

The Framing of Science and Technology Ethics in the Chinese Newspaper Press

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Abstract. This article investigates how science and technology ethics were framed in the Chinese national newspaper press. Coverage of sci-tech ethics since June, 2000 in 5 national newspapers was content analyzed and the use of specific news frames as well as dominant news frame by years was identified. Our results showed that an important speech about one issue by the state leader or the promulgation of a policy or law about one issue may play a significant role in improving the news value of the issue and influencing its ensuing framing in the newspaper press in China.

Keywords: Science and Technology Ethics, News Frames, Chinese Newspaper Press.

1. Introduction

In recent year, it becomes increasing significant how the news media frame the range and nature of issues associated with sci-tech ethics. Since rapid development of the sciences and technologies has controlled life process (like genetically modified crops, human cloning, or surrogacy) and causes much controversy about its possible social risks and long-term implications.

This article's principal aim is to investigate how sci-tech ethics were framed in the Chinese national newspaper press since June, 2000, a time when a number of pertinent techno ethics issues began to achieve public salience in China. This period commences with a public intervention by chairman Jiang Zemin, and continued with a series of laws or policies events about sci-tech ethics such as the promulgation of "National medium and long-term plan for science and technology development (2006 ~ 2020)" in 2006, the revise of "the Science and Technology Progress Law" and "the implementation regulations of the national science and technology awards detailed rules" in 2008 and 2009. Those events in China are of particular interest since they all mentioned some rules about science and technology ethics.

To date, few systematic studies of news media coverage of sci-tech ethics have been undertaken, especially in China. By undertaking an analysis of the framing of sci-tech ethics in the Chinese newspaper press, this study intends to gain fresh insights into how laws or policies events for much of the subsequent news coverage were established.

2. Framing of Science and Technology Ethics in the News

2.1. Science and Technology Ethics

Science and technology ethics is abbreviated as sci-tech ethics which combine the nature science and applied technology. There are difference between science and technology, science is for discovery and to know the world while technology is for invention and to change the world (Wang Xuechuan 2009). So there are also science ethics and technology ethics, in our research we consider them as all in the range of sci-tech ethics and make them as our research objects. The sci-tech ethics originate from the ethics but also is relative to each discipline of science and technology. According to discipline we can divide the sci-tech ethics to

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Biology engineering ethics, Computers and Information ethics, Environment ethics, Military science ethics and atomic nuclei ethics(Raymond E. Spier 2002). Recent researches about sci-tech ethics can be divided into two kinds, one study the whole sci-tech ethics(like Laura P. Hartman 2001 study the privacy of technology, Raymond E. Spier 2002 edited a book about sci-tech ethics) and another one study the different disciplines of sci-tech ethics(like Kenneth C. Laudon 1995, Soraj and Charles 2007 study the information technology ethics)

"Ethic", we find, is defined as "moral principles that control or influence a person's behaviour" in the Oxford Advanced Learner's English-Chinese Dictionary(2004). And the word "moral" is defined as "standards or principles of right and wrong behaviour". Raymond E. Spier(2002) thought sci-tech ethics as "scientists and engineers have to redefine the way in which they work so as to be more aware of the ethical implications of what they are seeking to achieve. They should also be appraised of various ethical systems and be able to apply them to the solution of such questions as what should we do now in relation to cloning, information, nuclear power, the motor car, CO2 emissions and so on?" According to those, we defined "science and technology ethics" as "a standards or principles that the society and public use to appraise the science and technology behaviour is right or wrong , the awareness of considering the sci-tech achievement's possible bad impacts on society and solving problem caused by wrong sci-tech behaviour that scientists and engineers should have".

2.2. News Frames

News frames or framing have no single definition but many research before point up similar characteristics. Entman(1993) referred to framing as "a scattered conceptualization" and it is "selecting some aspects of a perceived reality to enhance their salience in such a way as to promote a particular problem definition, causal interpretation, moral evaluation, and or treatment recommendation." Neuman(1992) identified news frames are conceptual tools which media and individuals rely on to convey, interpret and evaluate information". While other studies have considered the relationship of agenda setting, priming, and framing. McCombs, Shaw, and Weaver(1997) suggested that not only are agenda setting and framing effects related, framing is, in fact, an extension of agenda setting. Additional research demonstrating effects of framing. Goffman(1974) point out frames are to help audiences "locate, perceive, identify, and label" the flow of information around them and Tuchman(1978) thought that frames are to "narrow the available political alternatives".

We consider the framing of science and technology ethics in Chinese newspaper press as Chinese newspaper press selecting some aspects of science and technology ethics to report in order to enhance its salience. Our research studies what kinds of aspects of sci-tech ethics the Chinese choose to report, in the other words to frame this issue, and why, as well as if the framing gets its ideal effects. We want to answer the following questions: How has news on techno ethics been framed and does the framing of sci-tech vary significantly by different newspapers and why? When, and under what circumstances, have certain issues, themes, and debates gained prominence?

