Discourse Analysis in Socio-Scientific Debates: In Support of an Ecojustice Science Education

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ABSTRACT
This qualitative paper applies Critical Discourse Analysis (CDA) as a tool to analyze a transcript of a socio-scientific debate in a senior high school science class in the Philippines. Drawing from insights and implications generated from the analysis, this paper also endorses this framework and tool as just one among the several other approaches and tools beyond the field of natural and physical sciences that the field of science education could use to analysis science classroom talk and discourse. The result of using CDA in this paper hinted on verbs as signal for attributions of agency at the level of the text; an anthropocentric science discourse manifested by the use of science to study and manage animals for human gains; and a social practice that normalizes human intervention on human habitat and lives. CDA as a tool to analyze science classroom speech and discourse is particularly viable as one of several initial steps to foster an ecojustice science education position and agenda geared at interrogating and challenging society's normalization of anthropocentric discourse and social practices in education, science, and the wider society. An ecojustice science education envisions global societies that are diverse, democratic, and sustainable, a more ethical Society 5.0.

Keywords: Critical discourse analysis, Socio-scientific issue debates, Ecojustice education.

1. INTRODUCTION

While issues on the environment have figured prominently in most contemporary socio-scientific issues and debates, the predominant use of quantitative methods to study this subject presents gaps in scholarship and practice [1]. Taking a qualitative view and method, this paper applies Critical Discourse Analysis (CDA) as a tool to analyze a transcript of a socio-scientific debate in a senior high school science class in the Philippines. Drawing from insights and implications generated from the analysis, this paper also endorses this framework as one of the viable tools from beyond the natural and physical sciences that science education could use to analyze of science classroom talk and discourse. Beyond engaging in this identified gap in the science education, this paper is also an initial contribution to the ongoing scholarly discussions that link environmental issues in science education, and educational studies and practice; and an invitation for science education to use applicable conceptual and analysis tools from other disciplines.

Environment in science education has been a prevailing interest in a climate change driven changing global reality. The growing trend towards surfacing and acknowledging the issue of environment in education is part of the robust discussions on education for environmental citizenship. A fairly recent edited volume on education and environmental citizenship, demonstrated that this subject could be approached through analyses from psychological, socio-political, cultural, and lenses from other disciplines beyond science that highlight key issues such as global environmental crises and sustainability issues [2]. The ongoing climatic change crisis and the role of humans in its escalation has provided the impetus for serious discussions that links science education to the myriad of current and emerging socio-political and ecological realities, challenges, and controversies. This movement in science education finds a tangible traction in the ecojustice education movement whose assumptions and approaches are influenced by constructionist paradigms and methodologies.

Like most constructionists, language becomes one key starting point for exploration and analysis. Key proponents of ecojustice education claimed that "we begin from the recognition that in order to know

anything, humans must use language to represent it, or more broadly stated, a symbolic system, which immediately puts us at a distance from what it is we seek to know" [3]. Through a deep and informed understanding of how language constructs experiences and relationships between and among the components of nature, one could recognize that "to be human is to live engaged in a vast complex system of life, and human well-being depends on learning how to protect it" [4]. This entails an analysis and critique of the current anthropocentric cultural and social reproduction of a consumerist culture in and beyond education and a recognition of the deep cultural assumptions underlying the contemporary hegemonic culture of commercialization and globalization that endangers, debases, and discredits the local and global ecosystems essential to life for all creatures [3,4]. The implication of the constitutive and constructive capacities of language is that it could lead to the oppression and exclusion, or othering of certain entities based on the meanings and values we attach to our human selves vis-à-vis the meanings and values we attach to our relationships towards these entities. This recognition of the power of language in constructing reality and relegating other species and the world as the others or othering, and therefore of lesser value and dignity, is one of the key principles of ecojustice education. The language used and the context of its use is underpinned by the current ecological crisis, which goes deeper than the usual coverage of environment education. Writing for an audience of science educators and scholars, this movement have been advocating for stepping away from viewing and approaching ecology with a strictly science-centric stance of managing nature, pointing out its limitations and proposing an ecojustice education framework [3]. A key notion of ecojustice education "…is shaped by an understanding that local and global ecosystems are essential to all life" [4]. It also resists the "…deep cultural assumptions underlying modern thinking that undermine those systems" and recognizes the "need to restore the cultural and environmental commons" [4].

