



Representation of socioscientific issues in the most popular Turkish daily newspapers¹

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Abstract

Socioscientific issues (SSIs) have become important in science education because of their feature of important component of scientific literacy. The purpose of this study is to analyze the representation of SSIs in Turkish national newspapers. The methodology employed in the present study is content analysis. The archives of newspapers were online searched for predetermined SSIs, news titles were categorized according to content and year. And then, samples of news title were selected from various newspapers for each issue title and were demonstrated with newspaper name and publishing year. The results demonstrated that the most mentioned SSIs are nuclear energy, environmental pollution/problems, and global warming in the last 11 years. Moreover, a steady was seen in the SSIs between 2004 and 2014. Interpretations are given in more detail in results and discussion.

Keywords: Socioscientific Issues; Newspaper Representation; Turkey.

Introduction

The importance of socioscientific issues (SSIs) in science education has received much attention and has been investigated by science education researchers in recent years. Although many scientists reached a consensus that science has influenced the society, they are aware that they do not have their role in it (Feynman, 2013). Moreover, scientific literacy has become a common internationally educational goal (The American Association for the Advancement of Science (AAAS), 1989; De Boer, 2000; Ministry of National Education of Turkey (MoNE), 2013). SSIs have become important in science education because they take part in the core of scientific literacy (Bingle and Gaskell, 1994; Dawson and Venville, 2009). In modern societies, science and technology are like a sword with two sharp side and have positive and negative outcomes (Jho, Yoon and Kim, 2014). Solutions proposed for the society, technology, and environment are considered to be a component of scientific literacy SSIs that are important components of scientific literacy and solution proposals are demanded for the encountered problems in the interaction of science with society, technology and environment. SSIs in science teaching, in the learning field of Science-Technology-Society-Environment (STTE), provide individuals to develop solution proposals and ethical and scientific reasoning skills about it (MoNE, 2013). Scientific literacy is important as it leads to the development of discussion skills, interpretation and interference (Sadler,

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2004; Sadler and Zeidler, 2005). Sadler (2011a) argued that as students learn science with SSIs, they would become more scientifically literate. SSIs were located in the curriculum for instructional purposes first in 2013.

Teaching social issues is highly recommended in science education to increase student understanding of economic, environmental, political, and ethical issues in science (Albe and Simonneaux, 2002, Sadler and Fowler, 2006; Sadler, 2011b). Therefore, it is required for SSI decision-makers to take notice of scientific ideas and data along with other type of knowledge (Sadler, 2009). SSIs are composed of social dilemmas with conceptual or technological links to science (Fleming, 1986; Sadler, 2004). The issues are real-world issues that are socially significant and rooted in science. Although multiple reasonable solutions exist, solutions to societal issues are not always easily explicit; (Zeidler, Walker, Ackett and Simmons, 2002). Furthermore, in the theoretical definition of “new SSIs” personal social-scientific decision-making is the initial step (Levinson, 2013). Therefore, teaching SSIs has clearly gained importance. A prominent feature of SSIs is their multidisciplinary nature (Morris, 2014). For example, Rundgren and Rundgren (2010) have developed a model called ‘SEE-SEP’. This model consists of Sociology (S), Environment (E) Economy (E), Science (S), Ethics (E) and Policy (P). These issues enable interactive discussions and more. Students and teachers are acquiring such issues, at least in part, through media (Klosterman, Sadler and Brown, 2012). Students’ reading and media literacy skills have a large effect on their perception of socioscientific issues, science, and finally decision-making. Students may be more effective in some areas of science; SSIs are social dilemmas that have caught the attention of national and international media sources. Individuals with media literacy might analyze issues about websites, podcasts, blogs, news articles and news reports related with SSI (Dani, Wan and Henning, 2010).

Parallel to the development of media in recent years, the SSI related problems have also increased. On the other hand, these developments have raised the concern to access true information. In the primary media literacy curriculum of MoNE, students are expected to develop a conscious and critical slant (MoNE, 2006). The aim of media literacy is to make media users aware of the socially constructed nature of media (Klosterman, Sadler and Brown, 2012).