3. Methods

The sample of Chinese newspaper coverage under scrutiny includes articles selected from the period August1, 2000, to June 30, 2012, during which a number of major sci-tech ethics related events occurred. The samples included three national general newspapers and two national specialty newspapers was searched by the keywords "science ethics," "technology ethics," "science and technology ethics," and "ethics" . The three national general newspapers sampled were People Daily, Guang Ming Daily, Xinhua Telegraph. The two national specialty newspapers sampled were Science and Technology Daily and Social science in China.

Our sample articles were identified and download via China's important newspaper full-text database on Chinese National Knowledge Infrastructure (CNKI). In total, 184 newspaper articles were generated from

the sampling period. Each article in the sample was analyzed from the aspect of frequency, news frames, time periods.

4. Findings and Analysis

Table1: Frequency of articles by newspaper

Newspaper	Frequency	Percentage
People Daily	30	16%
GuangMing Daily	50	27%
Xinhua Daily Telegraph	24	13%
Science and Technology Daily	55	30%
Social Science in China	25	14%
TOTAL	184	100%

Our findings suggest that the press coverage during the twelve years under scrutiny was most on nature science specialty newspaper. Thirty percent (n = 55) originated from Science and Technology Daily which is far more than the fourteen percent (n=25) from Social Science in China. Of the general newspapers, the majority of articles (n = 50, or 37percent) appeared in Guang Ming Daily which aims at intellectual, while the rest sixteen percent appeared in People Daily and thirteen percent in Xinhua Daily Telegraph.

Table 2: News Frames

Newspaper	Frequency	Percentage
Scientific achievement's social risk	49	27%
The prevention or solution of problem caused by sci-tech application	48	26%
Public appraisalment	12	7%
Laws、 regulations and policies	23	12%
Academic theory and discussion	33	18%
Important speeches by the state leader	13	7%
Others	6	3%
Total	184	100%

As table 2 shows, a significant proportion of all featured the scientists and engineers view-related frame, which indicates strong news interest in "Scientific achievement's social risk"(n=49, or 27%) or "The prevention or solution of problem caused by sci-tech application"(n=48, or 26 percent). The "Academic theory and discussion" (n=33, or 18 percent) frame and "Laws、 regulations and policies"(n=23, or 12 percent) frame were relatively pronounced, being the third and fourth most common frame overall, which indicates strong interest in the theoretic exploration and making rules of sci-tech ethics. The publication of an approximately equal number (7 percent) of articles with the "Important speeches by the state leader" frame and the "Public appraisalment" frame conveys a mixed picture of the relationship between the public and the policy maker's each attitude for technology ethics. There is still three percent other frames like book review or education.

Table 3: News Frames by newspaper

	People Daily	GuangMing Daily	Xinhua Daily Telegraph	Science and Technology Daily	Social science in China	Total
Scientific achievement's social risk	7	7	21	10	4	49
The prevention or solution of problem caused by sci-tech application	7	11	0	19	11	48
Public appraisalment	2	1	0	6	3	12
Laws、 regulations and policies	3	5	2	10	3	23
Academic theory and discussion	4	21	0	5	3	33
Important speeches by the state leader	5	3	1	4	0	13
Others	2	2	0	1	1	6

It should be noted that these frames were not uniformly spread across the newspapers. As table 3 shows, for example, Science and Technology Daily had by far the largest single number of articles with a "The prevention or solution of problem caused by sci-tech application" frame (n = 19, or 40 percent), a "Laws、 regulations and policies" frame (n = 10, or 43 percent), and a "Public appraisalment" frame (n = 6, or 50 percent) while Guang Ming Daily had the largest single number of articles with a "Academic theory and discussion" frame (n = 21, or 64 percent), and People Daily had the largest single number of articles with a "Important speeches by the state leader" frame (n = 5 or 38 percent). The "Scientific achievement's social risk" frame appeared mainly in Xinhua Daily Telegraph, accounting for 43 percent of the frame.

Table 4 Time periods of different frames

	June,2000- June,2003	July,2003- June,2006	July,2006- June,2009	July,2009- June,2012	Total
Scientific achievement's social risk	9	12	14	13	49
The prevention or solution of problem caused by sci-tech application	19	6	7	16	48
Public appraisalment	1	3	6	2	12
Laws、 regulations and policies	6	4	9	3	23
Academic theory and discussion	13	12	5	5	33
Important speeches by the state leader	6	1	3	3	13
Others	4	1	1	0	6
Total	58(32%)	39(21%)	45(24%)	42(23%)	184

When one analyzes the data according to times (Table 4), one obtains a picture of the rise and fall of different news frames over the period. The largest single number of articles appeared during the first period, June, 2000 to July, 2003. The coverage declined thereafter, but remained at a reasonably steady level for the rest of the period.

