public institutions and non-governmental organizations were less frequently used as sources of information.

When evaluating the perspectives of the high school students on the concept of climate change across all dimensions based on their different field preferences, the special skills and social sciences students formed one group, while the science and mathematics and mathematics and social sciences students formed another. It can be stated that the special skills and social sciences students had a moderate level of perspective on climate change, whereas the science and mathematics and mathematics and social sciences students had a high level of perspective on the concept. These results support the expectation that young people with different talents, interests, and curricula in high school education may also have differing perspectives on climate change.

Young people with high levels of knowledge and awareness are more likely to develop positive behaviors towards adapting to and mitigating the effects of climate change. Therefore, education plays a crucial role not only in helping young people grasp the theoretical foundations, causes, and consequences of climate change but also in fostering climate-friendly behaviors through increased awareness. In this context, it is essential that both public institutions, including MEB, and schools place special emphasis on the development of climate-friendly and climate-literate individuals. Regardless of the educational curriculum linked to their field preferences, there is a need to enhance the educational curriculum and school activities to ensure that high school students receive fundamental education on climate change knowledge and awareness.

By integrating climate change education and awareness initiatives into educational curricula, it will be possible to increase post-education gains, cultivate climate-literate young individuals, achieve the goals and strategies in the fight against climate change, and thereby contribute to the formation of climate-resilient societies.

This study examined high school students' perspectives on the concept of climate change across various dimensions, providing a robust dataset for future research. Although the study's focus on high school students in Trabzon province constitutes a significant limitation, it successfully reached a broad sample group.

In light of this study, it is evident that young people's perspectives on climate change may be influenced by the level of development of the society they live in, their sociocultural and sociodemographic backgrounds, the education they receive, and their individual characteristics. Therefore, there is a need for further research across different educational levels and regions to better understand how these factors shape young people's views on climate change.

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App. Table 1. Results of variance analysis and Duncan's test based on knowledge levels
Ek Tablo 1. Bilgi düzeylerine göre varyans analizinin ve Duncan testinin sonuçları

Dimension	Knowledge level	Statements/Sub-dimensions	Scope field	Level of agreement			F	p	Homogeneous groups
				Mean*	Level	Mean			
		Geologic processes (Continental drift, volcanism, geological disasters, meteorite impacts, Paleocene-Eocene Thermal Maximum, etc.)	Special skills	2.78	Moderate	2.93	3.001	0.03	a
			Science and mathematics	2.94					ab
			Mathematics and social sciences	2.99					b
			Social sciences	3.05					b
		Solar activities (Solar cycles and flares)	Special skills	2.91	Moderate	2.89	1.190	0.31	-
			Science and mathematics	2.89					
			Mathematics and social sciences	2.79					
			Social sciences	2.98					
		Earth's Orbit (Changes in Earth's orbit and axial tilt)	Special skills	2.98	Moderate	3.08	1.436	0.23	-
			Science and mathematics	3.11					
			Mathematics and social sciences	3.12					
			Social sciences	3.14					
		Aerosols (Desert dust, etc.)	Mathematics and social sciences	2.46	Low	2.58	2.584	0.05	a
			Science and mathematics	2.58					ab
			Special skills	2.63	Moderate				ab
			Social science	2.71					b
		Atmospheric changes	Special skills	3.48	High	3.63	4.231	0.01	a
			Social sciences	3.61					ab
			Mathematics and social sciences	3.62					ab
			Science and mathematics	3.71					b
		Human activities (Greenhouse gases, fossil fuels, deforestation, etc.)	Special skills	3.78	High	4.18	43.821	0.00	a
			Social sciences	3.83					a
			Mathematics and social sciences	4.22	Very High				b
			Science and mathematics	4.44					c

1: Strongly disagree (1.00-1.80); 2: Disagree (1.81-2.60); 3: Neutral (2.61-3.40); 4: Agree (3.41-4.20); 5: Strongly agree (4.21-5.00)

App. Table 2. Results of the analysis of variance and Duncan's test based on perceptions of climate change effects and indicators
Ek Tablo 2. İklim değişikliğinin etki ve göstergelerine yönelik algıya göre varyans analizinin ve Duncan testinin sonuçları