Over the last decades, electronic media (computer, the internet, and cell phones) have become major part of daily routine (Brown and Martin, 2009). Additionally, in modern society, mass media have become increasingly significant mediators. Moreover, the progress of internet-based technologies has enhanced interest to the media (Klosterman, Sadler and Brown, 2012). With regard to analyses of media, newspapers now readily explore SSI and other science topics (Dimopoulos and Koulaidis, 2003).

According to Klosterman, Sadler and Brown (2012), secondary science teachers can use mass media reports to find SSIs and sustainability issues. However, they suggested that the use of media could put SSI based education for sustainability in order; additionally they also determined that media literacy education was limited. Dimopoulos and Koulaidis (2003) suggest that press is a useful teaching tool in terms of science and technology equipped citizenship, support decision making about social issues, and provide discussion novel conditions. According to a study of Miller in 2006 (as cited in Dani, Wan and Henning, 2010), SSIs are the target of many articles, television shows, movies, radio broadcasts, and websites. Students’ media literacy skills have an extensive impact their perceptions of SSIs and science.

Media has a major contribution to the progress of individuals that they cannot realize individually. According to Turkish Statistical Institute (TSI) September 2014 data on internet usage, newspaper or magazine sites (74.2%) rank second in online transaction. Dani, Wan and Henning (2010) state that media considers national and international sources. Therefore, the aim of this paper is to analyze to what extent SSIs were represented in the most popular Turkish national newspapers from 2004 to 2014 and how they were ranked in these newspapers.

Methodology

Qualitative research data collection methods were employed in the present descriptive study. Hence, news archives of five newspapers with accessible online archives and with the highest circulation according to November 2014 data of Newspaper Association (NA) in Turkey were online researched. The sample of the present study consist of national newspaper coverages about SSIs-related articles from January, 1st 2004 to December 31st Data obtained via online search was subjected to content analysis. Content analysis was especially preferred as it is a technique developed to analyze the content of newspapers in the USA (Scott and Morison, 2006). Content analysis put an emphasis on speech or text and integration of specific content (Zhang and Wildemuth, 2009). According to Weber (1990) a series of procedures employed in content analysis can be made in order to make valid interference from text or speech, use. These interferences can include the senders of the message, the message, or audience of a particular message. This analysis can be used to compare media or levels of communication among individuals and groups within a certain psychological circumstance or the tendencies in the dialog content. Online content research of the newspapers determined was based on certain keywords presented in Table 1. The search outcomes yielded 92000 news with the relevant keywords. The coding schema employed is given in Table 2. For SSIs mentioned in the main headings of newspapers and news year are presented respectively in Table 3 and Figure 2. The research design was summarized in Figure 1.

