

Science Teachers' Perceptions on the Use of Films Addressing Socioscientific Issues in the Classroom

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Abstract

The study aimed to develop some insights into whether science teachers are aware of films that contain socioscientific issues, the influence of the films they watch on their perception on these issues and whether they would like to use these films as teaching materials in the classroom. Therefore, in the study, the perception of science teachers on some socioscientific issues (nuclear power plants, global warming, genetically modified organisms, genetic cloning, tissue and organ donation) and the films they watched on these socioscientific issues were investigated. In this qualitative study, the case study design was used. A total of 18 science teachers participated in the study. The research data were collected through written documents, semi-structured interviews on the use of films in education and focus group interviews in order to reveal the teachers' perception on socioscientific issues. According to the written findings obtained, some of the participating teachers' perception on socioscientific issues changed after watching the films on these issues. According to the interview findings, 14 of the teachers mentioned that films related to socioscientific issues could change students' perception, while 4 stated that they would not change students' perception. Half of the participating teachers stated that they had not watched any films on socioscientific issues before the study and were unaware of the existence of such films. According to the teachers, the common characteristics of the films on socioscientific issues are being about issues that concern society, having individuals or companies' interests at the forefront, containing dilemmas, prompting questioning and thinking and showing different perception.

Keywords: Socioscientific issues, Science teachers, Films, Science education

Introduction

Socioscientific issues (SSIs) are complex, open-ended, often controversial social issues not having a certain answer and closely related to science (Sadler, 2004). SSIs are defined as issues that enable students to take responsibility in economic, political, social, health and ethical issues related to science, to look at events with a critical eye and to make informed decisions (Lee, 2007). In other words, they are referred to as dilemmas that lack consensus among scientists or have no straightforward conclusions, and they are related to environmental, medical, technological and scientific issues (Sadler & Zeidler, 2005). For a topic to be considered a socioscientific issue, it must meet at least two criteria: firstly, it should be closely related to science, and secondly, it should have meaning and significance in social life (Eastwood et al., 2012). In the science curriculum, subjects such as organic farming, nuclear energy, organ donation, endangered species, environmental issues, cloning, genetic engineering, space exploration, global warming, and the use of genetically modified organisms are addressed as socioscientific issues (MoNE, 2013). For example, genetically modified organisms (GMOs) have emerged as a field developed to meet the food demand resulting from population growth. The preference for these products has increased due to reasons such as their ease of production and longer shelf life. However, concerns about the potential for causing different diseases due to the unnatural nature of these products, fear of harming human organs, the potential decrease in the significance of agricultural professions, and the potential harm to human health through the disruption of plant functions and structures have led to negative views towards the use of GM products (Genc et al., 2020); Yavuz Topaloğlu, 2019). Regarding nuclear power plants, there are negative views due to factors such as

perceiving nuclear energy as a threat, its adverse effects on the environment and human health, concerns about countries controlling energy supply and potential use for nuclear weapon production. On the other hand, there are reports indicating positive views towards nuclear power plants due to their significant contribution to addressing energy deficits, helping reduce dependence on external sources and strengthening political positions (Dikmenli et al., 2019; Eş et al., 2016; Genc et al, 2020). Regarding tissue and organ donation, it is observed that there are individuals who express their opposition due to not wanting intervention in their bodies, stating that their families do not give permission, or objecting for religious reasons. On the other hand, there are individuals who support tissue and organ donation by expressing the importance of saving lives, believing that it brings religious merits and stating their desire to help others (Kavurmacı et al., 2014; Tetik & Cebesoy, 2019). The issue of global warming is also considered a socioscientific issue due to the ongoing debates about whether it is caused by natural factors or human activities (Christenson et al., 2014). Similarly, genetic interventions raise ethical concerns when applied to humans. The extent to which these interventions will affect the health, future well-being and rights of future generations is a subject of debate (Temizkan, 2006). These dilemmas emerging in SSIs lead individuals to engage in the process of critical thinking and decision-making.

The teaching of socioscientific issues is recognized as an important field for achieving the knowledge, skills and behaviours that science education aims to foster in students (Khishfe & Lederman, 2006; Yager et al., 2006). The use of SSIs in science education contributes to the development of scientific literacy, enhancement of students' informal reasoning, ethical and moral reasoning, socioscientific reasoning and argumentation skills. It also improves their understanding of the nature of science and enhances their interest, motivation and reasoning abilities in science, while facilitating the learning of science concepts (Genc et al, 2020). SSIs support students' reasoning, allowing them to engage in critical thinking and analyze scientific data related to the underlying scientific foundations of the issue (Zeidler et al., 2009) while promoting social awareness and the development of scientific thinking habits (Sadler, 2004). As evident from the research, SSIs should be integrated into science lessons by science teachers.

1. Socioscientific Issues, Media and Films

In today's world, socioscientific issues frequently appear in the media. Especially in new media, it is common to come across content related to socioscientific developments (Öztürk et al., 2017). The evolving role of media as a bridge between science and society has led to various relationships between science and media which have been the subject of numerous studies (Peters, 2013). Individuals are influenced by the media, and this affects the decisions they make regarding socioscientific issues. Therefore, providing quality education on media literacy alongside science education will contribute to individuals making more informed decisions. Many students, regardless of their educational level, perceive and utilize the media as a source of information (Eş et al., 2016). However, selecting accurate information from the media requires an important skill, and it is the responsibility of science educators to equip students with this skill. At this stage, teachers have significant responsibilities in selecting media materials to be used in the classroom. Sometimes a news article, sometimes a social media post, and sometimes a film can bring socioscientific issues to the public agenda. This study focuses on how films address socioscientific issues.

From the perspective of science educators today, there is a need for an element that will facilitate the flow of information between science and society, acting as a bridge between the two. Considering the speed of developments and the size of the target audience that needs to be reached, it is believed that these functional requirements can be met through the use of media. Compared to a few years ago, there has been a significant increase in public awareness of socioscientific issues in our society, and this is also reflected in the increased presence of socioscientific news content (Sakmen., Genç, & Arslan, 2020, p.260). Socioscientific issues such as the use of genetically modified organisms to meet food consumption, increasing global warming due to industrial activities, and the use of nuclear power plants to meet energy needs have been prominently featured in films, newspapers, and news articles in recent years. Visual and auditory media, such as videos, are playing an increasingly important role in global (online) education (Thomson et al., 2014).

