Nuclear Power Discourse Analysis: A Literature Review

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Abstract

Nuclear power is controversial subject that raises a lot of debates. The nuclear power debates impact the public perception of the value of atom as energy source, and consequently a country's development policy. The article presents an overview of the theoretical foundations of discourse analysis and the current approaches to discourse studies that contributed to the development of a new insight into nuclear power discourse analysis.

Key Words: Critical discourse analysis, discourse context, hegemony, nuclear power discourse.

Introduction: Discourse is a debate over reality (Demerit 2006); a straggle for political hegemony (Gramsci 1971). Discourse determines the frame through which the public perceives an issue, its value, and consequently impacts future policy of a country (Buizer and Van Herzele 2012). Discourse has important consequences for different aspects of life, and therefore it has been investigated in many fields of study, especially those studies dealing with political and social issues.

Nuclear power discourse is about a hundred years old (Kinsella 2005). It took birth with the discovery of the atom's properties. Possessing nuclear applications was seen as a factor that recast global political map. The fate of nuclear power depends heavily on the outcome of the interaction among political authorities, nuclear establishments, scientific community and general public. Since the construction of the first NPP, the course of nuclear power underwent several transformations especially at the time of NPP accidents. Nuclear power discourse is highly influenced by temporal and spatial aspects. Nuclear power discourse is highly politicized and complex phenomenon. It is a subject that raises a lot of controversial debates.

The main objective of this study is to give an account on the key theoretical terms that play an important role in nuclear power discourse analyses and to present an overview of the current approaches to discourse studies that contributed to the development of a new insight into nuclear power discourse analysis.

The present study starts from presenting the key theoretical terms viz., 'discourse', 'discourse context' and 'discourse hegemony'. It then describes the specificity of nuclear power discourse and the methods that have been used for the analysis of nuclear power discourse.

The theoretical foundations of nuclear power discourse: The word discourse is originated from the Latin word *discursus* which means 'running to and from'. Discourse can be conceived as a multifaceted dynamic system. In most cases, discourse is broadly described to be an information network. For example, discourse is defined as a communication or debate, or verbal expression in speech or the way of thinking and producing meaning (Oxford Dictionary 2012). One of the discourse examples could be the well-known tale of ancient India about the blind men and the elephant.

The Indian fable about blind men and the elephant is an example of what is call in western philosophy as 'moral relativism', which proclaims that due to human limitation in knowledge there could not be absolute truth—everything is relevant (Kleineberg 2013).

> *'It was six men of Indostan. To learning much inclined, who went to see the elephant (Though all of them were blind). That each by observation might satisfy his mind. The first approached the elephant, and happening to fall against his broad and sturdy side, "Is very like a wall!" The second, feeling of the tusk, cried: "Ho! What have we here, so very round and smooth and sharp, to me 'tis mighty clear, this wonder of an elephant is very like a spear!" The third approached the animal, and happening to take the squirming trunk within his hands, thus boldly up and spoke "I see," quote he, "the Elephant is very like a snake!'' ' (Saxe and Chief 1963).*

The way of the description of the very same object in the Indian tale has some similarities with controversial character of debates around nuclear power. The debate on safety of nuclear power could be one of the examples of the controversial nature of nuclear power. One of the researchers on nuclear power safety Sovacool (2010) indicated that besides the well-known Three Mile Island NPP (1979) and Chernobyl NPP (1986) accidents, about 100 nuclear accidents took place between 1952 and 2009. However, Romeo St-Martin (2014) argued that nuclear power is comparatively safe source of energy. Moreover, Ezzati et al. (2004) estimated that emissions from fossil fuel burning was found to cause more than one million deaths annually, which is very high number in comparison to the four thousands deaths caused by all nuclear accidents till date (Lovering et al. 2012).

Skea et al. (2013) argued that besides having a low-carbon print, nuclear power is a low-cost source of energy and this makes it an attractive option. However, Rosenkranz (2006) argued that being an attractive source of energy is not the sole perception of nuclear power. Nuclear power is considered to be a risky source of energy. Its riskiness is not derived only from health threats, but also from financial risk.