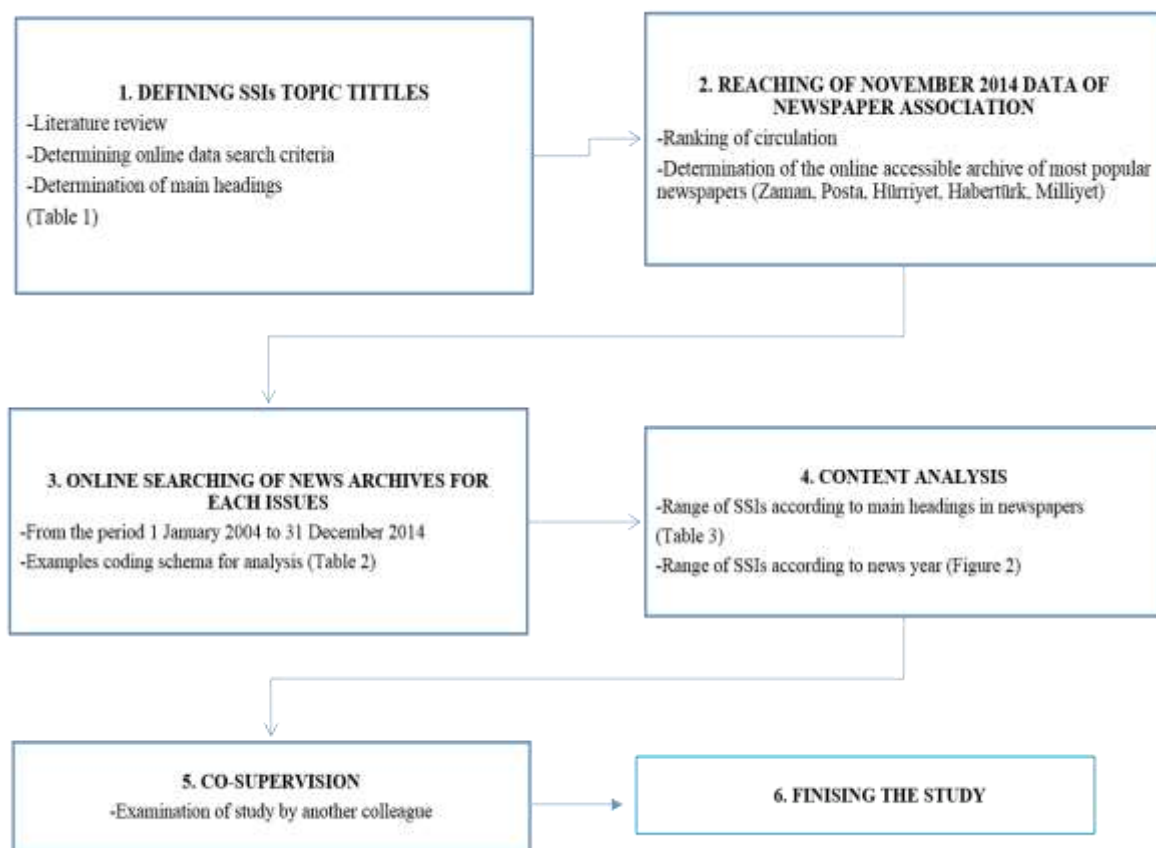


Figure 1. The research design

Table 1. Range of SSIs topics

Main Heading	Issue	Code	Reference
Biotechnology	Stem cell	B-SCL	Shea, 2013; Sadler, Chambers, and Zeidler, 2004; Sadler and Donnelly, 2006; Levinson, 2008; Reis and Galvão, 2009; Sadler and Zeidler, 2005; Tal, Kali, Magid and Madhok, 2011
	Cloning	B-CLN	Shea, 2013; Sadler, Chambers, and Zeidler, 2004; Sadler and Donnelly, 2006; Reis and Galvão, 2009; Zohar and Nemet, 2002; Reis and Galvão, 2004; Lee, Abd-El-Khalick and Choi, 2010; Sadler and Zeidler, 2005
	Gene therapy	B-THR	Shea, 2013; Zohar and Nemet, 2002; Tal, Kali, Magid and Madhok, 2011
	GMO	B-GMO	Shea, 2013; Levinson, 2008; Reis and Galvão, 2004; Sadler, 2004; Lee, Abd-El-Khalick and Choi, 2010; Sadler and Zeidler, 2005; Tal, Kali, Magid and Madhok, 2011
	Genetic Engineering	B-GEN	Sadler, Chambers, and Zeidler, 2004; Sadler and Donnelly, 2006; Reis and Galvão, 2004; Cook, 2012
	Genetic scanning	B-SCN	Shea, 2013; Dani, Wan and Henning, 2010
Environment	Biodiversity	B-DVS	Tal, Kali, Magid and Madhok, 2011
	Global Warming	E-GWR	Cook, 2012; Reis and Galvão, 2009
	Deforestation	E-DFT	Cook, 2012; Rickinson and Lundholm, 2008
	Climate Change	E-CCH	Morris, 2014
	Environmental Pollution/Problems	E-EPP	Cook, 2012; Acar, Turkmen and Roychoudhury, 2010; Morris, 2014; Lee, Abd-El-Khalick and Choi, 2010
	Management of Natural Resources	E-MNR	Sadler, 2004
	Nuclear/Radioactive Wastes	E-NRW	Morris, 2014; Lee, Abd-El-Khalick and Choi, 2010; Tal, Kali, Magid and Madhok, 2011
	Nuclear Plants	E-NUP	Rickinson and Lundholm, 2008
	Toxic Wastes	E-TXW	Reis and Galvão, 2004
Technology	Nanotechnology	T-NAN	Levinson, 2008
Health	Transplantation	H-TRN	Reis and Galvão, 2004
	Biological and chemical weapons	H-BCW	Dani, Wan and Henning, 2010
	Smoking and using alcohol	H-SUA	Acar, Turkmen and Roychoudhury, 2010
	Public Health	H-PHL	Reis and Galvão, 2009
Energy	Nuclear Energy	E-NUE	Tal, Kali, Magid and Madhok, 2011
	Efficient Energy Use	E-EEU	Acar, Turkmen and Roychoudhury, 2010