Ecojustice education positions human beings as part of nature, and not separate or above it. It makes inroads into the science curriculum and classroom saturated by a hard science-centric assumption and disposition through, among others, pedagogy that engages in divergent discussions, or debates. This casts a critical gaze on the normalized science discourses and practices in education that promote hyper-fragmentation in ecology and society. Thus, socio-scientific debates are viable venues and avenues for this educational agenda. Socio-scientific

issues create a worthwhile space and opportunity where issues on science, science education, and social justice find a common ground for healthy, constructive, and productive discussions [5,6]. Its links with critical thinking [7] and its applications beyond the classroom context [8] have also been studied, particularly on how it could make learning science as relevant, lasting and impactful for the learners. At the classroom level debates on socio-scientific issues facilitate these discussions and thus support the environmentalization movement and the ecojustice education agenda [9,10]. To guide the curriculum and provide a more grounded and contextualized views and approach to the science education, the field could respectfully and carefully draw from indigenous knowledge and views on content involving socio-scientific issues like the environment [11].

2. METHODS

2.1. Critical Discourse Analysis As Framework

Environmental discourse in science education are key influencers in creating conditions and experiences that impact the efforts towards environmental citizenship [2]. Science classroom debates are viable sites for explorations and analyses of these discourses. The "turn to language" and "turn to culture" movement in science education scholarship is a recognition of the need for a "confluence" in the various perspectives, directions, and approaches in the discipline which is "…part of living in relation to others who hold diverse perspectives and see things that we see in a different light, while together we see it in a much greater light and so forth" [12]. In this paper, the constitutive and constructive capacities of language in positioning and othering non-human species within the ecojustice education framework notions are acknowledged as critical theoretical frames for analysis.

Language and utterances would have to be located beyond their grammatical uses in a text by situating them within the larger scope of discourse and social practice as expected in CDA [13,14] in an effort to critique and eventually take action amidst the escalating and pervading ecological crises where science education in particular, and education as a ubiquitous social institution and system find themselves in. Fairclough's proposed framework of Critical Discourse Analysis (CDA) is one that is primarily concerned with exploring and tackling a social issue or concern with the ultimate aim of mounting some form of resistance to it. Unlike most linguistic analysis frameworks, this type of analysis

is not mainly concerned with the language in itself. Rather, it acknowledges the linguistic character of the socio-cultural and political-epistemological processes and structures that underlies the use of language in the deployment of knowledge for certain ends. CDA operates with the following principles: (a) discourse constructs and reflects socio-political issues; (b) discourse is a means where power relations are negotiated and performed; (c) social relations are reflected and reproduced through discourse; (d) discourse produce and manifests ideology [13–15]. Ultimately discourse contributes to the reproduction of unjust socio-cultural and political-economic systems and the normalization of these inequalities.

Fairclough's [13,14] CDA typically starts with a social problem and identifies the discursive dimensions of the problem such the texts (written or otherwise) that contain them. These texts are then analyzed by showing how power works within and through the discourses they foster, and this links discourse with the wider systems of power. There are three tiers in the analysis of discourse – text, discourse practice, and social practice [13].

For CDA, Texts are objects of linguistic analysis which could be written or spoken. This tier of analysis deals with vocabulary, grammar, unity or cohesion, and text structure. It describes the generation of the texts, genres, and the types and categories. The ideational, interpersonal, and textual functions of the text are explored. Some helpful questions for this tier: What is the text and what does it say? What does the text mean and what are the merits for further analysis? Is there another way to say or write this?

