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Identification of Research Thematic Approaches Based on Keywords Network Analysis in Colombian Social Sciences

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Additional information is available at the end of the chapter

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Abstract

The purpose of this research was to unveil the structure of knowledge of Social Sciences in Colombia through the analysis of thematic networks and its association with different disciplines' new knowledge production to define scenarios and trends in each. 2992 published articles in the period 2006–2015 were revised in this research, all indexed in Web of Science, Scopus and other bibliographic databases, applying the social networks analysis technique to the keywords of all. The analysis included each discipline's clustering coefficient and group metrics. The results described in this chapter identify how social disciplines in Colombia have mainly focused its research production in topics such as armed conflict, poverty and human development.

Keywords: social sciences, field of study, network analysis, keywords, Colombia

1. Introduction

Social Sciences agglomerate disciplines with a diverse object of study. Such diversity defines a thematic amplitude according to the multiple approaches and perspectives that surround social studies. Among the different disciplines, the appearance of distant methodological offers leads to significantly dissimilar analysis focuses regarding a same phenomenon. For

example, psychology applies quantitative research methods that belong to “hard sciences” through which it associates variables, predicts or explains human behavior. But also, psychology develops studies with qualitative approaches focused on the comprehension of the meaning around social and individual phenomena. Both of the approaches imply clearly differentiated theoretical corpora. Educational field’s research is predominantly qualitative [1], which also happens in Laws and Political sciences.

In summary, the study of Social Sciences is related to the variance of its object of study, which provides a complex, diverse and variable scenario of topics. For each scientific discipline, recognizing such topics means a significant contribution in the delimitation of the field of study, approaches posed or connections between investigative and theoretical proposals; it also helps researchers to determine which areas of work to explore or deepen and whom to cooperate with depending on the common interests.

2. The thematic-approach based analysis of scientific fields of study

Research in Social Sciences has lately changed its presentation, that is, with the publication formats used or association strategies between authors and institutions. Bibliometric research has mostly focused its interest on the productions indexed in Web of Science (WoS) and Scopus [2, 3], the internationalization of Social Sciences [4], the collaboration between authors and institutions [5–9] i.a. Bibliometric studies have made possible the characterization of the Social Sciences researchers’ scientific production, nevertheless, works surrounding thematic approaches analysis in this field of knowledge are still a proposal in development that has been evolving from the perspective of analysis and textual data visualization.

Studies with the goal to identify the structure of science are more common every day, seeking to understand areas of knowledge’s organization systems, relevant topics and research agenda. In other words, one of the most important tasks in scientometrics is the decomposition of scientific literature into disciplinary and sub-disciplinary structures [10]. This task is highly complex because it requires large volumes of information from which it is only possible to identify patterns through the use of computational tools [11].

The development of methods based on the usage of research production network metrics has been remarkably useful in the mapping construction. These studies have addressed diverse topics such as science interdisciplinary level [12], the multi-centric organization of basic sciences’ structure with bidirectional information flux in disciplines such as Physics, Chemistry or Medicine [13], the identification of edge and central concepts within a scientific discipline [14], the comparison of the different disciplines’ topological organization of quotation networks [15], the structural precision of the scientific panorama according to the size, similarities and interconnection among the different areas of science [16] i.a.

2.1. Social networks analysis and co-words method

Science maps or structures analyses also include the revision of scientific production’s semantic components as an identification mechanism of a particular area’s relevant topic of study.

For these purposes, the use of methods that take advantage of the textual resources and techniques of documentary summary has grown [15]. A useful tool that facilitates the identification of approaches and thematic trends in the different knowledge fields is the usage of metrics derived from text networks that define the interconnection of words or semantic fragments.

Social Network Analysis (SNA) is a common-used method in which the mapping procedures of terms' network structure [17] are made considering the relative importance of the concepts, the relational density level between them, that is, real connections given within all the possible connections, and the proximity among the different semantic units considered inside the networks.

Another possibility lies in the identification of clusters, from which the aggrupation of words according to its attraction is conformed, which gives rise to textual regions of high or low frequency where words are common or rare respectively [18].

Based on these analyses, knowledge maps are generated, they are built from the identification of co-occurrence in terms or words. This is a content analysis technique that eases the analysis of relations emerging within the ideas from a specific text [19, 20]. In the analysis, main topics from a scientific area are extracted and co-related to determine bonds between them [21] allowing the construction of hierarchies to define central research problems and (smaller) auxiliary areas [22].

2.2. Thematic approaches and contextualization of social problems

An important premise given by the SNA is the dynamic nature of the networks, which means that they can be structurally transformed when influenced by diverse variables [23]. For this reason, knowledge maps or networks are understood as dynamic structures, which contents are adjusted to the evaluation period and the immediate reality that affects the scientific work.

This is an especially important consideration in Social Sciences, given that social's relative nature is a feature inherent to the object of study of the disciplines that deal with these phenomena, therefore, the problems that social research addresses have a high contextual value [24, 25]. In general, the properties of scientific production are different between authors in the central region (North America & EU) and authors from peripheral scenarios as in the case of Latin-America [26, 27], this is noticeable in type of productions generated [28, 29] (central region has a higher number of works indexed in WoS and Scopus while peripheral area has preferences in local sources), as in the contents, themes of predilection and the significance value that the regional context gives to the studied problems.

