Topic Modelling Analysis to Explore Policy Considerations Regarding the Practical Introduction of Affirmative Action in the Field of Education

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Abstract

The aim of this study is to explore the policy considerations that should be taken into account regarding the practical introduction of affirmative action policies in the field of education. For this purpose, we analysed the 100 most relevant YouTube videos produced between 2015 and 2023 using network analysis, the aim being to utilize the material they provide on affirmative action so as to reflect this in future education policies. As a result, nine key policy considerations that should be considered when introducing affirmative action policies in the field of education were derived.

1. Introduction

Around the world, many countries and regions are introducing affirmative action policies, or discussing them. These policies are, however, necessarily adjusted to various political, social and cultural situations and so are applied differently in each country and region. For example, in the United States, one of the countries that have adopted affirmative action policies most extensively, it is common to consider race, gender and other diversity factors in college admissions. Nevertheless, legal disputes and controversies in this area continue to exist. Canada, also, is introducing affirmative action in some areas of education with the aim of promoting diversity. In particular, Canada is committed to promoting equality of educational and occupational opportunities across race and gender lines. European countries have taken a different approach from that of the United States. Some have implemented policies for promoting diversity, but in others these policies are controversial or weak (1) (2).

The global trend is towards introducing affirmative action in the field of education, but this has presented many problems. Some critics argue that affirmative action leads to reverse discrimination against certain races or genders. This criticism implies that if one group is advantaged in the process of selecting students on the basis of test scores or academic achievement, other groups are unfairly disadvantaged. In addition, some students who enter school or college owing to affirmative action may lack academic ability. This can affect academic performance, and there are concerns that this will lead to a decline in academic standards (3) (4).

In addition, it is pointed out that affirmative action can sometimes be perceived as conferring benefits on a specific group or disadvantaging another group. This raises legitimacy issues and can deepen social division. Additionally, if affirmative action is applied in schools or universities, competitiveness among students may be relatively reduced. This may present a problem regarding the job market of the future, and some argue that students should be better prepared to compete.

It is clear, then, that affirmative action in the field of education has both advantages and disadvantages. Thus,

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when introducing and applying affirmative action in education, it is necessary to adopt a balanced perspective that preserves the advantages while obviating the disadvantages. From this balanced perspective, if the aim is to reflect the affirmative action method in education policy, it is necessary to understand affirmative action in the context of the unique political, economic and social circumstances of each country. Against this background, this study seeks to design a balanced policy mechanism through which affirmative action can be reflected in the educational field in countries where parents' enthusiasm regarding the education of their children is extremely strong. The aim is to contribute to the stable introduction of socially controversial policies by suggesting suitable areas for the application areas of affirmative action methods in educational settings, along with areas where reflection is required. Also, this approximation will help to better understand current, emerging and future digital environments in which race, gender and others psychosocial factors are still overlooked, based on the results of multiple studies (5) (6) (7) (8) (9) (10) (11) (12) (13).

The material used for this purpose is drawn from YouTube videos. From the materials found on YouTube, we extract those containing both the keywords 'affirmative action' and 'education', and use this data to construct an ego-network and analyse it in order to derive key policy issues.

2. Theoretical Discussion and Research Problem Setting

'Affirmative action' refers to governments, businesses, schools and other organizations implementing policies such as special support and positive discrimination, along with a limited list of preferential treatments that take into account various population characteristics such as race, gender, ethnicity and place of origin (14) (15) (16). The aim of these policies is to eliminate past or present inequality and discrimination, promote diversity and ensure that all individuals have equal opportunities. Affirmative action policies are often used to promote racial, gender and ethnic diversity, resulting in additional opportunities and benefits for historically oppressed groups, or selective admissions, hiring and contracting opportunities based on specific population characteristics. These policies are implemented with the purpose of resolving social inequality and discrimination, but they are controversial, and opinions differ as to how they should be implemented and as to their effectiveness, making them the subject of extensive academic research and discussion (17) (18) (19).

Studies relating to the application of affirmative action methods in the field of education can be broadly classified into several categories (20) (21) (22). First, there are studies relating to diversity promotion and educational performance. These studies analyse and discuss the impact of affirmative action on the educational and economic outcomes of white students, and focus on investigating and

analysing the impact of such action on student diversity and educational outcomes in elementary, middle and high school or college admissions. Second, there are studies relating to the policy implementation and results of affirmative action. These studies primarily focus on examining and analysing the legal aspects of affirmative action policies and their consequences for college admissions. In addition, these studies are of great interest in examining the impact of affirmative action on the selection of minority students in elite colleges and universities.