Discursive practice refers to the production and consumption of texts. The meanings of the descriptions of the text are sought. This tier analyzes how the users of discourse draw upon already existing discourse corpuses and genres to construct the text being deployed. It also examines how the receivers of such employed discourses also apply discourses and genres at their disposal to consume and interpret the received discourses. Some helpful questions for this tier: How is the discourse produced? How is the discourse consumed? What is the context of the production and consumption of discourse? How do relationships and dynamics operate through the text to construct meaning?

Social practice considers the area beyond the text and into the social, cultural, political, and economic spheres where the discourse is located. This acknowledges the socio-political function of discourse. "Social practices are (partially) routine activities through which people carry out (partially) shared goals based on (partially) shared (conscious or unconscious) knowledge of the various roles and positions people can fill within these activities" [16]. The nature of the society from where the text has been produced could be revealed through this analysis, and thereby the social relations that it creates among all within it. Some helpful questions for this tier: What could be the wider impact of the text and discourse on society? How could text and discourse influence the logic and operations of society? What are the power relations, ideologies, and hegemonic struggles that the discourses foster, reproduce, challenge, or negotiates with?

CDA does not claim any position of objectivity and neutrality. It acknowledges that the kind of research produced using this view and approach are inherently political [13–15,17]. While there are several approaches in CDA, they are more or less unanimous on the notion that the use of CDA in studies is an affirmation of how "discourse structures enact, confirm, legitimate, reproduce, or challenge relations of power and dominance in society" [18].

2.2. A Philippine Case Study Of CDA In Science Class Discourse

This paper applied a Critical Discourse Analysis to a transcript of a socio-scientific debate set within an Asian Parliamentary debate format of a group of Filipino STEM senior high school students (academic year 2018-2019) in Iloilo City, Philippines when they tackled the proposition, "This House will abolish zoos". Three students formed both government and opposition benches. The government side's proposed policy in this debate was to abolish zoos and to set up nature preserves or animal sanctuaries instead. The opposition's side wanted to continue the operation of zoos albeit with added regulations and restrictions. Right after the debate, three student adjudicators, who were also their classmates, met and deliberated the merits of their arguments and decided on the winning side. When they have reached the consensus, they called both sides back into the room, explained their assessments, and pronounced the winning side. The debate and the adjudication were all carried out in English as this was also the official language of instruction and communication in all science classrooms in the Philippines. The study followed applicable ethical procedures such as consent forms to maintain confidentiality and protect the identities of the students. The data analysis made use of the CDA's three-tiered analysis of text, discursive practice, and social practice [13] to make sense of the students' science class debate transcripts in the following manner:

2.1.1. Text

The discourse corpus was read, coded, and subsequently organized by noting all the statements with active and passive verbs and attributing them to human or non-human (animal) subjects or objects. This phase of the analysis also highlighted the key vignettes or utterances where these salient and meaningful verbs were found.

2.1.2. Discursive practice

Thematic analysis [19] protocol was used to arrive at the two main argument themes which grounded the discursive practice of the debate.

2.1.3. Social Practice

The aforementioned themes were situated within the larger frame of the social practice where they occur. In this particular analysis, it was located within the prevailing practice of science and science education. The following table summarizes the salient points of the analysis made:

Table 1. Salient results of the critical discourse analysis

Text	Discursive Practice	Social Practice
Verbs and Phrases of Deliberate Action: Humans with Agency	Humans Know Better: Scientific knowledge give humans the means to manage and protect animals.	Science Controls the "Other": Normalization of human intervention and management of animals and their habitats
Verbs and Phrases of Irrational Action: Animals with Passivity	Utilitarian Science: Animals are valued based on their use in Science and Economics.	

These findings add to the growing human and animal relationship studies which have gained considerable attention among scholars as a complex and interconnected topic of interest [20]. Along with these studies and new perspectives, comes the acknowledgement of the power dynamics and socio-cultural histories within and around such relationships.