The other discourse topic is nuclear power's impact on environmental issues. On the one hand, Dittmar (2012) argued that nuclear power's contribution to the world's electricity production is around 11 percent, making it less significant than other sources of energy. Sovacool (2010) argued that use of NPPs could not make any significant difference in climate change and energy security issues. Moreover, in 2030, the world will have 500,000 tonne of radioactive waste (Wolfgang 2011). And all methods for storing nuclear waste are temporary and cannot give full guarantee against natural disasters (Wolfgang 2011). On the other hand, the development of nuclear power was found to be one of the promising solutions regarding climate change issue, since nuclear power plants have comparatively less CO_2 emission than other major sources of energy (Culley and Angelique 2011). Doyle (2011) analyzed governmental discourse on nuclear power and found that the priority of solving climate change problem has labeled nuclear power as less risky than the risk of intensifying climate change.

Endless debate is going on about nuclear power and public accountability. According to pro-nuclear power discursive coalition, in a world where millions of people are still living without electricity, the demand for energy is increasing. Regardless of the safety issues around it, nuclear power was found to be preferable to the energy derived from fossil fuel burning as the latter is tightly linked with health problems (Lovering et al. 2012). Emissions from fossil fuel burning were found to cause serious health problems (Ezzati et al. 2004).

Some anti-nuclear power discourse coalition scientists like Furitsu Katsumi (2008) doubt the reliability of reports from national and even international organisations like the IAEA and World Health Organisation (WHO) as they have not considered the last scientific data on radiation effects. Kopytko and Perkins (2011) considered nuclear power to be a dangerous source of energy because nuclear accidents could be deadly with large-scale environmental contamination.

Discourse Context: Discourse is a complex phenomenon. Discourse includes different points of view what make it as a dynamic and endless debate in which what is 'truer' and what is 'not' is defined by such factors like place, time, and event or in other words discourse context.

Human perception of the reality is framed in the 'social chamber' (Billett 2010). Discourse does not exist in isolation from society in which it is produced and reproduced, and thus should be interpreted in the context of specific social values and cultural norms (Demeritt 2006). Discourse is a socially constructed phenomenon that is rooted in a particular institutional context, and this is called discourse context (Hajer 1995). Buizer and Van Herzele (2012) argued that discourse is not merely thoughts framed in a text rather it is the context in which thoughts were framed. Gee (1999) described the interconnection of the context and text as a phenomenon of the 'chicken and egg' in which it is not clear which comes first, but it is clear that one could not be without the other. Alvermann and Hagood (2000) suggested that in order to gain audience interest, the represented information should be organised in the frame of the communal context. Gee (1999) argued that even in the

context of the same discourse, one word could have two or more meanings or could have meaning for some people and could not for others. The context of overall social change justifies discourse formation. The connection between discourses and context can be traced where discourse is deployed to achieve a particular effect on society. Discourse affects and is affected by its social context—where, when, why, who and with whom is the communication taking place (Van Dijk 1997).

A country standpoint on nuclear power issue depends on discourse context—which country we are talking about. For example, in 90s, Lithuania's public staged a protest in Vilnius city against the government plan to shut down the Ignalina Nuclear Power Plant (NPP). The public argued that they can't afford any price increases. The government was considered to be acting against the principles of democracy. The Lithuania's NPP power lines used to carry enough electricity not only for the whole country, but also to export cheap electricity to its neighbors. However, European Union deemed to close Ignalina NPP, as it was identical in design to Chernobyl NPP one. Following European Union's request, Lithuanian government closed the NPP. As a conscience, prices increased for all services that were provided by the Ignalina NPP: the electricity price rose by 20 per cent, hot water has increased in price by twofold, and winter season heating bills by five (Russia Today 2010).

Actually, pressing on Lithuania that was having highest reliance on nuclear power in the world in 1997 (81.5 per cent of electricity production (IAEA 1998)) to close its Ignalina NPP is also disputable. The US has 20 Mark 1—Fukushima type nuclear power reactors (Slivyak 2012), none of which was closed.