Third, there are studies relating to the social impact and benefits of affirmative action. They primarily explore the impact of affirmative action policies on the political forms and social structure of the United States. Finally, there are studies on the controversy and criticism of affirmative action policy. They raise objections to affirmative action and discuss the ethical issues and inefficiencies of such policies. In this connection, there are many case studies analysing and discussing the negative effects of affirmative action on African Americans (23) (24) (25).

Although written from a similar perspective to the above fourth category, there are many papers that point out that the educational competitiveness may be weakened when affirmative action is introduced into education policy. For example, Richard Sander and Stuart Taylor Jr. (2012), in 'Mismatch: How Affirmative Action Hurts Students It's Intended to Help, and Why Universities Won't Admit It' (26), argue that affirmative action can affect students' academic fitness and academic performance. They argue that it may have a negative impact – in particular, that students may suffer academically as they enter schools with lower than normal admission standards. However, factors like culture, beliefs and emerging social representation, social networks, counselling and other educational interventions, must be taken into consideration (27) (28) (29) (30) (31) (32) (33) (34) (35) (36).

In addition, another study argued that affirmative action distorts competition among students and creates unnecessary positive selection, thus potentially causing racial discrimination (37). Their study addresses claims that this may have a negative impact on academic suitability and academic performance. By contrast, other studies argue that affirmative action can help students gain higher rates of admissions than other students (38). Accordingly, the present study analyses the negative impact on academic suitability and academic performance when pupils enter school.

So, what conditions must be considered in order to enable the successful affirmative action in the field of education? Research on this includes the strategies for the successful implementation of affirmative action and case studies at the university level, and the explanation of what is needed for schools and universities to successfully implement such policies (39) (40) (41). In addition, analysis and discussion of the elements necessary for effectively applying affirmative action policies and efforts to promote diversity within universities (42) (43) (44). On the basis of the problem recognition and acknowledgement

of social background offered by these**,** the present study aims to causally analyse the conditions that must be considered when individual countries wish to apply affirmative action methods in the field of education. We set the following research questions:

What are the important issues relating to affirmative action in the contemporary education field?

What kind of balanced policy adjustment device can simultaneously enable affirmative action and strengthen educational competitiveness?

3. Analysis Design

3.1. Analysis data

We use YouTube video materials to examine affirmative action issues in the field of education. Unlike academic papers, these materials have the advantage of dealing with various issues encountered in actual educational settings. However, is necessary to stated that bibliometric and other scientometric studies could contributed to improve the methodological approach to this subject (45) (46) (47) (48) (49).

3.2. Analysis period

The analysis period of this study ran from 2015 to June 2023, the former being the year in which the UN announced the creation of sustainable development goals (SDGs). Since these SDGs require countries experiencing social inequality to meet certain standards, the period in which these policies were announced has special meaning. Policies such as affirmative action have attracted a great deal of social attention since 2015. However, if the period were set as running strictly from 1 January 2015 to 30 June 2023, too many videos might be included, and so only those 100 videos that are most directly relevant will be extracted and analysed.

3.3. Analysis method

Original data containing the keywords 'affirmative action' and 'education' are extracted from YouTube videos, and techniques such as word cloud analysis, ego network analysis and machine learning analysis are applied to these data to derive key issues. In addition, we aim to design a policy adjustment mechanism where affirmative action and educational competitiveness can coexist simultaneously by analysing related policies causally.

4. Analysis Results

4.1. Word cloud analysis

The word cloud analysis results for words included in the analysed network data are shown in Figure 1.
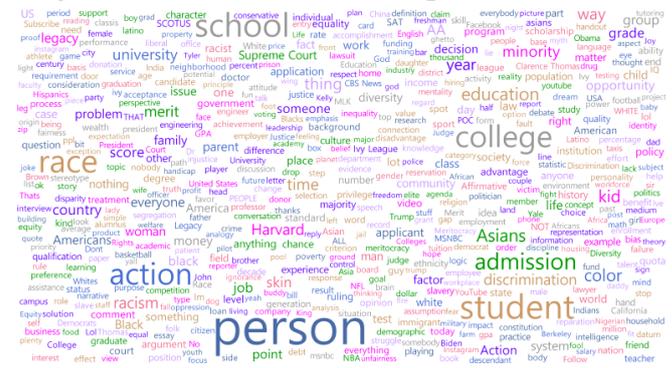

Figure 1. Word cloud analysis results

The network created in this way is so vast that it is necessary to first divide it into core topics and organize them. To accomplish this, we first attempted to determine the appropriate number of topics using the Netminer program. The coherence verification method was used for this. Table 1 shows the coherence verification results. Still, several studies indicated that this particular issue suggest the need of future research and different types of methodologies (50) (51) (52) (53) (54) (55) (56).