3. RESULTS AND DISCUSSION

While the result of the CDA revealed insights into the epistemic science knowledge, discourse, and attitude of this particular group of senior high school STEM students, this paper, aside from focusing on the results of the three-tier analysis, also discusses the value of CDA as framework when used to analyze the students' science classroom discourse and what it was able to reveal about the discourses and practices that permeate science education among this group of students. Studies that used CDA to analyze science curricula have yielded insights into how the environment is constructed separately from people, agency is ascribed to action instead of people, and an emphasis on technoscience for solutions that ignores socio-political dimensions and how it could also open up conversations and implications for literacy on the science and environment, social action, and the potential of curricular and policy documents in influencing teaching and learning systems [21]. What CDA was able to make apparent in these three tiers of analysis provided important implications for the on-going environmentalization in the science curriculum amidst the ongoing global ecological crisis.

3.1. Text: Verbs and Agency

CDA at the level of text provides those engaged in the analysis of science classroom debate a glimpse into the learners' notion of agency when drawing up from their accessible corpus of science knowledge and deploying them in speech. In the case of the above socio-scientific debate, CDA was able to provide a viable starting point for the analysis: verbs. Through a general reading and examination of word choice and the analysis of its dimensions and use – in this case, the verbs – about humans and animals, beyond merely pointing towards certain scientific facts or concepts used, this tier was able to provide clues on the expectations, rights, and roles of these entities have relative to either groups within the accepted or prevalent construction of discourses [14]. The choice of words indicates the relative position that the one using the science discourse has over the entities of which the speech pertains to. The use of verbs such as "regulate", "control", "limit" for humans' contrasts with "roam", 'run', "adapt", and "survive" ascribed to animals are workable starting points for analysis. This tier opens up the question of agency and the lack thereof, of who demonstrates superior rational capacities versus those who do not. This is apparent whenever vocabulary and grammatical decisions when discourses in speeches employed. Ultimately, this tier through the analysis of verb as the entry point was able to reveal who has better capacities for thinking and action in contrast to those who lack these rational capacities. This ultimately provided a clue as to who has power by

virtue of the capacity of wielding scientific knowledge when thinking and talking about non-human species, often casting them as the "other".

3.2. Discursive Practice: Anthropocentric Science

While the textual analysis tier of CDA allowed for the science class debate on socio-scientific issues to reveal that students regard themselves – being humans – as capable in contrast to the non-human species, the discourse practice tier was able to highlight the discourses – the bodies of knowledge – that enabled the learners to think and prospect in that manner. Note that "discursive practice draws on conventions that naturalizes particular power relations and ideologies, and these conventions and the ways in which they are articulated are a focus of struggle" [22]. The use of CDA revealed that the science discourse available and accepted among this group of STEM senior high school students is that scientific knowledge is used to manage and protect animals while the utilitarian needs of science could justify human intervention and use of animals for research. The unchallenged notion of animal irrationality was often raised without contestation as the main science discourses that were sent, received, and exchanged without any critical question among the students. A transcript vignette from a student opposition whip speaker illustrated this:

> *Next, how will you research on an animal if you're not going to test them and if you're going to just look on them in your sanctuary? The only way you can research them is if you take them away from their habitat and put them in a lab. And if there only and if there only way that they're going to research an animal, the only way they will do it is by observation which will not really do any help...(Lea, Opposition Whip).*

The highlighting these discourses at this tier provides both the science education researcher and educator clear notions of Science as a field, and science as a method among students. In the kind of science discursive practice that the students deployed and exchanged, it has become apparent that non-human species or animals are tools and objects subjected to arbitrary human designs and choices as mere specimens for observation and experimentation, or as objects of human affection.