This leads the social scientist to adjust the researched themes to the main problems of his immediate context [30, 27], which means that the networks of the thematic field can be substantially different depending on the social reality and the geographic position of the researchers. The study of meaning networks helps to understand those local-weighted differences defining the connections that facilitate the instauration of specific thematic axes in a field of knowledge.

This particular study applied the SNA fundamentals and the co-words method to identify the keyword networks in seven disciplines of the Social Sciences in Colombia. The results shared are part of a wider scientometric project that includes collaboration networks between authors and institutions and the assessment of research groups' scientific quality.

3. Methodological aspects of the study

2992 scientific articles published between 2006 and 2015 were analyzed for this study, all indexed in WoS, Scopus and other regional and international bibliographic databases (PsycINFO, Scielo, REDALyC, Political Science Complete, ProQuest, and others). The works belonged to the areas of Psychology, Education, Law, Sociology, Political Sciences, Journalism and Other Social Sciences (Economics, Anthropology, i.a). The production was developed by 7774 researchers from 168 research groups classified in the Colombian National System of Science, Technology and Innovation (SCIENTI-Col).

The keyword networks analysis was accomplished through the construction of vertical edge matrices using the NodeXL Excel Template (2016 version) software. For the generation of sub-groups inside networks the cluster coefficient of each area of knowledge was used. The cluster coefficient is the measure in which the nodes of a graph tend to cluster together with a relatively high density of the links. In this study, the clusters were calculated using the Clauset-Newman-Moore algorithm [31], which is highly effective for inferring community structure from network topology, being much faster than other algorithms that precede it, as well as allowing the calculation of community structure analysis in very large networks. Subsequently the group metrics were calculated, being: word counting by semantic group, number of established connections, maximum geodetic distance (DGM), its respective statistic measure (GDμ), and the relational density of each group. As a general criterion, it was defined that the main groups chosen would have a minimum integration of 10 keywords.

The visualizations of the networks (graphs) were organized using *grid algorithm*, which allows to clearly identify the sub-groups and their interaction.

The graph distribution was made with Harel-Koren Fast Multiscale [32], which eases the esthetic drawing of non-directed graphs with edges ordered in straight line, accomplishing the drawing procedure quickly for big networks. The node sizes were assigned according to the gross nodal degree obtained, that is the number of mentions in each term, the visualizations show all the nodes sized above 5, the lesser-graded nodes were overshadowed from 25 to 40% for the purpose of esthetic, simplicity and better readability of the graphs.

4. Fields of study in Colombian social sciences. Relevant results

Table 1 describes the sociometric properties of each group identified in Other Social Sciences.

Being an area that integrates several disciplines, it is expectable for thematic groups to have diverse analysis lines. In group 1, for example, at least three sub-groups are differentiated; The first one is focused in science studies and scientific production, the second one emphasizes in the problems associated to violence and the third agglomerates social and anthropologic study proposals and methodological approaches.

Other lines are focused on experiences linked to the armed conflict and the necessity of the social capital recovery, as well as conflicts regarding the environment and the territories. Equally,

Group	Group metrics					Grouped thematic lines (group name)
	Words	Connections	MGD ^a	GD μ ^b	Density	
G1	55	179	4	2.245	0.080	Science studies—social violence—diverse social approaches
G2	24	75	6	3.007	0.170	Post-conflict and social recovery
G3	22	75	4	2.112	0.212	Socio-environmental conflicts
G4	21	67	4	2.222	0.210	Social reintegration and Life quality
G5	21	63	4	2.150	0.190	Child labor and children development
G6	20	66	5	2.300	0.211	Urban development, basic needs and Health
G7	11	37	2	1.455	0.400	Bibliometric studies
G8	10	33	2	1.380	0.467	Administrative and financial processes
G9	10	23	4	1.860	0.333	Logistics

a = Maximum Geodetic Distance.
b = Mean geodetic distance.

Table 1. Keywords networks analysis in Other Social Sciences: description of metrics by thematic lines.

studies surrounding health, life quality and well-being of individuals in the civil reintegration process are highlighted. The scientific interest is also attracted by child labor, particularly referring to exploitation, violation of rights and exposure to risk conditions associated with work.

Groups 8 and 9 cross the eminent social barrier of the other groups, focusing on financial or administrative nature issues. Clustering terms related to the organizational activities and their financial affairs.

Figure 1 shows that thematic groups in Other Social Sciences have low density. The main inter-group relations are given between groups 1, 2 and 3, and between 2 and 4. Few thematic