This table also shows the dominance of particular frames at different times. Thus, of the forty-eight articles with the frame "The prevention or solution of problem caused by sci-tech application" nineteen (i.e., 40 percent) appeared between June, 2000 and July,2003. A larger proportion of the articles with "Academic theory and discussion" and "Important speeches by the state leader" frames also appeared during this

period (13 of 33 or 39 percent and 6 of 13 or 46 percent, respectively). This period during the initial framing of techno ethics is significant since early coverage can potentially set the agenda for later discussion (Petersen 2002). Approximately a third, 32 percent (n = 58), of the total sample of newspaper articles were published during the first three years of the sampling period.

While the frames “Important speeches by the state leader” as well as those focusing upon the prevention or solution or academic discussion gained particular prominence in the first quartile of the study, they received little coverage during the rest of the sample period except the frame of "Academic theory and discussion". The frame of "Academic theory and discussion" got continue dominance in the last 4 years with 12 of 33 articles or 36 percent between July,2003 and June,2006 while the rest frames in this periods was not dominant with less coverage.

The late framing of issues during the period from July,2006 to June,2009 was dominated by "Laws, regulations and policies" frame with 9 of 23 articles or 39 percent. Interestingly, other dominant news frames during this period were "Scientific achievement's social risk" (with 14 of 49 or 29 percent).

The period of July, 2009-June, 2012 got a continue attention in the frame of "Scientific achievement's social risk"(with 13 of 49 or 27 percent) while the rest frames in this periods had less coverage.

5. Discussion and Conclusions

In summary, the articles examined over the sample period convey considerable news interest in the scientists and engineers view-related frame. Yet the bulk of coverage is still confined, in the main, to a relatively small number of nature science specialty newspapers, exhibiting an uneven spread of different frames over the period. These newspapers provide differing emphases that reflect a number of factors, including the organization of news beats, target readerships, and political slants. We found the Chinese newspaper press have regular pattern on sci-tech ethics coverage.

5.1. Nature Science Specialty Newspaper Has more Coverage of Sci-tech Ethics

From table 1 we can find that the majority of coverage is concentrated in nature science specialty newspaper and intellectual aimed newspaper (n=105, or 57percent) means that the visibility of the issue has been restricted to the relatively small scientist and intellectual groups who are the most audiences of those two newspapers, —which may lead to a low level of recognition of sci-tech ethics in China, especially a low attention among social scientist.

5.2. There are more Scientists and Engineers View Frames than the Public View Frames

The frames of "Scientific achievement's social risk" and "The prevention or solution of problem caused by sci-tech application" is from the scientists and engineers' view and the rest is form the society and public's view. From table 2 we find that "Scientific achievement's social risk" and "The prevention or solution of problem caused by sci-tech application" have 53% articles of all and especially more than the "Public appraisalment" frame's percentage of 7. We can conclude that the Chinese new spaper press is more focus on the scientists and engineers view frames

5.3. Target Audience of a Newspaper Decides Its Report Focus

From table 3, we can see that People Daily as China's most important part organ has more coverage with the state leaders. Xinhua Daily telegraph good at supervision and fresh events reports has more coverage about the scientific achievement which is favourite by its readership. GuangMing Daily aiming at intellectual has more academic discussion reports, while Science and technology daily focus on the scientists and engineers view-related frame.

5.4. Political Factors is Crucial in the Framing of Sci-tech Ethics

The article suggests that the involvement of a state leader or promulgation of a policy or a law played a crucial role in enhancing the newsworthiness of the issues and influencing their subsequent framing in the newspaper press, which gave particular prominence to scientists and engineers view-related frames.

Chairman Jiang Zemin's important speech mentioned to build perfect sci-tech ethics system when he met 6 Nobel Prize winners at Beidai river in June, 2000 seems to launch the hotly debate of sci-tech ethics in newspaper. So in this period "Important speeches by the state leader" frames had a lot of articles. And this period also has the most articles of all, a third, 32 percent (n = 58), of the total sample of newspaper articles were published during this period.

"Decision of improve science and technology evaluation" was promulgated in 2003 and pointed out the science and technology evaluation should not only consider the economic factors but also should take the social benefits into count. It is the first time that the sci-tech ethic was put into policy and causing a hotly academic discussion. That might be the reason why "Academic theory and discussion" frame was dominant in this period.

The next period is an important time for the Chinese sci-tech ethics for a series of laws or policies of science and technology appeared during this time. The promulgation of "National medium and long-term plan for science and technology development (2006 ~ 2020)" in 2006 decides the development direction of Chinese science research. The revise of "the Science and Technology Progress Law" in 2008 added the twenty-nine regulation declaring that the state forbid science and technology research activities which violate the ethic."the implementation regulations of the national science and technology awards detailed rules" in 2009 pronounces that the science and technology achievements should not harm the state interests, social security and the public's health. All of this caused the continued enthusiasm in the frame of "Scientific achievement's social risk"(as table 4 shows).

6. References

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