This also reinforces the positivist knowledge and methodology of science as instrumentalist, detached, and "objective". CDA also makes evident the lack of critical gaze and problematization of these science discourse construction among the students. This points to the wider and deeper structure and logic created by the prevailing ethos of how the scientific field and practice is communicated via the curriculum and pedagogy; an anthropocentric construction of knowledge which thinks of "...human beings are the central or most significant entities in the world" [23]. This creates the knowledge and belief that humans are superior, human life has value while the rest are merely resources to be exploited.

3.3. Social Practice: Science Controls the "Other"

CDA of students' anthropocentric science discourse was able to highlight the human claim of scientific rationality as justification for its action towards non-human species as the prevailing social practice in the society where this science curriculum and pedagogy are situated. This is highlighted by positioning nonhuman species as the other and the almost routine wielding of the knowledge and tools of Science to control and manage them. The prospective action of intervening in the lives and controlling the animals received no objection on both sides. This points to the already normalized practices where humans "handle" animals based on their better knowledge and understanding of them for the security, safety, and benefit of society. This is apparent in the discursive practice of science research that often figured in the students' debate arguments that normalizes the treatment of animals as mere specimens for research and their valuations are assessed based on human-centric utility in the production of scientific data. Consider the following vignette where the ethical aim of the government side for the animals "...to be free and run wild and live free" is ultimately belied by the underlying parameters that such freedom is made possible by human intervention when the animals are "put" in a sanctuary. This is shown in this statement by the whip of the government side:

> *First, of course the zoos are artificial homes. They are located on the city and they're just trying to imitate the natural habitats of these...of these animals but these original biotic and non-biotic factors that could not be replicate in*

the zoo. These are just temporary solutions for these animals and should not and they should not be put in a zoo because animals of course I'd stated again are not meant to be put in the cage. They're meant to be free and run wild and live free. They're not meant to be put in the cage and be use for the entertainment and the profit for the people. Ladies and gentlemen, on our side on the other hand, we're going to put these animals in a sanctuary… in a sanctuary which are natural habitats of these animals. These sanctuaries are the places of refuge and protection, and this is a refuge for the wildlife (Wendell, Government Whip).

The debate policy position that actively facilitates the practice of intervening on the habitats and lives of animals are exchanged unchallenged so long as it is for the animals' welfare perceived from the human side. This welfare is determined by the application of scientific discourse. It is essentially saying that the animals' right to exist and thrive happens under human auspices and management. This reinforces the "othered" treatment of animals by humans and creates a contrived existence where humans and animals living together in one integrated ecosystem as unfeasible or abnormal. If interactions need to happen between animals and human, the prevailing social practice dictates that it should be the humans who would have to set the manner on how this happens.

They also stated that there would be an interconnection between these animals and humans when the animals that were…that were in the zoo are transferred in a sanctuary but what connection will be formed between the people and these animals if they haven't even seen an actual animal in the first place? (May, Opposition Deputy Leader)

This social practice is revealed with the third tier in the CDA which allows for the examination of a key unchecked practice in the pursuit of science: the normalization of human interventions on animal habitats and lives. This provides a precursor to the unethical debasement of non-human species for the sake of human societal progress. While there are recent ethical protocols, the discourse on this has not yet permeated the epistemic discourses available and used by the STEM senior high school students featured in this case. A concerning implication of this is the uncritical reception of the prospect in the students' debates of extracting animals from their habitats or managing them to either "protect" or "use" them. The stereotypical image of a disengaged and uninterested scientist image of a scientist inside a laboratory dissecting a specimen for research becomes the poster image for such social practice. What this CDA tier has made apparent out of the debate of students on the socio-scientific issue of the closure and maintenance of zoos is the more underlying normalized and non-problematized practice of extraction and resource consumption to satisfy human needs and designs which is prevailingly emblematic of the current practices of pushing forward the frontiers of science. This push in advancing the frontiers of Science is fueled by the desire for human-centric progress and a global heavily interconnected consumerist lifestyle that is indifferent to the consequences and unmindful of how these practices contribute to the ongoing global environmental crisis.