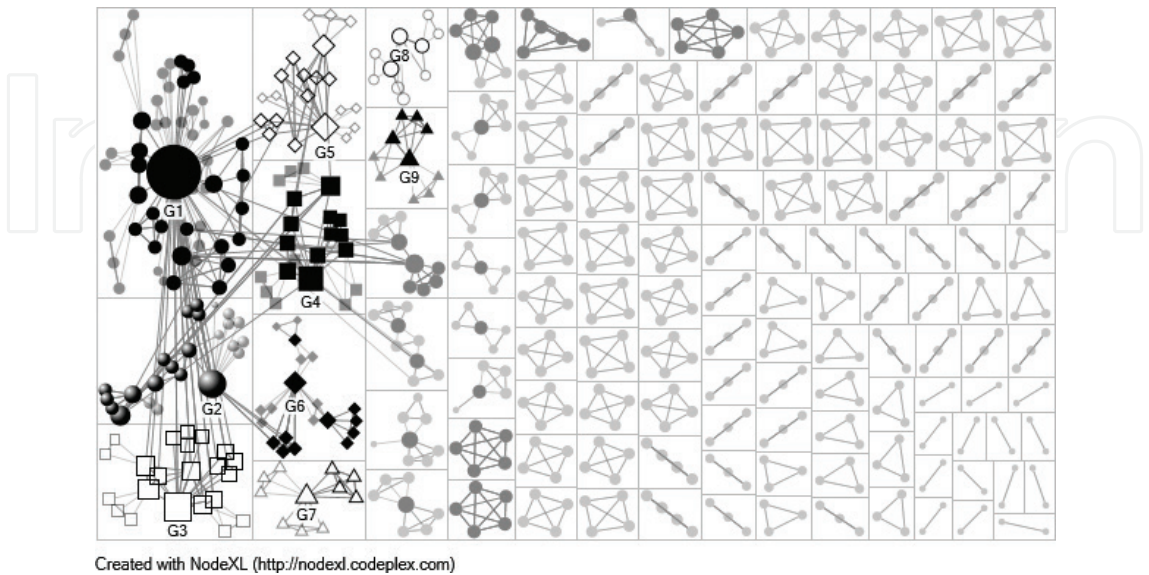


Figure 1. Graph of thematic groups with inter-group relations in Other Social Sciences.

interactions are found, perhaps because it is an area that includes research groups from different disciplines.

Information regarding thematic lines identified in **Psychology** appear in **Table 2**. In this discipline, the highest number of interconnected terms is related to neuroscientific issues and mental health, syndromes, conduct disorders and neuropsychological problems.

Several therapeutic approaches also excel inside relevant study topics, with cognitive system as precedence. Gender approach has an important role, specially facing phenomena as violence and sexuality. The qualitative notion of health and illness is seen from a perspective focused on the meanings constructed around the disease experience. The dynamic is also supported with other thematic lines directed to the meaning construction in front of social phenomena.

We observed interest in the social nature of psychological conditions of teens and children, by approaching violence, aggression and their related elements as factors that influence mental health and functional and non-functional behavior.

Group	Group metrics					Grouped thematic lines (group name)
	Words	Connections	MGD ^a	GDμ ^b	Density	
G1	183	944	9	3.888	0.032	Health and neuropsychological rehabilitation
G2	132	642	12	4.720	0.039	Clinical psychology, psychotherapy and public health
G3	119	581	10	3.908	0.044	Violence, aggression and mental health
G4	92	448	11	4.164	0.058	Qualitative social research and consumer psychology
G5	86	336	7	3.096	0.051	Quantitative methods; ethics and social/family conflicts
G6	82	330	9	4.166	0.055	Family, attachment relationships and gender
G7	53	205	5	3.104	0.082	Basic and applied psychology epistemology
G8	46	231	4	2.408	0.118	Basic research and neurosciences
G9	41	113	8	3.367	0.090	Instrumental studies in clinical psychology
G10	37	128	6	3.217	0.114	Psychology and psychopharmacology
G11	36	148	5	2.924	0.140	Health significances, illness and social development
G12	25	82	4	2.438	0.160	Bibliometric studies
G13	22	74	6	2.711	0.173	Subjectivities, violence and rights
G14	21	78	5	2.531	0.214	Basic research in consumer psychology
G15	18	61	6	2.759	0.222	Psychology of work and social inclusion
G16	15	38	5	2.347	0.238	Positive approach in health and coping
G17	15	47	4	1.982	0.295	Psychology of language

a = Maximum Geodetic Distance.

b = Mean geodetic distance.

Table 2. Keywords networks analysis in Psychology: thematic lines metric description.

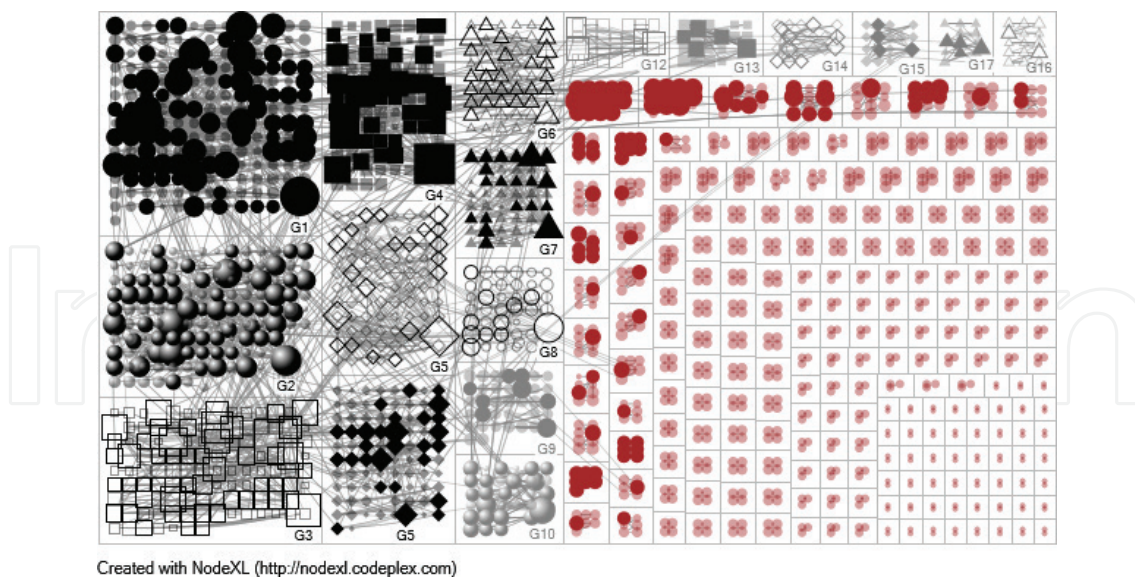


Figure 2. Graph of thematic groups with inter-group relations in Psychology.