4.2 Topic modelling analysis

As Table 1 suggests, coherence verification problem can be judged using statistics relating to cv and u_mass, and it is considered desirable when cv is high and u_mass is low**.** In this case, the number of topics was nine, and the alpha and beta values in this case were set to 0.020 and 0,010, respectively. On the basis of this information, we decided to analyse the number of topics at nine.

Table 1. Coherence verification results

Coherence Result

Index	Topic (k)	alpha	beta	u_mass	c_v
1	5.000	0.010	0.010	-2.851	0.717
2	5.000	0.010	0.020	-4.303	0.617
3	5.000	0.020	0.010	-3.851	0.666
4	5.000	0.020	0.020	-4.356	0.649
5	6.000	0.010	0.010	-2.617	0.717
6	6.000	0.010	0.020	-4.908	0.626
7	6.000	0.020	0.010	-5.805	0.629
8	6.000	0.020	0.020	-5.357	0.640
9	7.000	0.010	0.010	-4.510	0.658
10	7.000	0.010	0.020	-4.766	0.659
11	7.000	0.020	0.010	-3.852	0.634
12	7.000	0.020	0.020	-3.057	0.719
13	8.000	0.010	0.010	-4.259	0.682
14	8.000	0.010	0.020	-4.759	0.695
15	8.000	0.020	0.010	-4.091	0.735
16	8.000	0.020	0.020	-4.740	0.647
17	9.000	0.010	0.010	-3.332	0.715
18	9.000	0.010	0.020	-5.356	0.615
19	9.000	0.020	0.010	-3.628	0.684
20	9.000	0.020	0.020	-3.284	0.744
21	10.000	0.010	0.010	-4.900	0.680
22	10.000	0.010	0.020	-4.445	0.688
23	10.000	0.020	0.010	-4.524	0.683
24	10.000	0.020	0.020	-3.893	0.752

Figure 2 is a graph for verification of coherence, and helps determine the number of topics using the cv value and u_mass value.
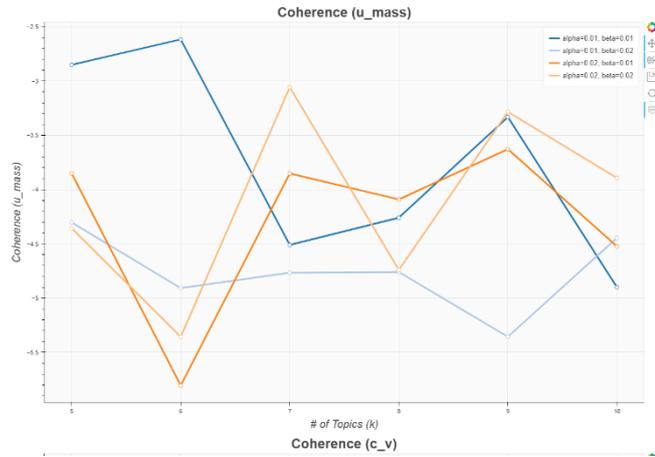