Hegemony: At the end of the 1980s, the direction of discourse studies shifted from linguistics to more detailed analyses of socio-political context, and the way language was being used in this context (Caldas-Coulthard1993). French philosophers Foucault (1970) defined discourse as a tool that determines socio-political issues. Foucault believed that a discourse is a result of power relations among parties, a power that shapes the text but does not appear in it (Buizer and Van Herzele 2012).

The importance of social and discursive practices in the processes of power relations and particular class domination is found in works of Italian communist and philosopher Antonio Gramsci. Gramsci was trying to understand why the Russian revolution (1917) did not ignite other countries' liberation from capitalism, what the power of capitalism was, and why the communist failed to consolidate the world proletariat. He found the answers to these questions in the socio-cultural field. He explained the difference between Russian and Italian communist movements and their outcomes through cultural specifics of nations (Gramsci 1971).

The dominance of a particular power (class) is based on the leadership of a class in determining information, perception and knowledge, which Gramsci called cultural hegemony. According to Gramsci's theory of hegemony, the supremacy of a ruling power (class) is based not only on the compulsion and material factors but also on cultural,

intellectual factors, and its ability to find consensus through which particular power gains hegemony. The hegemony under information network is realized through such institutions as parties, unions, educational and cultural institutions, the church, the media, and other social practices that define understanding, knowledge, and discursive contours. The question of power and discourse relation does not lose actuality and continues to be one of the main interests of discourse analyses researchers. Di Gregorio etal. (2013) argued that through discourse analysis, it is possible to evaluate how different policy actors use different sources of information, especially media, in order to emphasize their own claims. According to Van Dijk (1997), some discourses that are not in line with main policy could be specially hidden. In order to shape public perception, powerful political structures attempt to determine who or what is to be shifted to the backstage and who or what is to be highlighted in the text (Rashidi and Rasti 2012). This as a result also influences what makes particular points of view 'hegemonic' toward others. According to Fairclough (2003), the criteria for a discourse to be hegemonic are: the discourse is successful in delivering its representations as natural order; and the discourse is able to suppress alternative views. According to Gramsci (1971) hegemonic discourse is not an ideological monopoly. Discourse is a cultural phenomenon. Culture includes tradition and innovation elements, therefore any hegemonic discourse has alternative discourse, and consequently it is not possible to reach complete ideological monopoly.

Gramsci (1971) argued that hegemony is based on ability of ruling power to control people's minds. Intellectuals should first of all fight for the ideological leadership in order to overtake the status quo of supreme class ideology. Gramsci (1971) contraposed two main forces that form the intellectual climate in the society: 'organic intellectuals' and 'traditional intelligentsia'. The traditional intelligentsia is the force of the ruling class and the organic intellectuals are its counterforce. The task of the traditional intelligentsia is to ideologically justify the status quo and the goal of the organic intellectuals is to demand a change. Gramsci believed that a person becomes an organic intellectual when he or she is consciously engaging in political struggle.

Discourse is a dynamic phenomenon as many different discourse coalitions including classes, sectors of capital and social groups compete to achieve social dominance through imposing their interests as natural order of society. Hegemony is thus always subject to upgrade.

Nuclear power discourse and its analysis: According to Fairclough (2003), discourse could be seen through the interrelationship between meaning postulated in text, and socio-cultural context. Fairclough's model of discourse consists of the following elements: text, discursive practice, discourse context. Phillips and Owick (2012) argued that Critical Discourse Analysis (CDA) is taking into consideration the context of the discourse. Therefore the CDA method could be promoted for nuclear power discourse analysis. Foucault's philosophy, which lays stress on the conjoint influence of knowledge/power and discourse (Kinsella 2005), became a base for CDA. Van Dijk (1997) argued that the semantic polarization of political talk and texts in which there is an apparent positive self-