According to Table 1, topics studied in the SSI are biotechnology, environment, technology, health, and energy.

After literature reviews, SSIs framework for the titles were determined (i.e. stem cell, GMO, global warming, nanotechnology, nuclear energy). Then, determined titles were collected in the main headings of 5 most circulating newspapers (biotechnology, environment, technology, health and energy). These were Zaman, Posta, Hürriyet, Habertürk and Milliyet according to 2014, November data of NA (Total circulation was taken into account). Samples of news' title were selected from various newspapers for each issue and are demonstrated with newspaper's name and publishing date in Table 2. In this stage, news' numbers were generated in each sub-category by searching topic titles determined, during the period January 1, 2004 to December 31, 2014 (Table 3). Ultimately, news' titles were categorized regarding years (Figure 2).

Table 2 exemplifies the SSI news in newspapers that are most popular in Turkey.

Table 2. Example coding scheme for analysis

Code of News Title Sample	News Title	Newspaper	Publishing Date
B-SCL	404 Stem Cell Donation Done in Two Weeks	Hürriyet	6 September 2014
B-CLN	We Bring to World Three Baby by Cloning Methods	Milliyet	4 March 2009
B-THR	Promising Fight Against Cancer with Modified Virus Structure	Zaman	7 July 2006
B-GMO	Creates Resistance the GMO to Antibiotic	Habertürk	29 May 2014
B-GEN	Trying the First in Medicine	Milliyet	30 April 2013
B-SCN	"The Perfect Man" Arising	Habertürk	16 January 2013
B-DVS	20% of the Flora of Turkey in Denizli	Zaman	29 November 2013
E-GWR	Tropical Storm Is Changing Direction	Habertürk	16 May 2014
E-DFT	That will Prevent Erosion Plant	Posta	23 July 2011
E-CCH	Flamingos of Acıgöl Vanished	Hürriyet	15 September 2011
E-EPP	When Increased Environmental Awareness, What Companies are Doing?	Milliyet	7 May 2008
E-MNR	Platform from Norway will Find oil in Black Sea	Zaman	5 October 2009
E-NRW	Akkuyu EIA Report Protest of Greenpeace in front of Ministry of the Environment	Hürriyet	24 July 2014
E-NUP	Lifeblood of Energy Investment from İstanbul	Habertürk	18 August 2014
E-TXW	A Battery Equivalent to One-Year Water of 11 People	Posta	1 April 2013
T-NAN	Nanotechnology lay hands on our aging	Hürriyet	3 November 2012
H-TRN	95% Success in Organ Transplantation	Zaman	9 November 2013
H-BCW	Is HIV Biological Weapons?	Hürriyet	16 May 2008
H-SUA	It is True that Drug Abuse Develop Creativity...But...	Milliyet	11 July 2014
H-PHL	Ministry had Display Companies that Play with People's Health	Posta	28 October 2014
E-NUE	Detected a Leak in Canadian Nuclear Power Plant	Habertürk	5 November 2013
E-EEU	Domestic Using in Energy Plant Provide 250 Million Liras Saving	Zaman	28 May 2012

According to Table 2, “The Perfect Man Arising” (below Genetic Scanning, Habertürk Newspaper of 01.16.2013) and “Is HIV a Biological Weapon?” (below Biological and Chemical Weapons, Newspaper of Hürriyet, on 05.16.2008) were cited.

Findings and Results

Table 3 demonstrates the total number of SSIs news about according to main headings of most popular Turkish newspapers.