Among other thematic groups, psychology research in Colombia approaches: (a) consumer behavior, publicity and alike, (b) analysis of family's cycle of life, affective relationships and family dynamics, highlighting a particular role in the analysis of the differences between men and women in issues related to family development, (c) axiological study of social problems through the integration of values, moral, reflexivity and relational, social, political conflict, (d) methodological studies (qualitative, quantitative), epistemological revisions and reflexive approaches about the discipline's reach. **Figure 2** shows keywords network for Psychology.

Colombian research produced in the area of **Laws** shares with the other described disciplines an interest towards armed conflict, human rights and diverse social and juridical issues associated with violence. Among the production of Law researchers also excel the topics related to international processes that involve human groups migration, States participation and the protection guarantees of the migrants. Another local context issues are clearly relevant such as armed conflict and transitional justice, illegal actors, disarmament processes and the relations with the victims. The approach of mediation stands out as an instrument associated with the construction of peace. In addition, terms inherent to law and juridical exercise ethics are also common (**Table 3**).

Inside the field of study around Laws in Colombia, the following topics have been objects of academic analysis: (a) protection relating to personal interests over real rights and properties, (b) historical sources revision, reflexive analysis of the juridical exercise, (c) ownership and tenure of land, crops and peasant labor, agro-industry and rural development from a perspective of agrarian law and social rights, (d) analysis of criminal law issues, from an accusatory perspective as well as a focus on the defendants and their protection guarantees, (e) the reality of women as a infringed individuals, integrating terms related to intimate, moral and sexual rights of women.

The graph (**Figure 3**) generated for this field of knowledge allows to identify a high connection level between keywords of each thematic group, moreover, there is a notorious relation between groups 2, 3, 5 and 6. For its part, group 1, which thematic is focused on conflict, migrations and

Group	Group metrics					Grouped thematic lines (group name)
	Words	Connections	MGD ^a	GD _μ ^b	Density	
G1	179	933	7	3.341	0.033	Armed conflict, international right, migration and minorities with gender approach
G2	132	731	7	3.580	0.041	Constitutional and administrative law
G3	95	476	12	4.449	0.054	Conflicts, mediation, peace and law ethics
G4	88	389	8	4.153	0.055	Special protection groups and social rights
G5	82	567	9	4.093	0.081	Civil and patrimonial right
G6	69	365	10	3.751	0.081	Violence, refugee protection and environment
G7	69	483	7	3.302	0.097	Public law and supranational issues
G8	57	288	11	4.596	0.095	Epistemology, history and Right
G9	40	207	5	2.565	0.138	Agricultural, environmental issues and countryside dev.
G10	29	195	4	2.257	0.239	Law and criminal processes
G11	24	95	5	2.448	0.185	Violence against women and rights approach
G12	17	88	4	2.021	0.324	International law studies
G13	17	100	3	1.647	0.404	Public administration and crime studies
G14	15	81	3	1.662	0.419	Individual freedoms and role of the state

a = Maximum Geodetic Distance.

b = Mean geodetic distance.

Table 3. Keywords networks analysis in Laws: thematic lines metric description.

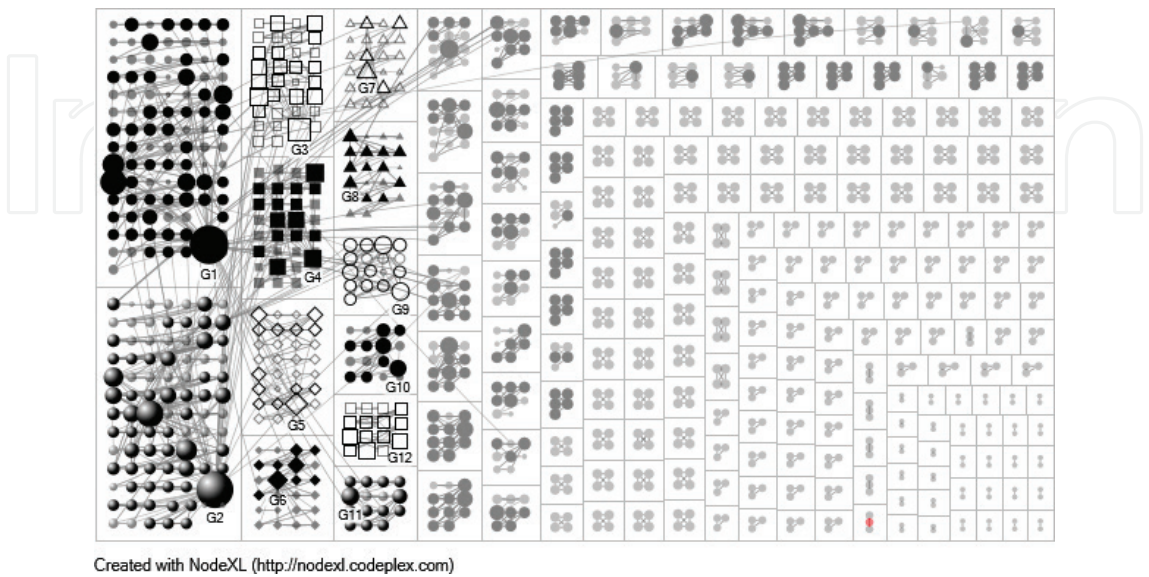


Figure 3. Graph of thematic groups with inter-group relations in Laws.

gender, constitutes a sub-group that agglomerates a vast number of keywords with high-leveled nodal degree, what exposes this group as the area in the field of Laws in Colombia with the highest exploration level in the last decade.