presentation and negative other-presentation makes CDA suitable for political discourse analysis. Rogers-Hayden, Hatton, and Lorenzoni (2011) argued that power struggles in the generation of hegemonic meanings are main focus of CDA. The difference between CDA and other qualitative methodologies is its ability to highlight social reality and the way of its evolution (Phillips and Owick 2012). Analysis of the discourse opens the so-called 'black box' of institutional processes of human actions (Phillips and Owick 2012). Forester (2012) argued that the main advantage of CDA is its potential to extract 'challenges' and 'opportunities' of a given issue as it enables the research to identify doubts, difficulties and finds out opportunities to change the situation in its particular social context. Moreover, the CDA is a widely used method for discourse analysis and considered to be best suited for political and social issues (Caldas-Coulthard 2012).

Rashidi and Rasti (2012) analysed the representation of social actors implicated in Iran's nuclear discourse in western press. In their attempt to investigate the Western news arguments on Iranian nuclear programme, the authors found ideological bias in presenting the Iranian stand, which resulted in unjust treatment of Iran. Rashidi and Rasti adapted Van Leeuwen's 'socio-semantic' analysis. The analysis highlighted the ways of social actors' representation through syntactic categories. The socio-semantic categories put forth by Van Leeuwen (1996) allow us to understand how social actors and their activities can be represented in a discourse and what kind of language descriptive frameworks and tools are employed to represent people. Dichotomy of inclusion/exclusion and socio-semantic categories are an important aspect of discourse analysis as it indicates whether social actors are marginalised, backgrounded, or accounted in a particular discourse. To serve somebody's interests, social actors could be depicted as passive figures or even represented as objects (Van Leeuwen 1996). If a news article has no reference to the social actors, it could be considered as 'suppression'; and when the social actors are not mentioned in the main part of the story, that could be recognised as 'backgrounding'. The 'suppression' of the social figures in the article could be investigated by detecting nominalizations, process nouns or passive voice (Rashidi and Rasti (2012). Gavrilov (2013) highlighted the need of protecting the individual, and society as a whole from manipulative influence.

Izadi and Saghaye-Biria (2007) analysed Iran's nuclear power programme in editorials of three elite American newspapers. This study found that the orientation of the dominant press in the US toward Iran's nuclear programme was to emphasis the Islamic nature of Iran and link it to threats of assumed Iranian nuclear weapons programme. The analysed U.S press was found to have a tendency toward hiding, emphasising and even changing information regarding Iran's nuclear power programme through adapting tactics such as hidden logical mistakes, thesis replacement, or justification of the thesis by false arguments. Based mainly on Van Dijk's concept of the 'ideological square', Izadi and Saghaye-Biria organised their study into the following parts: naming choices, lexical choices and argumentative features.

Regarding naming choices analysis, Van Dijk (1997) argued that ideologically framed information was found to appear frequently in articles' titles. Gavrilov (2013) supported this

idea and concentrated on the title. The title is one of the most important parts of an article; it is usually short, informative and attractive. Titles are frequently represented as facts. It does not matter, whether the title will be proved or explained in the body of the article, the title is the first thing the reader pays attention to and it remains on the reader's mind, even at first or selective reading. Through the title, the author's opinion is commonly represented as conventional fact. As a result, readers may share the perception of the author and/or perceive it as an opinion of the majority. Analysis of the lexical choices and argumentative features are based on rhetorical devices such as the following:

- **Imagery:** A rhetorical device related to imagery is metaphor. Each culture has its own metaphors that help to construct, organise and share some important aspects of life. Very often, metaphors have come to be taken for granted without questions (Gee 1999). Metaphors are being used in media to increase their trustworthiness. They allow sharing emotion that, in turn, can cause positive or negative reaction from the readers. However, a metaphor could be used to replace rational justification of judgment to irrational one (Gavrilov 2013).

- **Overstatements and understatements:** Overstatements and understatements can be achieved through replacement of arguments and shifting of narrative (Van Dijk 1997). Shifting of narrative accent is a description of an obvious fact that actually does not demand any proof in order to shift the attention of the recipient from proved information to argumentations of the well-known fact (Gavrilov 2013).