Figure 2. Coherence verification graph

The number of appropriate topics presented in Figure 2 and Table 1 was nine. Therefore, the number of topics was set to nine, and topic modelling analysis was performed using alpha and beta values. Concentric circle analysis is performed using a network limited to nine topics derived from topic modelling analysis, as shown in Figure 3.
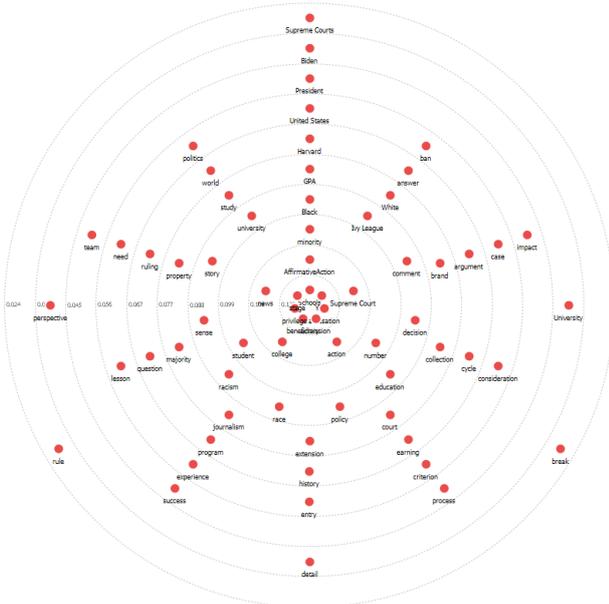
Figure 3. Concentric circle analysis results

Figure 4 shows the results for the network of words that make up the network limited to nine topics. Because the important keywords are interconnected, understanding the whole network appears somewhat complicated.
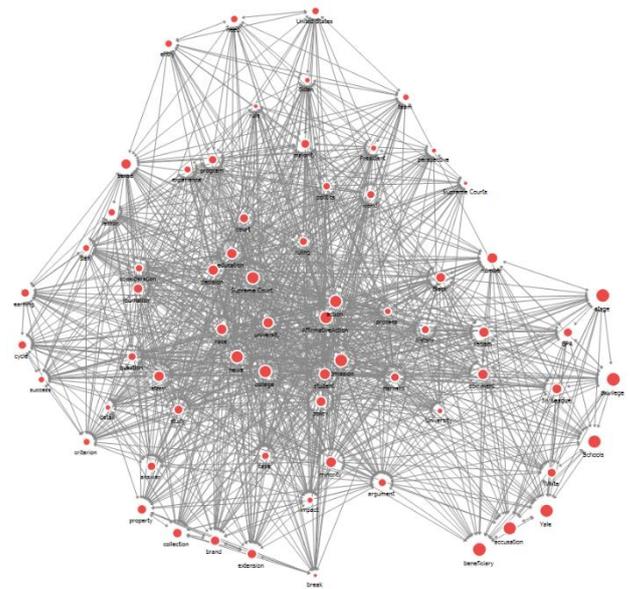
Figure 4. Network analysis results for a network made up of topics

Table 2 shows the degree centrality values of the words that make up the core network. In this network, the in-degree centrality and out-degree centrality values are the same. The degree centrality values of beneficiary privilege, stage, schools, Yale and accusation are the highest and show the same value. This suggests that these words play an important role in the core network.

Table 2. Degree centrality values of keywords

		1	2
		In-Degree Centrality	Out-Degree Centrality
1	beneficiary	0.130650	0.130650
2	privilege	0.130650	0.130650
3	stage	0.130650	0.130650
4	Schools	0.130650	0.130650
5	Yale	0.130650	0.130650
6	accusation	0.130650	0.130650
7	admission	0.123604	0.123604
8	AffirmativeAction	0.118654	0.118654
9	news	0.117558	0.117558
10	action	0.117158	0.117158
11	college	0.116581	0.116581
12	Supreme Court	0.115842	0.115842
13	minority	0.101646	0.101646
14	number	0.101104	0.101104
15	student	0.100890	0.100890
16	university	0.098480	0.098480
17	sense	0.097909	0.097909
18	racism	0.095653	0.095653
19	race	0.094963	0.094963
20	decision	0.094938	0.094938
21	story	0.094540	0.094540
22	comment	0.094378	0.094378
23	education	0.094061	0.094061
24	policy	0.091344	0.091344
25	Ivy League	0.090114	0.090114
26	Black	0.088720	0.088720

PFnet analysis was attempted to visually show a simple network consisting of only core words by reducing the complex network encompassing all words to a core network. This analysis method leaves only the network of words with values above a certain standard in order to utilize complex networks simply. Therefore, it is necessary to perform Path Finder network (PFnet) analysis, leaving only the core framework. Figure 5 shows a simplified framework structure derived from PFnet analysis.

Figure 5. PFnet analysis results

Cluster analysis was performed again to represent the above skeletal structure as a certain cluster. As a result of the analysis, it was re-organized into nine core clusters. Figure 6 shows the results of clustering analysis.