In the case of **Education (Table 4)**, 12 thematic lines were identified as relevant, with an important variety of contents due to the reach of the groups registered in the Colombian scientific system, focusing not only in pedagogical processes at a school level, but also in university teaching and the study of sciences.

Research in the education field in Colombia over the period 2006–2015 has shown a strong interest in technology and its application to the education of basic sciences, and also has emphasized in elements related to teaching/learning methods and the pedagogical reflection in sciences and at general level.

A relevant area consists in the analysis of the role of education, school and educational actors in front of a diversity of social issues that affect the individual and its community cores. The notion of human development is certainly appreciated as a transversal element in the educational field, also denoting an interdisciplinary perspective of education.

Investigation, teacher's research formation, knowledge diffusion and its visibility are also themes approached by this discipline, accentuating the usage of technological tools in relation to the abilities and competences on its handle. In the second instance, there is interest regarding the disciplinary performance and the role of education as a mechanism of socio-political transformation (**Table 4**).

Group	Group metrics					Grouped thematic lines (group name)
	Words	Connections	MGD ^a	GDμ ^b	Density	
G1	99	335	9	3.750	0.045	Tech. basic sciences and didactical fundamentals
G2	90	326	11	4.018	0.050	Education in front of social issues
G3	34	106	7	3.126	0.112	Educational research, scientific visibility and problem intervention
G4	32	104	5	2.938	0.125	Disciplinary and informational skills
G5	31	95	6	2.968	0.131	Education and politics
G6	24	75	4	2.219	0.167	Ethics and education
G7	23	56	7	3.009	0.142	Violence and education sociohistorical approach
G8	22	72	6	2.888	0.190	Cognitive functioning and performance
G9	17	66	4	2.035	0.272	Teaching and teaching practice
G10	16	51	4	2.000	0.267	Science teaching and mathematics
G11	15	54	3	1.831	0.305	Specific teaching performance
G12	15	65	3	1.938	0.305	Childhood, care and protection

a = Maximum Geodetic Distance.

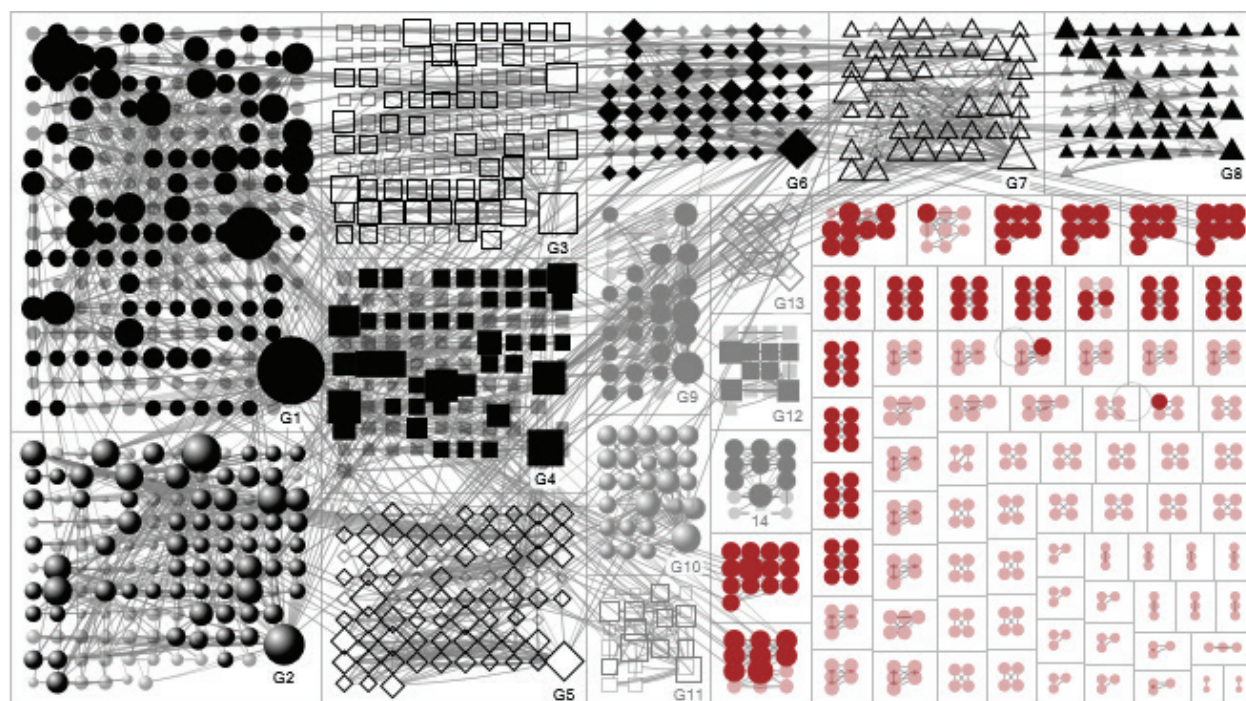
b = Mean geodetic distance.

Table 4. Keywords networks analysis in Education: thematic lines metric description.