Table 3. Range of SSIs according to main headings in newspapers

Main Heading	Code	Newspapers					Total (N)	P (%)
		Zaman	Posta	Hürriyet	Habertürk	Milliyet		
Biotechnology	B-SCL	742	271	1191	469	670	3343	3,63
	B-CLN	228	31	228	83	118	688	0,75
	B-THR	28	4	53	13	26	124	0,13
	B-GMO	455	62	1458	215	349	2539	2,75
	B-GEN	255	38	198	50	128	669	0,73
	B-SCN	91	13	203	120	160	587	0,64
	B-DVS	122	9	98	17	41	287	0,31
Environment	E-GWR	3793	55	2311	627	1470	8256	8,96
	E-DFT	12	1113	5	15	9	1154	1,25
	E-CCH	3067	214	1638	472	1269	6660	7,22
	E-EPP	5300	265	1654	387	936	8542	9,27
	E-MNR	1800	52	100	653	65	2670	2,90
	E-NRW	370	2	101	15	57	545	0,60
	E-NUP	-	35	1759	112	203	2109	2,29
	E-TXW	2991	151	125	22	83	3372	3,66
Technology	T-NAN	563	52	449	143	268	1475	1,60
Health	H-TRN	335	77	2268	929	1377	4986	5,41
	H-BCW	2146	425	329	211	303	3414	3,70
	H-SUA	2600	69	1208	762	874	5513	5,98
	H-PHL	964	13	2668	1399	1744	6788	7,36
Energy	E-NUE	15146	52	3699	1348	2540	22785	24,72
	E-EEU	5168	2	268	81	159	5678	6,16

N: Number of news

According to Table 3, between 2004-2014, the most emphasized SSIs in the newspapers are “nuclear energy” 22785 (24.72%), followed with below the category of energy, “environmental pollution/problems” 8542 (9.27%), below the category of environment and “global warming” 8256 (8.96%) below the category of environment; fewest emphasized ones are “Gene therapy” 124 (0.13%) and “Biodiversity” 287 (0.31%) below the category of biotechnology and subsequent to “nuclear/radioactive wastes” 545 (0.60%) are among the less common categories within these 5 years. Figure 2 illustrates the total number of the most popular SSI news in Turkey distributed according to the years (Number of news shown in parentheses and atop the relevant year).

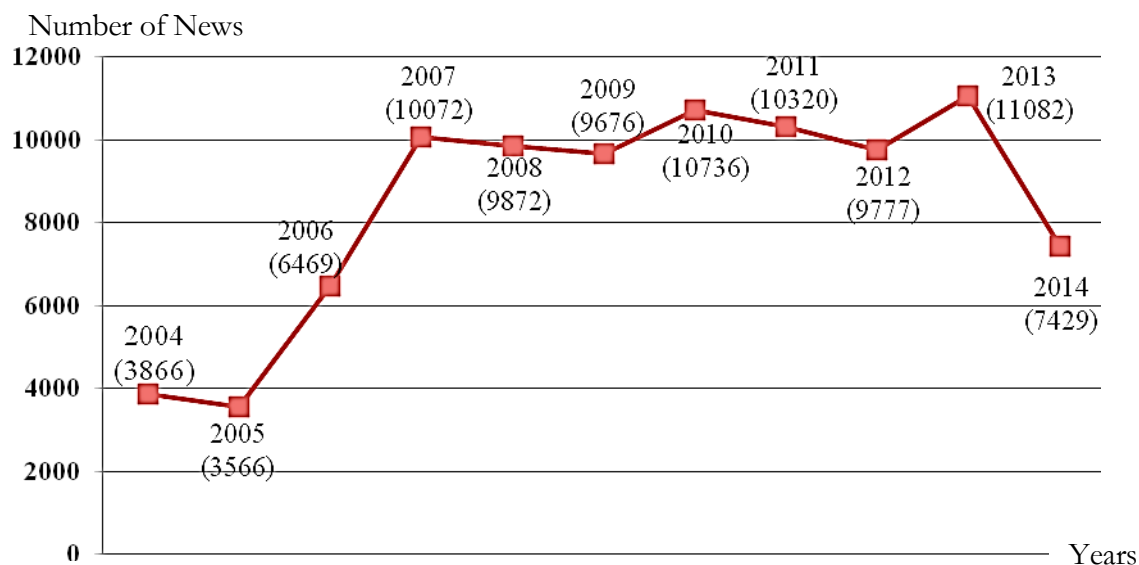


Figure 2. Range of SSIs according to years

According to Figure 2, SSIs in the newspapers are mentioned the most in 2013 11082 (11.93%) and the fewest in 2005 3566 (3.84%).