Dimension		Statements/Sub-dimensions	Scope field	Level of agreement			F	p	Homogeneous groups
				Mean*	Level	Mean			
Perception		Warming of the Earth's surface	Special skills	3.67	High	3.98	32.118	0.000	a
			Social sciences	3.68					a
			Mathematics and social sciences	4.03					b
			Science and mathematics	4.18					c
		Warming of the oceans and atmosphere	Special skills	3.60	High	3.92	29.312	0.000	a
			Social sciences	3.73					a
			Mathematics and social sciences	4.00					b
			Science and mathematics	4.09					b
		Changes in precipitation patterns	Special skills	3.63	High	3.95	34.699	0.000	a
			Social sciences	3.63					a
			Mathematics and social sciences	4.05					b
			Science and mathematics	4.13					b
		Shrinking of glaciers and rising sea levels	Special skills	3.73	High	4.09	39.727	0.000	a
			Social sciences	3.76					a
			Mathematics and social sciences	4.13					b
			Science and mathematics	4.33	Very High				c
		Extreme weather events	Special skills	3.69	High	3.99	30.311	0.000	a
			Social sciences	3.69					a
			Mathematics and social sciences	4.01					b
			Science and mathematics	4.18					c
		Depletion of water resources	Special skills	3.67	High	3.95	30.324	0.000	a
			Social sciences	3.67					a
			Mathematics and social sciences	3.99					b
			Science and mathematics	4.15					c
		Decline in biodiversity	Special skills	3.54	High	3.89	36.151	0.000	a
			Social sciences	3.65					a
			Mathematics and social sciences	3.95					b
			Science and mathematics	4.10					c
		Decreased fertility of agricultural lands and challenges in food supply	Social sciences	3.55	High	3.86	31.770	0.000	a
			Special skills	3.56					a
			Mathematics and social sciences	3.91					b
			Science and mathematics	4.05					b

1: Strongly disagree (1.00-1.80); 2: Disagree (1.81-2.60); 3: Neutral (2.61-3.40); 4: Agree (3.41-4.20); 5: Strongly agree (4.21-5.00)

App. Table 3. Results of the analysis of variance and Duncan's test based on climate change anxiety
Ek Tablo 3. İklim değişikliği kaygısına göre varyans analizinin ve Duncan testinin sonuçları

Dimension		Statements	Scope field	Level of agreement			F	p	Homogeneous groups
				Mean*	Level	Mean			
Anxiety		Feeling the effects of climate change in daily life	Social sciences	3.50	High	3.69	8.761	0.000	a
			Special skills	3.52					a
			Mathematics and social sciences	3.70					b
			Science and mathematics	3.81					b
		Viewing climate change as a global issue	Special skills	3.71	High	4.02	24.461	0.000	a
			Social sciences	3.76					a
			Mathematics and social sciences	4.05					b
			Science and mathematics	4.22	Very High				c
		Viewing climate change as the most important issue for future generations	Special skills	3.74	High	4.03	24.172	0.000	a
			Social sciences	3.76					a
			Mathematics and social sciences	4.04					b
			Science and mathematics	4.23	Very High				c
		Perceiving climate change as a threat to personal health and safety	Special skills	3.48	High	3.73	19.327	0.000	a
			Social sciences	3.51					a
			Mathematics and social sciences	3.76					b
			Science and mathematics	3.90					b
		Seeing climate change as a threat to the health and safety of family, friends, and close ones	Special skills	3.49	High	3.72	17.593	0.000	a
			Social sciences	3.50					a
			Mathematics and social sciences	3.73					b
			Science and mathematics	3.88					b
		Viewing climate change as a threat to the future of plants, animals, and all living organisms	Special skills	3.62	High	3.91	22.657	0.000	a
			Social sciences	3.69					a
			Mathematics and social sciences	3.93					b
			Science and mathematics	4.11					c
		Increasing mortality rates due to the effects of climate change	Special skills	3.59	High	3.81	13.813	0.000	a
			Social sciences	3.66					ab
			Mathematics and social sciences	3.79					b
			Science and mathematics	3.97					c

App. Table 3. Results of the analysis of variance and Duncan's test based on climate change anxiety (continue)
Ek Tablo 3. İklim değişikliği kaygısına göre varyans analizinin ve Duncan testinin sonuçları (devamı)