Other relevant contents in Education are: (a) Political vision assessment as a linked factor of educational teaching. The analysis of politics excels from the citizen participation and the state, and also the concept of subject as political subject, (b) ethical analysis focused on teaching, (c) analysis in Colombian history perspectives about violence, (d) the analysis of cognitive skills and individuals' performance in the task execution, (e) especially in decisive strategies for problems or accomplishment of tasks in basic sciences specific areas of formation, (f) the teaching exercise and the role of the teacher. This includes theoretical points and pedagogical approaches of the educational activity, the teacher's performance and skills from a perspective of academic specialization, directing the interest to professional performance areas, (g) welfare of the children, integrating the education with complementary areas which focus was centered in the attention, care and prosperity of the minors.

Figure 4 graphically shows the suggested groups of keywords analysis for Education. It can be observed that groups 1,2,3 and 7 establish tight transitive connections. Highlighting group 1 (*Technology, basic sciences and didactical fundamentals*) as the most developed component in the educational area in terms of interconnected keywords and the number of connections with other thematic cores.

For the case of **Sociology**, the exceeded thematic lines (**Table 5**) include topics in common with other disciplines, as violence, armed and social conflict, inequity, discrimination and social/economical gaps in specially protected populations such as women, natives and cultural minorities. Likewise, Colombian scientific production in sociology has focused on the investigative analysis of armed confrontation, sociopolitical issues and the nation's reality in terms of violence. It is stressed a positive approach focused on peace, reconciliation and social change, highlighting



Created with NodeXL (<http://nodexl.codeplex.com>)

Figure 4. Graph of thematic groups with inter-group relations in Education.

Group	Group metrics					Grouped thematic lines (group name)
	Words	Connections	MGD ^a	GDμ ^b	Density	
G1	86	318	7	3.055	0.056	Sociopolitical conflict and transition to peace
G2	37	157	7	3.002	0.143	Public policies, migration and colonization
G3	33	126	6	2.621	0.140	Cultural, gender and ethnic inequity
G4	22	86	5	2.566	0.212	Educational sociology
G5	22	76	5	2.339	0.203	Ecological/environmental sociology
G6	21	81	4	2.150	0.233	Health and environment
G7	19	61	4	2.155	0.234	Bio-geography, sociology and archaeologic-botany
G8	16	50	2	1.633	0.258	Cultural socio-anthropology
G9	15	55	4	2.142	0.295	Nativism, culture and health
G10	13	58	3	1.716	0.397	Ethno-botany and sociology

a = Maximum Geodetic Distance.

b = Mean geodetic distance.

Table 5. Keywords network analysis in Sociology: thematic groups metric description.

regional experiences and recovery surrounding violence (studies of case). Public policies have also been objects of study, as well as the development of social mobilization and settlement, population and territorial occupation activities, with its respective administrative, social and political implications. There is a notorious emphasis in forced displacement of population.

Besides the aforementioned, there is a diversity of themes identified in the sociological study including (a) sociological aspects in education, formation and educative quality, pedagogical exercise, superior education and teaching of sciences, (b) environmental reality, role of the society in the care or degradation of the ecological systems, (c) experiments related to human health, as well as social discourses and practices in terms of environment, (d) revisions of natural and geographic elements of past archeological eras, including the study of plants or investigations about archeology or anthropology, (e) analyses of human activities from a contextual perspective with qualitative approach, (f) studies focused on the analysis of native communities' health in general from an ethnographic perspective and native's activities towards healthcare and protection, (g) analysis of relation between human groups and vegetal environment. The network analysis also allowed to identify that these groups themselves are constituted as sub-units (mostly independent from each other) in the universe of Sociology keywords (**Figure 5**). Among the analyzed groups, only group 1 (*Sociopolitical conflict and transition to peace*) has inter-group relations defined with groups 7 and 10, nevertheless, this connection is given by the usage of the word *Colombia*. Despite the thematic similarity between groups 7 and 10, there is no direct connection detected among their topics. Apparently in Sociology there are defined thematic fields which production or study area is usually sectorized and with low tendency to interact between approaches within the same discipline.