Discussion

The results from this study show that the most popular five Turkish daily newspapers about representation of SSIs according to issues and news year in recent 11 years in Turkey.

The Representation of SSIs in the Most Popular Turkish Newspapers according to Issues

In the last 11 years, the most emphasized socioscientific issues are nuclear energy, environmental pollution/problems and global warming in the five most popular Turkish newspapers. These issues, highlight the focus on environment and energy. In Poberezhskaya's (2015) study about climate change, out increase of articles from Kyoto Conference of 1997 to Copenhagen Conference are presented. As the issues within the government policy and thus under public notice, they will inevitably find their place in in the media. For this reason, problems frequently faced by the people in everyday life will find easily their place in the newspapers. Krosnick, Holbrook and Visser (2000) state that although there was an increase attitude to global warming and reports in the media, global warming as a national problem did not change. Besides the impact of global warming on people and on other species, the awareness among people is unavoidable. With respect to nuclear energy, Kim (2014) suggests that after the 2000s and particularly after the Fukushima incident, in the newspapers, environmental activists paid attention socially but media or civil organizations locally did not receive any attention. The impact of adverse conditions of nuclear energy plant in enclosed areas have been considered in last few decades in Turkey. For example, the effects of the Chernobyl Reactor Incident had an impact in north zones of our country. On the other hand in the most popular Turkish newspapers, the least reported SSIs are gene therapy, biodiversity and nuclear/radioactive wastes. These issues were paid less attention compared to environmental and energy issues. This may be because of the problems faced in everyday life.

The Representation of SSIs in the Most Popular Turkish Newspapers according to the Years

In the last 11 years, SSIs took most part in 2013 and the least in 2005. However, there was between these years a steadily rising increase in SSIs. Due to social, ethical and argumentative feature of SSIs, they have come more and more into prominence. Especially, because of the direct relationship of SSIs to people's life, representation of these issues have increasingly become linked to characteristic features of these issues. According to results of Teräväinen's (2014) study about

representation of energy policy and technology in the British and Finnish newspapers, in both countries energy technologies have increasingly linked to societal and political questions. In developing countries such as Turkey, energy requirements have found their place in the agenda. In line with the Energy Strategy of Republic of Turkey Ministry of Foreign Affairs, the limits of Turkey's domestic energy sources in light of its growing energy demand have led to dependency on energy imports. In order to reduce energy dependence, Turkey has already signed an agreement concerning the construction and operation of a nuclear power plant in 2010 (Republic of Turkey Ministry of Foreign Affairs, 2015). The Eighth-Ninth Five-Year Development Plan steered the policy towards integrated sustainable development. Within the same years, within the EU harmonization process, emphasis of Turkey to international environmental commitment has increased (Sustainable Development Report of Turkey, 2012, p.31).

The present study draws attention to the sharp decline of SSIs in 2014. This decrease may be attributed to the presidential news which have had wide media coverages in the country's agenda in 2014 According to TSI (2015), in 2014 political news have had the highest rate (85.8%). Otherwise, in 2014 compared to previous four years newspaper circulation has decreased. This can be attributed to the decrease in the total news number.

Conclusion

It is concluded that environment and energy related socioscientific issues are frequently reported in the most popular Turkish daily newspapers. Because of energy usage and consumption agenda of Turkey led to environmental arguments are drawn a great deal of attention by society, it provide that these issues become important.

Otherwise, there was a steadily rising increase in socioscientific issue related news in the last 11 years. This increasing show that SSIs are paid attention by both columnist or newspapermen and society.

In this case, students and educators should be closely interested in many media devices such as newspaper, book, magazine, video, and internet. In the analysis of the messages transferred through the media, society-media connection should describe the effects of SSIs.

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