- **Hyperbole (exaggeration):** Exaggeration can be achieved through repetition, which gives additional weight to specific information and directs the attention of the audience to the most important idea (Gavrilov 2013).

- **Euphemism and mitigation:** Backgrounding, euphemism and mitigation, as opposed to exaggeration, is achieved through simplification of certain information or replacement of an animate object to an inanimate object (Gavrilov 2013).

The other way of the CDA is based on discourse themes or packages. Discourse as a text written or spoken is composed of fragments around particular concepts that are called discourse themes. Kinsella (2005), in his book One Hundred Years of Nuclear Discourse, described how nuclear power discourse changed in history as well as changed the history. Kinsella (2005) manifested the nature of nuclear discourse right from the beginning of atomic physics. The author used the following master themes to analyse the course of nuclear discourse: Mystery; Entelechy; Potency; Secrecy. The first stage of this journey called 'Mystery' as there was very less knowledge about the world around us. The author calls the active stage of the world's discovery 'Entelechy' following Aristotle's terminology. And possibly the last stage of this journey could be the contemporary world full of fear and secrecy around nuclear technologies. The author combined Burke's methodology, which is based on 'four master tropes' and Foucault's philosophy of mutual influence of power/knowledge and discourse. Through analysis of texts in the frame of these master themes, the interaction between public interests with establishment activities in

the frame of a complex policy domain was revealed. The book describes the trajectory of nuclear discourse as a dramatic shift from public pride on the ability of humans to manipulate nature to public concerns regarding their interaction with nature.

A study that was based on different interpretive packages is Gamson and Modigliani (1989). The researchers analysed nuclear power discourse in a particular country, namely, the United States. The country's nuclear power discourse was found to represent the means for the interaction between power/knowledge and discourse. The authors argued that media has strong influence on forming nuclear power discourse and vice versa. Analysis of main themes or 'interpretative packages/themes' gave holistic understanding of the mutual influence of power/knowledge and discourse, and theoretical formations. For example, giving priority to 'not cost-effective', 'public accountability' and 'soft paths' packages is a sign of rising public concerns toward nuclear power as they are recognised as anti-nuclear narrative packages (Gamson and Modigliani 1989).

- The 'soft-paths' interpretative package advocates the renewable sources of energy, need of new culture of energy conservation and ecological values.
- The 'not cost-effective' frame takes up doubts regarding the promotion of cheap price of nuclear power.
- The 'public accountability' package reflects nuclear power establishments' attitude toward public needs and safety concerns. The 'soft paths', 'not cost effective' and 'public accountability' are opposite to the pro-nuclear 'cost-benefit', 'energy independence' and 'progress frame' packages.
- The 'cost-benefit' and 'energy independence' interpretative packages reflect energy issues and their importance in particular countries (Choi et al. 2009). Taylor (2013) in his work thinking about nuclear power, emphasised that one of the main public concerns toward nuclear power is its possibility of double use. The 'progress frame' package reflects the dual nature of nuclear power as it emphasises the positive impact of promoting the civil use of nuclear power.
- Another package is the 'climate change' package which was especially highlighted in pre-Fukushima time at the peak of nuclear power renaissance and analysed in the works of authors such as Culley and Angelique 2010, and Culley and Angelique 2011.

Revising Gamson and Modigliani's (1989) nuclear power discourse packages method, one can notice that nuclear power discourse issues have a dual character that give to the discourse particular elements of controversy. De Cock (1998) found that discourse themes/packages can be divided for comparative analysis into pro-nuclear, neutral, and anti-nuclear discourse coalitions. A particular discourse context supports and justifies a particular discourse coalition which could be considered as hegemonic vis-à-vis other alternatives.

Conclusion: Nuclear power is a controversial and politicized subject that attracted the attention of several researchers. Different nuclear power discourse studies adapted different

methodologies. As nuclear power discourse is a complex phenomenon that determined in a particular context, considering discourse context in nuclear power discourse analysis was a common element in the reviewed studies.

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