4. CONCLUSION

With the use of frameworks and analytical tools from other disciplines, socio-scientific issue debates could unravel some entrenched discursive and social constructions in the curriculum. CDA's approach to discourse analysis could reveal how language adds to subjugation of "others" [13,14]. Implications drawn from a debate transcript in this paper also demonstrate that oppressive relationships could also extend beyond human-to-human interactions, and to also include human-animal relationships. Raising critical consciousness is part of the initial steps in emancipation – in this case, an emancipation from anthropocentric discursive and social practices in science education [13,14]. This resonates with the common mantra of "oppression of one is oppression of all" associated with human struggles of structural change for social justice. Ecojustice science education now is in engaged in rethinking prevailing assumptions, goals, and methodologies to also emancipate those which has been marginalized and oppressed by the field's modernist tendencies. There have been critiques of the "…empirical-analytical tradition and its focus on the technical and behavioral aspects of the curriculum" [24] and its

shortcomings in constituting a more ecologically sound and just Humans-in-Nature relationship. CDA from the environmentalization and ecojustice education view assists in revealing the power dynamics that underlie the discursive and social practices in science education. There is power in discourse, and it could be used to either reproduce the already ecological unsound logic of the modern, neoliberal, and anthropocentric science that now permeates the curriculum. However, with the use of CDA and other critical lenses and approaches, consciousness could be raised as an initial step towards a science curriculum and science education that could lead to future global societies of "diverse, democratic, and sustainable communities" [4] where humans today and tomorrow create and wield scientific knowledge not as masters of Nature, but as respectful, empathizing, and responsible citizens of a shared interconnected world; a more ethical Society 5.0.

AUTHORS' CONTRIBUTION

Donne Jone Panizales Sodusta: conceptualization, method, data gathering, data analysis, and manuscript writing. Riris Marito Tamba: data analysis and reviewing of manuscript

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REFERENCES

[1] A.E. Yapıcıoğlu, N Atabey. Evaluation of Trends in Theses on Socio-Scientific Issues: The Case of Turkey. International Journal of Progressive Education, 16 (4) (2020) 115-134. DOI: **https://doi.org/10.29329/ijpe.2020.268.8**

[2] A. Hadjichambis, P. Reis, D. Paraskeva-Hadjichambi, J. Činčera, J.B-d. Pauw, N. Gericke, M-C. Knippels, Conceptualizing enviromental citizenship for 21st century education, vol. 4, Springer Nature, Switzerland, AG. DOI: https://doi.org/10.1007/978-3-030-20249-1

[3] R.A. Martusewicz, J. Lupinacci, G. Schnakenberg, EcoJustice Education for Science Educators Cultural Studies and Environmental, vol. 3, Springer, New York, 2010, pp. 11–27. DOI: https://doi.org/10.1007/978-90-481-3929-3_3.

[4] R.A. Martusewicz, J. Edmundson, J. Lupinacci, EcoJustice Education: Toward Diverse, Democratic, and Sustainable Communitie, Routledge, 2014. URL: https://www.routledge.com/EcoJustice-Education-Toward-Diverse-Democratic-and-Sustainable-Communities/Martusewicz-Edmundson-Lupinacci/p/book/9781138018846

[5] M.P. Mueller, D.L. Zeidler, Moral–Ethical Character and Science Education: EcoJustice Ethics Through Socioscientific Issues (SSI), Springer Science_Bussiness Media B.V, 2010.

[6] B.D. Rowe, What's Wrong with Genetic Engineering? Ethics, Socioscientific Issues, and Education, Springer, 2010.