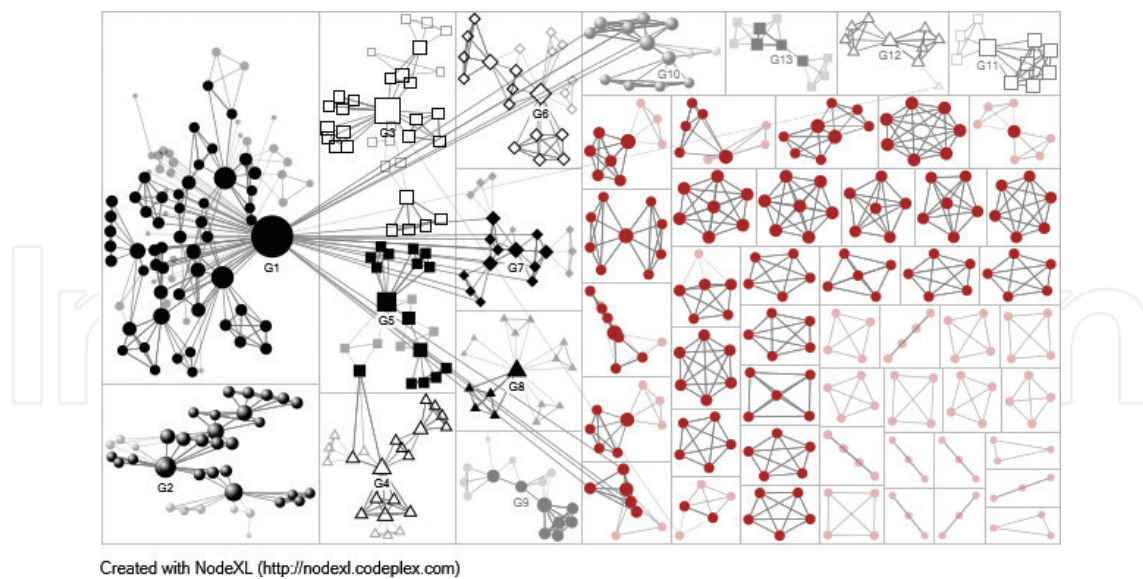


Figure 5. Graph of thematic groups with inter-group relations in Sociology.

Group	Group metrics					Grouped thematic lines (group name)
	Words	Connections	MGD ^a	GDμ ^b	Density	
G1	147	540	6	2.679	0.033	Electoral studies, social violence and organized crime
G2	81	254	7	3.452	0.048	Socio-economic development policies of nations
G3	76	263	8	3.704	0.058	Foreign affairs, national security and politics
G4	72	304	7	3.403	0.070	Political philosophy, transitional conflict and security
G5	63	208	9	4.204	0.068	Administrative behavior and economic policies
G6	42	205	5	2.514	0.134	Conflict-peace transition policies and national systems
G7	29	103	6	2.966	0.143	Post-conflict and implied actors
G8	24	84	5	2.413	0.174	Economic systems and military/security financing
G9	24	133	4	2.288	0.261	Crime and role of public force
G10	22	95	4	2.107	0.234	Productive sector responsibility in post-conflict
G11	14	43	4	1.939	0.275	Collective participation in peacebuilding
G12	14	51	3	1.847	0.319	Political behavior and participation
G13	11	45	3	1.504	0.455	Urbane and environmental public policy

a = Maximum Geodetic Distance.

b = Mean geodetic distance.

Table 6. Keywords network analysis in Political Sciences: thematic groups metric description.

The revision of **Political Sciences** is the last-but-one analysis, its thematic lines are varied (Table 6). the most important groups are related to Colombian sociopolitical conflict as the main emerging category, also integrating other types of organized violence and its social

consequences. This field of study also focus the scientific interest in phenomena associated to electoral activities and the exercise of democracy, including their own diverse issues such as partisan conflict, clientelism, electoral volatility, a.o.

In addition, it is noticed an ethical, axiological and psychosocial perspective of the armed conflict and the restoration of the rights of groups and individuals. This thematic field does not ignore the role of the victims or demobilized people from illegal armed groups, addressing affairs related to the recovery status of political subjects-of-rights in the post-conflict.

The politic role in foreign relations is also a relevant topic, such as political, geographical and economical nature issues that constitute risks for the security of nations, assuming also the national risks based on the internal affairs in Colombia.

Other analytic field is the study of the economic development policies from the public administration including a regional perspective and proposals/reflections of economic development alternatives to the traditional model. Other highlighted topics are military expenses, security policies professionalization and the analysis of the economic development models and approaches. The study of crime is also noted, especially illegal organized activities related to the history of armed confrontation and war financing in Colombia. This group also weights the role of the police forces.

Armed conflict is without doubt the main topic in Social Sciences. Beside the described perspectives, other approaches direct the interest towards the private sector and institutions that contribute to the economy, in the development of productive processes that tend to contribute with social reintegration, as well as in the negotiations regarding the termination of armed conflict in Colombia and the participation of citizen groups in the peace-building.

Figure 6 shows the distribution of each thematic group with its interrelations. The graph allows to identify an important relation between groups 3 and 8, which emerging topics are indeed related (See **Table 6**), Likewise, group 1 shares bonds with almost all of the other groups, especially because the bonding concept is *Colombia*, being contextualized studies. This group also interacts

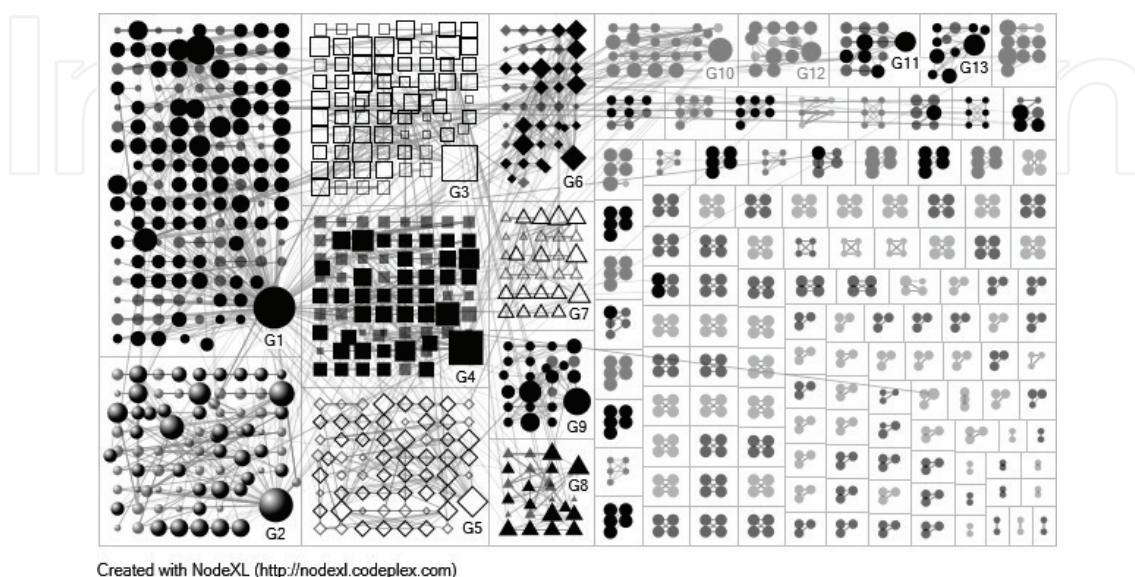


Figure 6. Graph of thematic groups with inter-group relations in Political Sciences.