Educators increasingly use videos and visual elements such as film clips in their lessons for various purposes, including conveying conceptual knowledge and enhancing students' level of interest. Films, particularly due to their special effects, have gained worldwide popularity and hold significant importance in science education due to the developments in their production. They contribute to learners' creative and critical thinking skills and help them develop their ability to learn scientific concepts. Despite the importance of films, there are shortcomings in their use for teaching science (Abdel-Radi, 2021).

When the literature is examined, it is seen that there are various studies on the use of films in education. For example, Bondi et al. (2021) investigated whether a film would lead to long-term effects and whether supportive education would play a role in participants' understanding. In this study conducted using a survey, undergraduate students' climate change responses were assessed before watching, while watching, after watching, and 9 weeks after watching the climate change documentary "The Human Element" (2018). A statistically significant difference was observed in self-reported climate change responses, such as motivation, concern, and understanding, immediately after watching the documentary. During the 9-week interval after watching the documentary, half of the participants received weekly information about climate change through a dedicated website, while the other half did not receive any information. After the 9-week interval, the

experimental group who received information through the website showed statistically significant differences compared to the control group. However, it was found that receiving information from the website did not have a statistically significant effect on motivation and concern.

Barnett and Kafka (2007) utilized a film or television scene during the lesson to demonstrate a specific scientific concept or engage students in a discussion about how the scientific accuracy of a particular scene can be determined. It was stated that the length of the discussion varied depending on the scientific richness of the film scene. In the study, while nine films were used, they presented the effects of two films in their articles (The Core and Red Planet). They asked the students to reconsider why they believed in the science depicted in "The Core". According to the research findings, 40% of the participants correctly understood the description of Earth's core in the film, 30% thought the film was logical, 20% believed the scene was incorrect but did not have a good alternative explanation and 10% knew that the scene was incorrect. It was determined that 70% of the students attributed different meanings to science after watching the film. Later, the students were asked to fill out a card explaining why they thought the film was incorrect or why they believed the film was scientifically accurate. According to the obtained data, it was determined that students tended to believe in unscientific ideas.

Knippels et al. (2009) examined the results of a designed science module to be covered in four class hours to foster idea development in the context of genomics in high school education. This study investigated whether film plots encourage students to form ideas in socioscientific issues. There were two experimental groups and one control group in the study. The first experimental group was the film group, which examined a science module containing film clips. The other experimental group, the news group, used science module clips containing news reports. Before and after the implementation of the module, a questionnaire was administered to 266 high school students to assess their idea generation skills. The results demonstrate that the science module had a significant positive effect on students' opinion-forming skills and that the movie group improved their skills more compared with the news report group. It may be concluded that the use of fiction—to be more specific, movie clips about genomics extracted from feature films—to introduce a socioscientific issue in the classroom stimulates students to develop their opinion-forming skills. Also Cavanaugh (2002) concluded that the "Jurassic Park" films give students the opportunity to visually experience two very different periods of life on Earth. In the study, it was stated that movies have an important effect on science lessons such as "entertaining students". According to the results of the study, it is fun for students to learn science and experience it with movies.

When the literature is examined, it is seen that different films are used as course materials in science teaching. However, no study has been found that has been conducted with the participation of science teachers using films on different SSIs and that has investigated the views of teachers on the use of films as instructional materials..

Therefore, responses to the ensuing inquiries were deemed necessary:

How do science teachers perceive the use of socioscientific films in terms of influencing their views on socioscientific issues?

Are science teachers willing to use such films in their teaching practices?

2. Methods

2.1. Research Design

The current study employed the case study design, one of the qualitative research methods. A case study is the limited examination and description of a particular case (Creswell, 2008; Glesne, 2016). A case study approach was used to explore teachers' perceptions within a real-life teaching context.

2.2. Study Group

A total of eighteen science teachers (12 females, 6 male) participated in the study in the fall term of the 2022-2023 academic year. The criteria considered in participant selection were that the science teachers were actively engaged in teaching and willing to participate in the study. Science teachers were asked if they could participate in the study, and those who expressed their willingness to participate formed the study group. All participants are middle school science teachers working in public schools across urban and rural areas. Eighteen science teachers (12 female, 6 male) teaching at public middle schools participated. Teachers had an average teaching experience of 10.3 years (SD = 5.7), and their ages ranged from 23 to 41.

Teachers were invited to participate in the study in a manner consistent with ethical rules (Ethics committee approval was obtained from the university where the researcher works). Science teachers were informed about the general purpose of the study and that participation in the study was on a voluntary basis. They were informed that their names would be kept confidential and they were told that they could leave the study whenever they wanted. An identification number (from 1 to 18) was given to each participant in order to keep the true identities of the participants confidential. "ST" stands for science teacher. For example, the first of the science teachers participating in the study was coded as ST-1.

2.3. Data Collection Tools

Different data collection tools were used in the study. These are written documents, semi-structured interviews and focus group interviews. Teachers completed written reflections before and after viewing each film. Interviews explored their opinions on SSI-related films, their impact on students, and their classroom applicability. The focus group discussion served to deepen insights. Within the context of the study, the views of the teachers on that socioscientific issue were taken before and after watching the film on each socioscientific issue. Questions asked to the teachers were prepared in compliance with the content of each SSI. For example, they were asked the following questions regarding Genetically Modified Organisms (GMOs): "What are your thoughts on GMOs? What is your stance on consuming/producing GM products? Imagine a friend who holds a different opinion on this issue. What could be his/her thoughts? What kind of arguments could your friend develop to support his/her viewpoint? How would you persuade this friend who holds a different opinion to align with your own?" Again, similar questions were asked on other SSIs and the opinions of the teachers were taken. The questions were given to the teachers in the form of an open-ended questionnaire and they were asked to answer them. It was administered by the researchers at the university. They were given as much time as they wanted to answer. After all the films were watched by the teachers, semi-structured interviews were conducted with the teachers about the use of films in education. In the semi-structured interview form, teachers were asked questions regarding the films they watched, including the ratings they gave and their justifications. They were also asked if they watch films related to socioscientific issues in their daily lives, justification if there was a change in teacher views after the films, whether films on socioscientific issues can change students' perspectives, whether there are films that changed their own perspectives and if so, which films. Furthermore, there are questions inquiring whether the films based on socioscientific issues have any common characteristics, whether teachers should show these films to their students in their classes and whether they have any specific films in mind that they intend to show. After the semi-structured interviews, focus group interviews were conducted with participants in order to detail the answers they gave. The focus group interview, which was conducted in the computer environment (zoom application), was carried out with an administrator, an assistant and science teachers. The focus group interview was recorded and the total time of the recordings is 92 minutes.