Dimension		Statements	Scope field	Level of agreement			F	p	Homogeneous groups
				Mean*	Level	Mean			
Anxiety		Rising climate-sensitive health issues (infectious diseases, UV radiation, etc.)	Special skills	3.58	High	3.82	15.908	0.000	a
			Social sciences	3.64					a
			Mathematics and social sciences	3.83					b
			Science and mathematics	3.98					b
		Increasing zoonotic diseases and pandemics due to climate change	Special skills	3.49	High	3.71	18.695	0.000	a
			Social sciences	3.45					a
			Mathematics and social sciences	3.68					b
			Science and mathematics	3.88					c
		Perceiving climate change as a threat to water security	Social sciences	3.68	High	3.91	27.453	0.000	a
			Special skills	3.59					a
			Mathematics and social sciences	3.91					b
			Science and mathematics	4.13					c
		Viewing climate change as a threat to food security	Special skills	3.61	High	3.89	21.568	0.000	a
			Social sciences	3.72					ab
			Mathematics and social sciences	3.87					b
			Science and mathematics	4.08					c
		Viewing climate change as a threat in terms of natural disasters	Special skills	3.60	High	3.67	18.481	0.000	a
			Social sciences	3.72					a
			Mathematics and social sciences	3.88					b
			Science and mathematics	4.03					b
		Viewing climate change as a threat to energy security	Special skills	3.56	High	3.83	19.930	0.000	a
			Social sciences	3.65					a
			Mathematics and social sciences	3.86					b
			Science and mathematics	3.99					b
		Perceiving climate change as a threat in terms of migration	Social sciences	3.47	High	3.79	23.065	0.000	a
			Special skills	3.56					a
			Mathematics and social sciences	3.82					b
			Science and mathematics	3.97					b
		Viewing climate change as a natural process of the Earth	Special skills	3.03	Moderate	2.94	1.124	0.338	-
			Social sciences	2.90					
			Mathematics and social sciences	2.91					
			Science and mathematics	2.90					

1: Strongly disagree (1.00-1.80); 2: Disagree (1.81-2.60); 3: Neutral (2.61-3.40); 4: Agree (3.41-4.20); 5: Strongly agree (4.21-5.00)

App. Table 4. Results of the analysis of variance and Duncan's test based on climate change mitigation actions
Ek Tablo 4. İklim değişikliğini azaltım eylemlerine göre varyans analizinin ve Duncan testinin sonuçları

Dimension		Statements/ Sub-dimensions	Scope field	Level of agreement			F	p	Homogeneous groups
				Mean*	Level	Mean			
	Mitigation actions	Preservation of green spaces and increased afforestation efforts	Special skills	3.74	High	4.07	36.668	0.000	a
			Social sciences	3.81					a
			Mathematics and social sciences	4.07					b
			Science and mathematics	4.30	Very High				c
		Use of alternative energy sources	Special skills	3.72	High	4.06	33.908	0.000	a
			Social sciences	3.89					b
			Mathematics and social sciences	4.06					c
			Science and mathematics	4.28	Very High				d
		Preference for low-energy-producing products	Special skills	3.75	High	3.95	18.260	0.000	a
			Social sciences	3.77					a
			Mathematics and social sciences	3.90					a
			Science and mathematics	4.12					b
		Strengthening thermal insulation	Special skills	3.66	High	3.95	28.432	0.000	a
			Social sciences	3.78					a
			Mathematics and social sciences	3.92					b
			Science and mathematics	4.14					c
		Ensuring conservation of electricity and water consumption	Special skills	3.75	High	4.06	30.569	0.000	a
			Social sciences	3.87					a
			Mathematics and social sciences	4.07					b
			Science and mathematics	4.27	Very High				c
		Reduction of household waste	Special skills	3.63	High	3.95	36.560	0.000	a
			Social sciences	3.71					a
			Mathematics and social sciences	3.95					b
			Science and mathematics	4.18					c
		Prevention of urban population growth	Special skills	3.67	High	3.94	28.754	0.000	a
			Social sciences	3.68					a
			Mathematics and social sciences	3.92					b
			Science and mathematics	4.14					c
		Support for sustainable agriculture	Social sciences	3.79	High	4.03	30.890	0.000	a
			Special skills	3.75					a
			Mathematics and social sciences	4.01					b
			Science and mathematics	4.24	Very High				c

1: Strongly disagree (1.00-1.80); 2: Disagree (1.81-2.60); 3: Neutral (2.61-3.40); 4: Agree (3.41-4.20); 5: Strongly agree (4.21-5.00)

App. Table 5. Results of the analysis of variance and Duncan's test based on behavioral intentions related to climate change