Figure 6. Clustering analysis results

As Figure 6 shows, a total of nine clusters were derived. Here, this means that words included in the same cluster are in a close relationship with each other. Therefore, a causal map between variables can be constructed using the precedence relationship between words included in the same cluster.

Table 3 shows the composition of the words included in the nine clusters.

Table 3. Characteristics of words making up the nine clusters

Number	Cluster content	Keywords	Characteristics
Cluster 1		minority, argument, Ivy League, White, privilege, beneficiary, GPA, number, Yale, accusati	Criticism of predominantly white people being admitted to prestigious universities and the privilege

Cluster	Diagram	Keywords	Description
Cluster 2	on, schools, stage, comment, rule	impact, Supreme Court, question, university	that arises as a result.

Impact of ruling by Supreme Court onuUniversities. |
Cluster 3	(admission, Harvard, college, case, student, policy, history, race)	consideration, race, college, Harvard, case, admission, student, policy, history	The need for policy consideration of race issues at prestigious universities such as Harvard.
Cluster 4	(answer, study, success, cycle, earning, ban, criterion)	success, ban, earning, criterion, study, answer, cycle	Relationship between education and income.
Cluster 5	(break, extension, brand, property, collection, journalism)	extension, detail, collection, property, journalism, brand, break	Journalism's impact on university brands.
Cluster 6	(education, action, Supreme Court, story, news, decision)	university, ruling, news, story, Supreme Court, decision, action, education	Importance of Supreme Court ruling on university education.
Cluster 7	(Biden, President, court, politics, perspe)	perspective, experience	Political implications of President Biden and the Court's decision.
Cluster 8	(program, sense, entry, United States, need, team)	affirmative action, program, sense, entry, United States, need, team	In the United States, affirmative action in educational matters, which is highly related to school admissions.
Cluster 9	(world, process, Black)	majority, Black, world, process	Affirmative action defined as the process of solving problems where the majority dominates the minority.

As Table 3 suggests, affirmative action policy issues in the field of education can be said to comprise nine important issues. These are as follows:

1. There is criticism that only white people are admitted to prestigious universities, thus according them unfair privileges.

2. The ruling by the US Supreme Court has had a significant impact on universities.

3. There is a race issue at prestigious universities such as Harvard. It is generally accepted that there is a strong need for policy improvement.

4. Because there is a strong relationship between academics and income, white people who enter good universities have an advantage in terms of income.

5. Journalism has a significant impact on university brands.

6. The US Supreme Court ruling on college education has a significant social impact.

7. It is politically significant for President Biden and courts in the United States to adjudge and take decisions relating to universities and affirmative action.

8. In America, there is a strong correlation between affirmative action and school admissions.

9. Affirmative action should be defined as the process of solving the problem of the majority ruling the minority.

5. Implications and Conclusion

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As a result of the analysis carried out in this study, the policy implications for incorporating affirmative action in the field of education in the future are as follows:

1. Efforts are needed to incorporate affirmative action into education so as to basically increase the competitiveness of education and prevent political controversy. To achieve this, it is necessary to set transparent standards and evaluation criteria. It is necessary to clearly establish and publicly share the application and evaluation criteria for affirmative action policies. Thereby, students and stakeholders should be able to understand how the policy works.

2. Basic data collection and monitoring are important. It is necessary to continuously monitor the effectiveness of policies, collect data and evaluate results. This makes it possible to check the performance and side-effects of the policy and make necessary adjustments.

3. Efforts must be made to improve the quality of education. It is necessary to promote measures to encourage diversity and improve the quality of education through affirmative action policies, thus striving to ensure that all students receive high-quality education.

4. Activity is called for in participation and opinion collection. In order to hear and consider the opinions of various stakeholders, procedures must be clarified and active participation encouraged. Active communication channels must be established so that all stakeholders, including parents, teachers, students and education experts, can participate in policies and share their opinions.

5. Legal compliance must be emphasized. When establishing an affirmative action policy, there is a need to strictly comply with the laws and regulations of the relevant country or province. Political controversy can be minimized only when policies are implemented while complying with legal requirements.

6. Affirmative action policies must be pursued according to a long-term vision. It is necessary to incorporate this policy not only into short-term goals but also into long-term vision and goals. This policy must be sustainable and contribute to improving the education system as a whole.

7. Finally, collaboration with various stakeholders is vital. Affirmative action policies in education will achieve greater success through collaboration with educational institutions, governments, communities and non-profit organizations.

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