The following are some illustrative interview questions:

What are your thoughts on [specific SSI]?

How might such a film influence students' views?

Would you consider using this film in class? Why/why not?

Teachers completed written reflections before and after viewing each film. Interviews explored their opinions on SSI-related films, their impact on students, and their classroom applicability. The focus group discussion served to deepen insights.

2.4. Procedure

The researchers included films on socioscientific issues which they determined according to the objectives set in the science curriculum. They watched these films before the study and used the films they thought were the most appropriate for each socioscientific issue in terms of the participant group in the study. While selecting the films, attention was paid to the fact that they contain socioscientific issues in the curriculum, dilemmas, and that individuals need to make reasoning. The science teachers and researchers came together and the study plan was explained to them. The study was conducted at the university.

The researchers made the teachers watch films on various socioscientific issues on a weekly basis. In the first week, the teachers watched Pandora (nuclear power plants), in the second week, The Island (genetic cloning), in the third week, The God Committee (organ donation), in the fourth week, Percy (genetically modified organisms), and in the fifth week, Conspiracy: The Sustainability Secret (global warming). The views of the teachers on the SSI addressed in each film were elicited before and after watching the film. After all the films were watched, semi-structured interviews were conducted with the teachers to elicit their opinions about the films. Subsequently, a focus group interview was held with all the teachers to further explore their responses.

A weekly schedule of film screenings and data collection was followed:

Week 1–5: Weekly film screenings (one SSI-related film per week)

Pre/post film written reflection collection

Week 6: Individual semi-structured interviews

Week 7: Focus group interview via Zoom

2.5. Data Analysis

Thematic analysis (Braun & Clarke, 2013) was employed to identify similar themes in the data. Subsequently, a quantification approach (converting qualitative data into numerical values) was applied to determine which themes emerged more frequently in the data (Miles & Huberman, 1994). Inter-coder reliability exceeded 90% using the Miles & Huberman (1994) formula. The perception of each teacher before and after watching the films on different socioscientific issues were analyzed by the researchers and sample quotations were included. The responses of each teacher regarding the use of films in education, gathered through semi-structured interviews, were analyzed separately, and exemplary quotations were provided to support the findings.

The scores given by the participating science teachers to each film (ranging from 5 to 1, where 5 indicates high liking and 1 indicates low liking) were summed up. These sums were then divided by the total number of the teachers involved in the study to calculate the average score for each film. For example, the total sum of scores given to the film on global warming (Conspiracy: The Sustainability Secret) was divided by the total number of the teachers, resulting in an average film score of $66/18 = 3.66$.

2.6. Reliability of the Study

In order to establish the reliability of the study, two researchers with expertise in science education and socioscientific issues independently coded the data related to the teachers' views on the SSIs collected before and after watching the films. They also coded the data from semi-structured interviews and focus group interview regarding the integration of films into the educational environment. Later, the researchers came together to discuss each data and reached a consensus on the analysis framework. Inter-coder reliability was calculated using the formula (Miles & Huberman, 1994): $\text{total agreements} / (\text{total agreements} + \text{total disagreements})$. This calculation was employed to demonstrate the consistency and agreement between the two coders. The reliability in the analysis of all the data was determined to be over 90%, and after 100% consensus was reached, the final data were tabulated. In addition, the statements of the participating teachers were given in the form of sample quotations to ensure the consistency of the study.

3. Findings

In this section, the final findings obtained as a result of the analyses are described. Each film's impact on teacher perceptions presented in narrative form. Summary statistics for film ratings and interest in using films provided.

3.1. Views of the Science Teachers on the SSIs Before and After Watching the Films

Below are the views of the science teachers on different socioscientific issues before and after watching the films.

Table 1. Perception of the science teachers before and after watching the film (The Pandora) on the socioscientific issue of "Nuclear Power Plants"

Nuclear power plants	Frequency before watching the film	Teachers and sample opinions before watching the film	Frequency after watching the film	Teachers and sample opinions after watching the film
They should be established	7	(ST-1, ST-4, ST-7, ST-9, ST-12, ST-14, ST-17) ST-1: I believe that nuclear power plants are an appropriate way to reduce dependency on external sources in a country. A nuclear power plant must be established in our country.	6	(ST-1, ST-4, ST-9, ST-12, ST-14, ST-17) ST-1: The film didn't change my opinion. What caught my attention in the film was the emphasis on nuclear energy as a cleaner and more efficient alternative to fossil fuels at the beginning. It also highlighted the importance of maintenance for these power plants, which can be both clean and efficient but also potentially dangerous. The example of the Chernobyl incident in 1986, which occurred as a result of negligence, serves as a vivid illustration of this.
They should	10	(ST-2, ST-3, ST-5, ST-6, ST-8, ST-10, ST-13, ST-15, ST-16, ST-18)	12	(ST-2, ST-3, ST-5, ST-6, ST-7, ST-8, ST-10, ST-11, ST-13, ST-15, ST-16, ST-18)

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d not be establ ished	ST-16: I have a negative view about nuclear power plants. Currently, the fate of radioactive waste is uncertain, and our country lacks the necessary technological capabilities to implement this technology. The damage caused by nuclear power plant explosions is not limited to radiation; the resulting trauma and stress disorders in humans can lead to significant destruction, which should not be underestimated. In the United States, 13 reactors have been shut down since 2013, while France remains determined to establish thermal power plants in its major cities. However, I believe that our country should focus on the widespread use of solar and wind energy, which are less harmful alternatives.	ST-7: My opinion has changed after watching the film. I am currently opposed to nuclear power plants due to the perceived risk they pose to living beings. The conversations in the film, taking place in government offices, illustrated how fragile human life can be, and as a result, my perspective has shifted.	ST-16: It didn't change my opinion, but it expanded my perspective. The most striking events in the film were the difficulties in the intervention process. Misinforming the President initially disrupted the management of the situation, and the lack of sufficient information to the public led to chaos. The restriction of press freedom caused even bigger problems. After the explosion, the radiation levels were so high that intervention was nearly impossible. Additionally, the lack of advanced technology within the plant and inadequate emergency response equipment became evident. I noticed that the technicians lacked sufficient knowledge and training. There was no developed technology for the disposal of spent fuel rods, and inadequate precautions were taken by simply filling water tanks with thin concrete walls.
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Undeci ded	1	(ST-11)	-	-
ST-11: I am undecided because a part of me thinks, "Why shouldn't we have our own nuclear power plant? We are dependent on foreign countries and fossil fuels for our energy resources." Looking at the world, most developed countries have nuclear power plants. Additionally, environmental organizations often create significant awareness by highlighting the potential harm to the environment and human health. However, considering the hundreds of lives lost in mining accidents in our country, I fear that if we establish nuclear power plants, we might face another disaster.				