Ek Tablo 5. İklim değişikliğine yönelik davranışsal niyete göre varyans analizinin ve Duncan testinin sonuçları

Dimension		Statements	Scope field	Level of agreement			F	p	Homogeneous groups
				Mean*	Level	Mean			
	Behavioral intentions	Knowing and carrying out tasks related to climate change mitigation actions	Special skills	3.37	Moderate	3.56	16.272	0.000	a
			Social sciences	3.40					a
			Mathematics and social sciences	3.59	High				b
			Science and mathematics	3.74					c
		Contributing to climate change mitigation actions through daily behaviors	Special skills	3.29	Moderate	3.55	25.465	0.000	a
			Social sciences	3.34					b
			Mathematics and social sciences	3.55	High				c
			Science and mathematics	3.76					d
		Setting an example for the environment with behaviors related to climate change	Special skills	3.09	Moderate	3.15	0.963	0.409	-
			Social sciences	3.07					
			Mathematics and social sciences	3.17					
			Science and mathematics	3.18					
		Feeling responsible for reducing the effects of climate change	Special skills	3.41	High	3.68	23.002	0.000	a
			Social sciences	3.47					a
			Mathematics and social sciences	3.72					b
			Science and mathematics	3.85					c
		Continuously following current information on climate change	Special skills	3.35	Moderate	3.58	20.150	0.000	a
			Social sciences	3.34					a
			Mathematics and social sciences	3.62	High				b
			Science and mathematics	3.74					c
		Believing to have sufficient knowledge about climate change	Special skills	2.92	Moderate	3.07	5.333	0.000	a
			Social sciences	2.99					a
			Mathematics and social sciences	3.11					b
			Science and mathematics	3.15					c
		Engaging in discussions about climate change with family, friends, close ones, and teachers	Special skills	2.80	Moderate	2.76	1.042	0.373	-
			Social sciences	2.86					
			Mathematics and social sciences	2.76					
			Science and mathematics	2.71					
		Willingness to participate in any activity and education related to climate change	Social sciences	3.02	Moderate	2.87	2.475	0.060	-
			Special skills	2.94					
			Mathematics and social sciences	2.90					
			Science and mathematics	2.79					
		Believing in being climate-friendly	Social sciences	3.28	Moderate	3.50	3.806	0.010	a
			Special skills	3.43	High				ab
			Mathematics and social sciences	3.51					b
			Science and mathematics	3.58					b

1: Strongly disagree (1.00-1.80); 2: Disagree (1.81-2.60); 3: Neutral (2.61-3.40); 4: Agree (3.41-4.20); 5: Strongly agree (4.21-5.00)

App. Table 6. Results of the analysis of variance and Duncan's test based on sources of information access related to climate change

Ek Tablo 6. İklim değişikliği bilgisine erişimin kaynağına göre varyans analizinin ve Duncan testinin sonuçları

Dimension		Statements	Scope field	Level of agreement			F	p	Homogeneous groups
				Mean*	Level	Mean			
Sources of information access		Learning about climate change through teachers and school courses	Science and mathematics	2.77	Moderate	2.81	1.412	0.237	-
			Mathematics and social sciences	2.90					
			Special skills	2.88					
			Social sciences	2.75					
		Learning about climate change through family, friends, and close ones	Special skills	2.78	Moderate	2.76	1.034	0.377	-
			Social sciences	2.88					
			Mathematics and social sciences	2.78					
			Science and mathematics	2.72					
		Learning about climate change through environmental organizations/associations	Science and mathematics	2.11	Low	2.22	4.301	0.005	a
			Mathematics and social sciences	2.22					ab
			Special skills	2.33					b
			Social sciences	2.40					b
		Learning about climate change through visual and written media, documentaries, science fiction films, and scientific publications	Special skills	3.26	Moderate	3.41	3.273	0.020	a
			Science and mathematics	3.44	High				ab
			Mathematics and social sciences	3.45					ab
			Social sciences	3.55					b
		Learning about climate change through educational/awareness activities by public institutions	Science and mathematics	2.21	Low	2.31	5.957	0.000	a
			Mathematics and social sciences	2.50					ab
			Special skills	2.46					bc
			Social sciences	2.29					c

1: Strongly disagree (1.00-1.80); 2: Disagree (1.81-2.60); 3: Neutral (2.61-3.40); 4: Agree (3.41-4.20); 5: Strongly agree (4.21-5.00)