[7] A.R. Santika, W. Purwianingsih, E. Nuraeni, Analysis of students critical thinking skills in socio-scientific issues of biodiversity subject, Journal of Physics: Conference Series, 2018. URL: https://iopscience.iop.org/article/10.1088/1742-6596/1013/1/012004

[8] M. Baptista, P. Reis, V. de Andrade, Let's save the bees! An environmental activism initiative in elementary school. Visions for Sustainability. 9 (2018) 41–48. DOI: https://dx.doi.org/10.13135/2384-8677/2772

[9] L. Simonneaux, J. Simonneaux. STEPWISE as a Vehicle for Scientific and Political Education. Springer, Cham, 2017. DOI:10.1007/978-3-319-55505-8_27

[10] J. Sjöström, I. Eilks V.G. Zuin. Towards Eco-reflexive Science Education: A Critical Reflection About Educational Implications of Green Chemistry Science & Education 25 (3-4) (2016) pp. 321–41. URL: https://eric.ed.gov/?id=EJ1096555

[11] R. Zidny, J. Sjöström, I. Eilks. A Multi-Perspective Reflection on How Indigenous Knowledge and Related Ideas Can Improve Science Education for Sustainability Sci. Educ. 29 (2020), pp. 145–185. DOI: https://doi.org/10.1007/s11191-019-00100-x

[12] D.J. Tippins, M.P. Muller. The Need for Confluence: Why a "River" Runs Through It, vol. 2, Springer, Dordrecht, pp 1–4. [13] N. Fairclough. Critical Discourse Analysis: The Critical Study of Language, (2nd ed.). Routledge, 2010. URL: https://doi.org/10.4324/9781315834368

[14] N. Fairclough. Language and Power, (3rd Edition). Routledge, 2014. URL: https://www.routledge.com/Language-and-Power-3rd-Edition/Fairclough/p/book/978113879097

[15] R. Wodak. Disorders of discourse. New York: Longman, 1996. URL: http://www.worldcat.org/oclc/33948228

[16] J.P. Gee. Discourse Analysis: What Makes it Critical? An Introduction to Critical Discourse Analysis in Education, Routledge, 2011. URL: https://www.routledge.com/An-Introduction-to-Critical-Discourse-Analysis-in-Education/Rogers/p/book/9780415874298

[17] S. Titscher, M. Meyer, R. Wodak, E. Vetter. Methods of Texts and Discourse Analysis. Sage Publications Ltd, 2000. URL: https://www.doi.org/10.4135/9780857024480

[18] T.A. Van Dijk. Critical Discourse Analysis The Handbook of Discourse Analysis, in: Hoboken, NJ, USA: John Wiley & Sons, Inc., 2015, pp 466–85. DOI: https://doi.org/10.1002/9781118584194.ch22

[19] V. Braun, V. Clarke. Using thematic analysis in psychology, Qualitative Research in Psychology, 3 (2), 2006, pp. 77–101. DOI: 10.1191/1478088706qp063oa

[20] M. DeMello, Animals and Society: Changing Perspectives, vol 1 New York: Columbia University Press. 2012. URL: cup.columbia.edu/book/animals-and-society/9780231152945

[21] E. Hufnagel, G.J. Kelly, J.A. Henderson. How the environment is positioned in the Next Generation Science Standards: a critical discourse analysis Environmental Education Research 24 (5) (2018) 731–53. URL: https://doi.org/10.1080/13504622.2017.1334876

[22] H. Woodside-Jiron. Language, Power, and Participation: Using Critical Discourse Analysis to Make Sense of Public Policy An Introduction to Critical Discourse Analysis in Education, Routledge, 2011. URL: https://www.taylorfrancis.com/chapters/edit/10.4324/9781410609786-15/language-power-participation-using-critical-discourse-analysis-make-sense-public-policy-haley-woodside-jiron

[23] S.E. Boslaugh, Anthropocentrism Green Ethics and Philosophy: An A-to-Z Guide, SAGE Publications, Inc., 2011. URL: https://sk.sagepub.com/reference/greenethics/n4.xml

[24] A.C. Bell, C.L. Russell. Beyond human, beyond words: Anthropocentrism, critical pedagogy, and the poststructuralist turn. Canadian Journal of Education 25 (3) (2000), 188–203. URL: https://journals.sfu.ca › cje-rce › article › download