From Table 1, it is evident that before watching the film, the majority of the science teachers (10 out of 12) were against the establishment of nuclear power plants. However, after watching the film, two teachers changed their opinions. ST-7, who initially supported the establishment of nuclear power plants before watching the film, and ST-11, who was undecided prior to the film, both changed their opinions after watching the film. They now believe that nuclear power plants should not be established.

Table 2. Perception of the science teachers before and after watching the film (The Island) on the socioscientific issue of "Genetic Cloning"

Gen etic clon ing	Frequenc y before watching the film	Teachers and sample opinions before watching the film	Frequency after watching the film	Teachers and sample opinions after watching the film
	8	(ST-4, ST-6, ST-7, ST-8, ST-10, ST-11, ST-12, ST-13)	7	(ST-4, ST-6, ST-8, ST-10, ST-11, ST-12, ST-13)

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I am positive	ST-4: I have a positive outlook on genetic cloning as it aims to treat diseases. As long as it is for the benefit of humanity, any type of research can be conducted.	ST-4: No, my opinion hasn't changed. As I said, if we use the research correctly and prioritize the humanitarian aspect: Taking into account the interests of a group, a community, or a company rather than the overall welfare of humanity, it turns into a punishment inflicted upon humanity rather than a genuine breakthrough or discovery. Therefore, my opinion remains unchanged.	ST-13: The approach and implementation examples in the healthcare sector greatly impacted me. It can provide hope for people who wish to have children. As a mother myself, I can say that I was personally affected by this situation.
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I am negative	4 (ST-1, ST-3, ST-9, ST-14)	7 (ST-1, ST-3, ST-7, ST-9, ST-15, ST-14, ST-17)
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ST-14: Genetic cloning, also known as cell nuclear replacement, involves creating a multicellular organism that is genetically identical to the nucleus of a single cell. However, these practices are not ethically or economically advantageous. The success rate is approximately 0.5%, and the mortality rate is around 50%. Even though a living being created through cloning is considered a success, it is ethically unacceptable for it to die.

ST-15: Yes, it was quite unsettling. It made me wonder if I would ever want to be cloned or if there are already cloned humans like that. As technology pushes its boundaries, it beautifully showcases how humans also push their own limits. It made me think about how, in a utopian or dystopian world, if we eliminate all the factors that make us feel or believe that we exist, how can we tell that we are not just pitiful beings in a weak and diseased body? This film hits us like a slap with the dark side of advancing technology and the deteriorating nature of humanity. What caught my attention is the fact that how cruel people can be while the desire for a long and healthy life has always been the greatest aim of humankind.

ST-17: Before watching the film, I approached the issue of genetic cloning with a more logical perspective, particularly regarding the creation of missing or diseased organs or limbs. However, after watching the film, I came to a clearer understanding that experimenting with human cloning should only be attempted until the time when organ regeneration becomes a reality, and that human cloning should never be pursued, even for therapeutic purposes. I realized that, regardless of being produced in a laboratory setting, I could develop emotional attachments to the resulting new entities.

I am both negative and positive	6 (ST-2, ST-5, ST-15, ST-16, ST-17, ST-18)	4 (ST-2, ST-5, ST-16, ST-18)
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ST-18: Genetic cloning is one of the technologies that can potentially restore the world to a sustainable ecosystem. It can also offer solutions in the fields of agriculture and animal breeding through plant and animal improvement. However, the cloning of transgenic organisms and the potential negative consequences that may arise in the future are among the anticipated aspects of this issue. This situation requires me to evaluate the matter from both dimensions.

ST-18: My opinion hasn't changed, but there is a very striking scene in the film. In that scene, there is a conversation between the clones and the technician who assists them, and the technician says the following: "People love the animals they eat but they don't want to know them." This truly struck me as a harsh reality.

ST-2: The film did not change my perspective. It actually portrayed the fears that I already had regarding human cloning and its consequences. While the idea of cloning may seem promising in order to overcome various negatives, we will still be unaware of what lies behind that uncertainty. What struck me the most in the film was the contradiction between the statement that cloned humans would not have the ability to think and question, and the actual development of the situations where they did exhibit those capabilities.

ST-17: I am concerned that research in the field of genetic cloning could disrupt ecological and economic balance. Uncontrolled proliferation can disrupt the ecological balance in living organisms. Additionally, mass production of commercially valuable organisms can also have negative impacts on the economy. However, I believe that genetic cloning is acceptable when it is solely intended for the treatment of certain limbs and organs in need of repair.

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As seen in Table 2, before watching the film, 8 science teachers had a positive outlook on genetic cloning. However, after watching the film, ST-7, who initially had a positive view, and ST-15 and ST-17, who had both positive and negative views, expressed their negative outlook on genetic cloning. Before watching the film, 4 science teachers stated, “We have a negative outlook on genetic cloning”. However, after watching the film, 7 science teachers expressed their negative views towards genetic cloning.

Table 3. Perception of the science teachers before and after watching the film (The God Committee) on the socioscientific issue of “Tissue and Organ Donation”

Tissue and organ donation	Frequency before watching the film	Teachers and sample opinions before watching the film	Frequency after watching the film	Teachers and sample opinions after watching the film
I am for donation	10	(ST-3, ST-4, ST-8, ST-9, ST-11, ST-12, ST-13, ST-14, ST-16, ST-18)	10	(ST-3, ST-4, ST-7, ST-8, ST-9, ST-12, ST-13, ST-14, ST-16, ST-18)
		ST-14: Given that the human body is reduced to the skeletal system after burial, if at least our healthy organs can save lives, I believe it is necessary to proceed with organ donation. If a person is in a condition that does not threaten their health, such as being a living donor, it does not seem to pose a problem. It is clear that being kept alive by machines does not benefit an individual who has experienced brain death. In that case, families simply do not want to lose the person they are connected to, but it does not hold any meaning for the individual. Therefore, if an individual has experienced brain death, there should be no problem with donating their organs.		ST-14: My opinion hasn't changed, but my doubts have increased. Like in any field, overlooked the possibility of commercialization and the prioritization of the powerful. However, the film reminded me of this. Regardless of the severity of one's health condition, if someone can gain an advantage with their money, it will increase the exploitation of such situations. I believe the system should be completely detached from money. After all, the person donating organs should not request money; the payments should only be made to doctors and should be recorded. There was a scene in the film where it was stated that the heart is just a muscle. This drew my attention to the perception that a doctor is not doing their job if they approach it from an emotional standpoint and are criticized for giving importance people's lives. Although scientifically it may be just a muscle, it won't be so for the person having it. In the film, being caught between someone with poor health and personal history, and someone whose health is improving but also has responsibilities towards his/her family, seems like a situation that needs careful consideration, but it is quite clear who should be given priority. I believe that objective doctors who can make the right decisions should prevail over those who fight for their own interests.
				ST-7: Yes, it changed my decision. The possibility of touching a life we never knew through organ donation and potentially providing a better future for someone has made me more receptive to this situation.
I am against donation	2	(ST-1, ST-15)	3	(ST-1, ST-11, ST-15)
		ST-1: I am not in favour of organ donation because I do not find it religiously acceptable.		ST-11: The film I watched had a negative impact on my views regarding organ donation. It raised doubts in me about organ donation. For instance, I am considering donating my organs, but will they truly reach deserving individuals? Would I want my heart to beat in someone who lacks ethical and moral values just because they are financially well-off? Would I want my organs to be given to someone who has mistreated their body while I take care of my health and avoid harmful habits?
	6	(ST-2, ST-5, ST-6, ST-7, ST-10, ST-17)	5	(ST-2, ST-6, ST-10, ST-5, ST-17)

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Undecided	ST-10: After becoming a living donor and donating my organ, we cannot predict what challenges we might face as we age. Therefore, it is a difficult decision to make. However, I believe that after brain death occurs, tissue and organ donation can be beneficial to other people.	ST-5: I am still undecided about organ donation after death. ST-2: I do not want to change my answers. While I recognize the sanctity of being an organ donor, I still harbour doubts within me when it comes to making this decision.
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As seen in Table 3, before watching the film, 10 science teachers stated, “I am in favour of tissue and organ donation. After watching the film, ST-11, who initially stated being in favour of donation, expressed that he/she is no longer in favour of donation. On the other hand, ST-7, who was undecided before the film, stated that he/she is in favour of donation after watching it.

Table 4. Perception of the science teachers before and after watching the film (The Percy) on the socioscientific issue of “Genetically Modified Organisms (GMO)”

GMO	Frequency before watching the film	Teachers and sample opinions before watching the film	Frequency after watching the film	Teachers and sample opinions after watching the film
I am positive	3	(ST-1, ST-4, ST-5) ST-1: I have a positive outlook on genetically modified organisms (GMOs). Especially, the high nutritional value and quick production of food containing GMOs are favourable factors.	3	(ST-1, ST-4, ST-5) ST-1: The film did not change my opinion. What caught my attention in the film was the focus on the financial aspect in GMO-related meetings. However, it would have been more beneficial to pay attention to the speeches and ideas of the South American representative during the meetings in India.
I am negative	12	(ST-2, ST-3, ST-6, ST-8, ST-9, ST-11, ST-13, ST-14, ST-15, ST-16, ST-17, ST-18) ST-16: This generation, which is nourished by genetically modified foods, is struggling with obesity. It also brings along psychological problems, chronic diseases, and genetic disorders. I am in favour of minimizing the consumption of these foods and I am against them. ST-14: I believe that genetically modified organisms have negative effects on human health. Since it is impossible to prevent the spread of genetically modified organisms to other organisms, genetic transfer and toxin accumulation will pose greater harm to higher-level organisms. Therefore, although the efficiency of genetically modified food production may increase, in my opinion, the potential harm outweighs the benefits of obtaining higher yields. It has become difficult to determine whether the products are genetically modified or not because the genetic structure of the seeds has also been altered. This means that even the food we grow in our own gardens may contain toxins that we cannot avoid.	13	(ST-2, ST-3, ST-6, ST-8, ST-9, ST-10, ST-11, ST-13, ST-14, ST-15, ST-16, ST-17, ST-18) ST-16: No, it did not change my opinion but expanded my perspective. I did not realize before that companies have plans to bankrupt farmers and take over their farms to grow their own crops by suing individuals. The film actually focuses on this issue. I found it interesting because I did not previously realize how significant the role of companies is in the GMO industry. ST-6: The film I watched honestly scared me. It showed what people are capable of and how human life can be devalued. The most striking scene in the film was the artificial environment resembling a mother's womb and the moments of birth. Creating a living being to save a human life and then killing that being again seems very senseless.
I am both positive and negative	3	(ST-7, ST-10, ST-12) ST-10: Genetically modified organisms (GMOs) may increase productivity and provide a response to the growing population, but on the other hand, I do not believe that GMOs are healthy.	2	(ST-7, ST-12) ST-7: On one hand, I believe that there is a need for genetically modified organisms (GMOs) due to the growing population and shrinking agricultural lands. On the other hand, I think that GMOs have negative effects on health and the ecosystem.

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As seen in Table 4, before watching the film, 12 science teachers had a negative view towards GMOs. However, after watching the film, ST-10, who initially expressed being undecided, stated that they now hold a negative view towards GMOs.

Table 5. Perception of the science teachers before and after watching the film (Conspiracy: The Sustainability Secret) on the socioscientific issue of "Global Warming"

Global warming	Frequency before watching the film	Teachers and sample opinions before watching the film	Frequency after watching the film	Teachers and sample opinions after watching the film
Not nature-induced	16	(ST-1, ST-2, ST-3, ST-4, ST-5, ST-6, ST-7, ST-8, ST-9, ST-10, ST-11, ST-12, ST-13, ST-14, ST-17, ST-18) ST-4: I believe that global warming was naturally occurring in the past, but today it is triggered by human activities that impact the environment. The increasing population, which leads to an unnatural rise in animal numbers due to the demand for food, and the increased use of fossil fuels contribute to global warming. ST-14: In my opinion, the factors that have the greatest impact on global warming are, in order of importance are the increased use of fossil fuels, the rise in per capita consumption, deforestation, harmful gases emitted from chemical products, and the persistence of products like plastics in the environment. Therefore, I believe that these factors are primarily caused by human activities. ST-17: Primarily, industrialization, deforestation and the extensive release of greenhouse gases into the atmosphere, particularly carbon dioxide, resulting from the use of fossil fuels. These factors are primarily caused by human activities.	17	(ST-1, ST-2, ST-3, ST-4, ST-5, ST-6, ST-7, ST-8, ST-9, ST-10, ST-11, ST-12, ST-13, ST-14, ST-16, ST-17, ST-18) ST-1: After watching the film, I learned that the consumption of animal meat has a significant impact on the depletion of water sources. ST-16: Yes, I have decided to change my opinion. Learning that the livestock industry is responsible for 51% of human-induced climate change has shifted my perspective on the industry. As someone who already consumes a low amount of meat (once a week), I have decided to further reduce my consumption. I have also realized that I consume a significant amount of dairy products, so I will make an effort to reduce their intake as well. What struck me the most in the film was the avoidance of the issue by renowned environmental organizations that are known for their prominent environmental policies. It was surprising to see their attempts to evade the issue. The fact that the FBI is closely involved in this matter and even declares people as terrorists highlights the worrisome extent to which the government is driven by money. After all, when this world perishes, they will perish too. ST-5: I used to believe that the main cause of global warming was largely attributed to fossil fuels all this time. However, that was until I watched this documentary. What caught my attention the most was the reasons why environmental organizations haven't emphasized the impact of the food sector on global warming and how our dietary choices can disrupt the balance of the world. The fact that livestock farming has been determined to contribute to 51% of greenhouse gas emissions is particularly striking to me.
Nature-induced	-	-		
	2	(ST-15, ST-16)	1	(ST-15)

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Both nature and human-induced	ST-15: The increase in global average temperature is primarily caused by human activities such as burning fossil fuels, deforestation and certain agricultural and industrial practices, which contribute to the rise of greenhouse gases, particularly carbon dioxide and methane. The continuous growth of the human population over the years has also led to the breeding and maintenance of farm animals such as cows and sheep for meat and dairy consumption, which further contribute to the issue. The methane gas emitted by these animals unfortunately acts as a factor that exacerbates global warming.	ST-15: After watching the film, I will feel guilty when consuming meat. However, while Conspiracy focuses on the solution of ending animal food consumption, it does not address the improvement of efficiency in animal farming. The documentary seeks ways to sustainably feed people and ultimately suggests that veganism is the solution. It criticizes livestock farms while praising vegan farms, essentially doing what Greenpeace does. It is stated that thousands of years ago, most of the biomass belonged to animals, but now animal species are already endangered, so I questioned why animals are considered so dangerous at present. A plant-based diet can also lead to a decrease in plants and consequently a decrease in oxygen. It would also impact our health. How will we obtain B12? Additionally, I love animals, and even their waste can be used as fertilizer. Therefore, my views have not changed.
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As seen in Table 5, 16 science teachers stated that global warming is not nature-induced (with emphasis on being mostly caused by human activities). After watching the film, ST-16, who initially stated that global warming is both nature and human-induced, changed his/her view to it being not nature-induced. Although only 1 science teacher seems to have changed his/her view, the teachers who initially stated that global warming is mostly human-induced expressed after the film that they now recognize the significant role of animals in global warming.

3.2. Teachers' Average Film Ratings and Opinions on the Films

The most liked films by the science teachers, based on the average ratings, are as follows: "The Island" (4.61), "Pandora" (4.55), "Percy" (3.88), The God Committee (3.83) and "Conspiracy: The Sustainability Secret" (3.66).

Here are the opinions of science teachers regarding the films they watched about socioscientific issues:

Table 6. Perception of the science teachers about the films they watched on SSIs

Findings from the interviews with the teachers	Sample quotation
The effects of films on teachers' perspectives	
-Change (ST-1, ST-2, ST-3, ST-6, ST-10, ST-12, ST-13, ST-8, ST-7, ST-9, ST-15, ST-16, ST-17, ST-18)	<i>"Films based on socio-scientific issues can raise awareness, encourage individuals to question, and enable them to realize the benefits and risks involved, thereby potentially changing their perspectives. For example, films on nuclear power plants and organ donation have changed my perspective."</i> (ST-13) <i>"Yes, films can change your perspective. For example, a line in the film about organ donation impressed me a lot. The line was "Remember that the heart is just a muscle."</i> (ST-1) <i>"Before watching the nuclear energy film, I had a favourable view of nuclear energy. However, after watching it and conducting further research on the topic, my opinion changed. This is because politicians, scientists, and the media can influence people's thoughts and beliefs"</i> (ST-10) <i>"Yes, there was a film that changed my perspective. It was the movie "Pandora". The film had a captivating storyline that aimed to convey a certain perception. Its emotional approach could have a significant impact on many individuals, in my opinion."</i> (ST-2)
-Do not change (ST-4, ST-5, ST-11, ST-14)	<i>"My perspective didn't change; I can say it was further reinforced when I saw the reasons behind it."</i> (ST-5/ST-14)
Watching films on SSIs in daily life	

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-I watch (ST-4, ST-2, ST-9, ST-10, ST-11, ST-13, ST-14, ST-15, ST-16)	"I watch these kinds of movies a lot, but I don't enjoy them when the film portrays a scenario where companies and personal interests prevail over societal benefit. I expect the triumph of goodness and righteousness. Apart from these films, I watched a movie called The Fugitive which was about the story of Dr. Richert." (ST-4) "I watch these kinds of films in my daily life because they provide a different perspective on societal, scientific and ethical issues, allowing for a more informed judgment rather than forming shallow conclusions based on one-sided events. Some of the films I have watched include "Zero Dark Thirty", "Chernobyl Diaries" and "Fukushima" (ST-15) "I watch films related to socioscientific issues. However, the plot is also important to me. Topics such as nuclear power plants, vaccines, pandemics, artificial intelligence, planets, global warming (I really enjoyed Mad Max), and cloning (The 6th Day) capture my attention." (ST-11) "Yes, I frequently watch films and documentaries of this kind in my daily life. I have watched Food Inc (GMO), The Future of Food (GMO), Gemini Man (Cloning), Our Planet (Episode 2 on global warming), Kiss The Ground: The Case for Regenerative Agriculture (Global warming), the Resident Evil series (Cloning), The Prestige (Cloning), and Avatar (Cloning)." (ST-16)
-I don't watch (ST-3, ST-1, ST-5, ST-6, ST-12, ST-8, ST-7, ST-17, ST-18)	"I have not watched films focusing on SSIs before. However, I will watch them from now on because these five films have provided me with new information and have changed my perspectives." (ST-3) "I have never watched films on socioscientific issues before. However, I will watch them from now on." (ST-1)

Common aspects of the watched films in terms of SSI

-They include issues concerning the society (ST-1, ST-2, ST-5, ST-13, ST-8, ST-7)	"Each film addressed issues that concern society and presented elements that can positively or negatively impact human life." (ST-13)
- The interests of individuals or companies are at the forefront (ST-4, ST-5, ST-6, ST-14, ST-18)	"I really enjoy watching these types of films, but in most cases, the interests of individuals or companies take precedence." (ST-4) "The common aspect in these films is the presence of capitalist monopoly corporations that emerge in various fields and take on the role of main players. Of course, science has become a kind of R&D activity, and we see that the people financing it expect some return on their investment." (ST-18)
- They show different perspectives (ST-3, ST-1, ST-12, ST-7)	"In each of these films, issues that concern society are approached from different perspectives." (ST-1)
-They include dilemmas (ST-10, ST-9, ST-14, ST-15, ST-16)	"Having dilemmas according to society; for example, in the film Percy, people with different worldviews among farmers and countries have approached the events in different ways. Additionally, all of these films are related to science." (ST-10)
- The source of the problems is human errors and negligence. (ST-17)	"The main sources of problems are often human errors and missed opportunities. There were also neglected issues in nuclear power, for example. In the GMO film, there was ignorance and the use of agricultural pesticides with errors. In the context of global warming, there is also food injustice and consumerism, for instance. Although there are individuals who make flawed and biased practices, the idea that there are people who are dedicated to justice and fairness, who strive for scientific behavior, and who hold opposing views to the authority and majority, and take ownership of their work, made me happy." (ST-17)
- All films are related to science (ST-10)	"These films are related to science." (ST-10)
-They always depict negativities (ST-11)	"Most of the films depicted the negative aspects to us. They did not present a positive and supportive perspective." (ST-11)
- They foster questioning and thinking (ST-12, ST-13, ST-8, ST-9, ST-15)	"They were films that prompted viewers to question and encouraged deep thinking. They had contents that emphasized the absence of a single perspective in socioscientific issues." (ST-12)

The films that are wanted to be shown to the students in the classroom

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-The Island (ST-4, ST-5, ST-6, ST-7, ST-8, ST-10, ST-11, ST-12, ST-14, ST-17)	<i>"I make them watch The Island and Pandora. Since they are related to our subject in science teaching, I would support them with their causes and consequences. I would have my students discuss their positive and negative aspects on the basis of the possible consequences." (ST-5)</i> <i>"I would like to show the films Conspiracy, The Island and The God Committee. I believe these films contain dilemmas and situations that can prompt critical thinking and allow students to approach them from various perspectives. I might interpret other films as being biased, but as teachers, our goal is to provide students with unbiased and thought-provoking scenarios, encouraging them to think and reach conclusions based on reasons. These selected films also present such dilemmas." (ST-14)</i>
-Pandora (ST-2, ST-3, ST-1, ST-5, ST-6, ST-7, ST-8, ST-10, ST-11, ST-12, ST-13, ST-16, ST-17)	<i>"I would like to show the film Pandora. I particularly want students to have information and opinions about the nuclear power plant that is planned to be established in our country, especially considering the third one. I would also show the films Percy and The Island." (ST-10)</i>
- Conspiracy: The Sustainability Secret (ST-3, ST-6, ST-7, ST-8, ST-9, ST-12, ST-14, ST-16, ST-17)	<i>"Conspiracy is an ideal film for exploring the truth about global warming and the impact of animal agriculture on the environment. Percy demonstrates how GMOs can affect even traditional farming families. The God Committee presents ethical dilemmas between organ transplant patients and committee decisions." (ST-9)</i>
-Percy (ST-1, ST-3, ST-6, ST-7, ST-8, ST-9, ST-10, ST-12, ST-15, ST-17, ST-18)	<i>"I am planning to show films related to GMOs and Nuclear Power Plants. Because these are currently the closest issues to our society." (ST-1)</i> <i>I would only show Percy in its entirety. The reason for choosing Percy is that it is suitable for the age group and allows for the evaluation of independent and different perspectives. I would not show Pandora and The Island due to violent scenes, The God Committee because I did not like it and Conspiracy due to uncensored content and some profanity." (ST-18)</i>
-The God Committee (ST-6, ST-7, ST-8, ST-9, ST-12, ST-13, ST-14, ST-15, ST-17)	<i>"I would show The God Committee because I believe it is effective in raising students' awareness and gaining different perspectives. Additionally, I would show Pandora because I believe it is effective in demonstrating and raising awareness about the potential impacts of such practices in the present and future. (ST-13)."</i>

As seen in Table 6, 14 participating teachers expressed that films related to socioscientific issues could change students' perspectives, while 4 stated that they would not change their perspectives. Nine science teachers mentioned that they watched films on socio-scientific issues in their daily lives, while another nine teachers indicated that they had never watched such films before and were unaware of films related to socioscientific issues. When asked about the common characteristics of the films related to socioscientific issues, the participating teachers mentioned the following: addressing topics that concern society, highlighting the interests of individuals or companies, containing dilemmas, prompting questioning and critical thinking, presenting different perspectives, being related to science, depicting problems stemming from human errors and negligence and predominantly portraying negative aspects. When examining the films that the teachers expressed the highest desire to show in the classroom, based on the frequency of mentions, the top choices are Pandora (13 teachers), Percy (11 teachers), The Island (10 teachers), The God Committee (9 teachers), and Conspiracy: The Sustainability Secret (9 teachers).

4. Discussion, results and suggestions

When the findings were examined, it was seen that the opinions of participating teachers regarding SSIs did not change significantly after watching the films related to socioscientific issues. As demonstrated in the tables; while 14 of the teachers stated that films related to socioscientific issues could change students' perspectives, 4 of them expressed that they would not change their perspectives. Half of the participating teachers stated that they had not watched any films on socioscientific issues before the study and were unaware of the existence of such films. According to the teachers, the common characteristics of the films on socioscientific issues are being about issues that concern society, having individuals or companies' interests at the forefront, containing dilemmas, prompting questioning and thinking and showing different perception. In the focus group interview, the participants stated that the reason for this was their sufficient knowledge in the subject area, which allowed them to make more rational judgments. Therefore, they expressed that films did not significantly change their perspectives on socioscientific issues. It has been emphasized that if students lack sufficient conceptual knowledge when encountering socioscientific issues for the first time, films can support their idea formation and therefore change their perspectives. Knippels et al. (2009) concluded that there occurred a positive impact on the ability to develop ideas in the students in the film group compared to students in the other group. Therefore, it is thought that the films watched can change or enhance students' views.

When asked whether they would use films as a teaching material in their classes, a majority of the teachers stated that they would like to use parts from the films, while some mentioned that they would show the entire films. Furthermore, the opinion expressed during the focus group interview that “films should be used in lessons by selecting appropriate parts that are relevant to science subjects and content” supports their use as teaching materials, while also recommending a filtering process to determine their suitability for classroom use. While some science teachers expressed that not all parts of a film may serve the intended purpose, ST 12 mentioned that he/she would show the entire film because he/she believed that witnessing the entire process would be more beneficial for students. Similarly, Wijnker et al. (2019) stated that teachers generally do not have clear predetermined objectives for using specific videos and instead intuitively select and use videos in their lessons.

In addition, it is seen that films are used for entertainment purposes and capturing students' interest (Cavanaugh, 2002), concept teaching (Barnett et al., 2006), developing reasoning skills (de Oliveira Moraes, Aires & de Souza Góes, 2021), enhancing interest in and understanding of scientific concepts and promoting critical thinking about scientific concepts (Laprise & Winrich, 2010). There are also studies (Barnett & Kafka, 2007) that aim to investigate the pedagogical advantages and disadvantages of films.

Laprise and Winrich (2010) used science fiction films as a pedagogical tool in science classes to increase students' interest in science and foster critical thinking about scientific concepts. The students critically evaluated various films (19 different films) for their scientific accuracy through written assignments. During this process, the students' perceptions of this activity were assessed through a survey administered in three classes over the course of one year. The students expressed that analyzing science fiction films increased their interest in and understanding of science and technology. Most of the students expressed that they enjoyed watching and critiquing films, finding them valuable for their own learning. They particularly mentioned that the use of popular films sparked their interest in the course material and science in general (Laprise & Winrich, 2010). In this regard, the use of science fiction films or films related to SSIs in science education is believed to particularly increase awareness and enhance critical thinking.

With the current study, it was aimed to develop an understanding of whether science teachers would be willing to bring films on socioscientific issues as a teaching material into their classrooms. In this context, the science teachers, taking certain factors into consideration, expressed their willingness to use films as an educational material in their classrooms. While some teachers consider bringing films that they deem important according to the science curriculum, others consider bringing films that can provoke questioning and allow students to interpret them more objectively. There are also teachers who aim to bring films to the classroom based on the suitability for students' age, considering that they will provide them with knowledge and ideas. When the relevant literature is examined, it is seen that there are studies indicating that the use of films in the classroom is seen as an opportunity and a means of enjoyment (Cavanaugh, 2002).

When the views of the participating science teachers on SSIs before and after watching the socioscientific films were examined, it was seen that one of the participating teachers, ST-1, expressed a positive stance towards nuclear power plants and GMOs. Furthermore, when the films that this teacher intended to show to students in the context of socioscientific issues were examined, it was seen that he planned to show films about GMOs and Nuclear Power Plants as these are the closest issues to our society at the moment. It was also found that this teacher's preferred films to be used as classroom materials are Pandora (about nuclear power plants) and Percy (about GMOs). Therefore, it can be inferred that teachers' views on SSIs may affect their selection of films to be used as instructional materials. It is believed that teachers may be less inclined to use films related to SSIs for which they have a negative opinion as instructional materials. The same teacher also mentioned that films on SSIs can change individuals' perspectives. Similarly, Levin and De Filippo (2014) argue that films are created with the intention of convincing the audience that the main idea of the film is valid.

When asked about the common characteristics of films related to SSIs, the most mentioned ones by the teachers were; addressing issues that concern society, putting individuals or corporations' interests at the forefront, containing dilemmas, prompting questioning and critical thinking and depicting different perspectives. Melo E Silva et al. (2017) conducted a bibliographic research on academic studies that relate the plot of the film “Elysium” to real-life situations, highlighting the need for discussing socioscientific issues in an educational context. The experiential reports of the students regarding the film “Elysium” were analyzed and interpreted in a public school setting. In their study, de Oliveira Moraes et al. (2021) aimed to investigate the impact of using the dystopian novel “1984” associated with socioscientific issues on the development of moral values and critical thinking skills among high school students. In this study, data were evaluated through a questionnaire and a discussion on the 1984 film. The students expressed that by discussing social issues, they were able to explore scientific concepts. They found that dystopian texts associated with SSI discussions encouraged them to develop questioning skills and tendencies needed to express themselves, challenge fake news and uncover new possibilities for understanding the truth, thus triggering creativity. In this regard, it is believed that films related to socially relevant SSIs, by presenting dilemmas and highlighting different perspectives, can compel individuals to question and think critically.

In the focus group interview, ST 17 expressed that these films help students to look at things from different perspectives and to understand different ideas. Similarly, Knippels et al. (2009) stated that science-themed movies have

a significant positive effect on students' ability to form ideas. In their study, they found that the film group developed more ideas than the news report group. In particular, they concluded that the use of movie episodes to address a socioscientific issue in the classroom supports the development of students' idea-formation skills. In the focus group interview, ST 14 expressed a cautious approach towards films, stating that they can present a one-sided perspective, which may lead to incorrect learning and misunderstandings due to not presenting all dimensions of the event. In a similar vein, Barnett et al. (2006) conducted a study where they found that students who watched "The Core" had some misconceptions about Earth science concepts compared to students who did not watch the film. It has been emphasized that watching a film only once can pose a risk of negatively influencing students' ideas about scientific phenomena.

It is important to include films in lessons to increase students' interest in science and to encourage students to think critically about scientific concepts (Laprise & Winrich, 2010). Therefore, films can be useful pedagogical tools in helping students develop their understanding of science. In this sense, it can be recommended to carry out further studies that will compare the academic performance of students who watch films that are based on socioscientific issues and science. In this way, not only the effect of such films on academic success, but also whether students have learned something from the films can be examined (Laprise & Winrich, 2010). At the end of this study, it is concluded that movies containing dilemmas can contribute to teachers' awareness of socioscientific issues.

Disclosure statement

No potential conflict of interest was reported by the author(s).

Ethics statement

This study was approved by the Duzce University Ethics Committee (Approval No. E-78187535-050.06-268915). Participants provided informed consent and could withdraw at any stage.

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