Group	Group metrics					Grouped thematic lines (group name)
	Words	Connections	MGD ^a	GD _μ ^b	Density	
G1	54	184	7	3.018	0.080	Journalism, diffusion and social visibility
G2	51	193	7	3.155	0.095	RSI, communication and social conflicts
G3	36	122	6	2.617	0.121	Media and political news
G4	18	66	6	2.673	0.248	Semiotics, cinema and literature
G5	13	43	4	2.178	0.308	Journalism and audiovisual productions
G6	12	48	3	1.639	0.394	Journalism and childhood protection
G7	12	48	3	1.639	0.394	Journalism and history
G8	10	25	4	1.780	0.333	Research in cinematography

a = Maximum Geodetic Distance.

b = Mean geodetic distance.

Table 7. Keywords network analysis in Journalism: thematic groups metric description.

closely with groups 3, 5 and 10, by referring a wide spectrum of themes related to conflict, State's economic financing facing the ending of war, victims' recovery and social reintegration.

Finally, **Table 7** gathers data related to emerging thematic lines in the area of **Journalism**. The scientific interest in this area is for topics linked to the use of journalism and communications as a social impulse to highlight social minorities; political and sociocultural approaches are articulated to this line. Likewise, associated terms point an approach in the role of media and journalism in communication, information and entertainment, such approach gives relevance to the younger audiences and also emphasizes in the quality of the transmitted information. It is also observed a group of words directed towards formation in journalism.

Other important thematic field is the internet's social networks and their usage with informative ends in front of relevant social/political events, as well as the analysis of the participative ends in the use of web networks and the definition of relations mediated by the technology.

Colombian research in journalism does not ignore the visible reality of this nation, thereof, issues as forced displacement, poverty and security (integrated to the use of communication media) excel as a study topic.

Investigations related to the following topics are also relevant: (a) the role of media (conventional & digital) in the coverage and diffusion of national/regional politic news, (b) television and radio productions and the development of journalism activity. Also headlining the interest in research processes focused in the content and discourses of journalism, and the gaps of information access in the knowledge society, (c) studies related to infancy and childhood, the protection of their rights and the diverse processes that surround their development, (d) the Internet and its properties, this time in relation to the history and how journalism communicates such information.

In journalism, other two thematic lines are accented apart from the interest in social issues, focusing their interest on artistic and esthetic affairs, in one hand, there is research in literary issues, based on the revision of representative authors and works in literature and

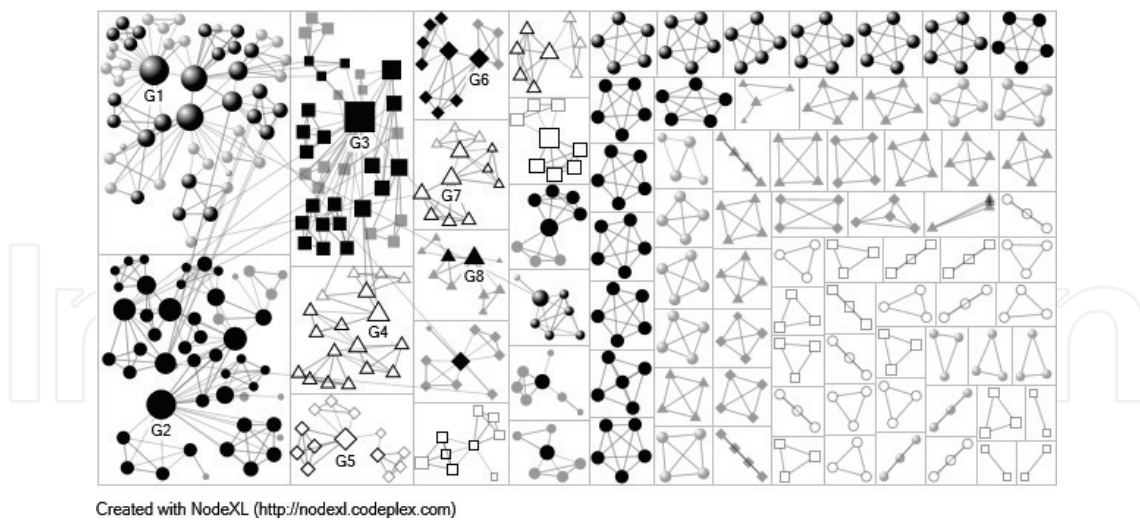


Figure 7. Graph of thematic groups with inter-group relations in Journalism.

cinematography. On the other hand, there are social research and representations, as well as the use of images and cinema as object of study from journalism and communication.

Figure 7 represents each one of the main groups described and their interaction. The graph shows interaction between most of the thematic groups, although clearly groups 5, 6 and 8 establish subgroups apart from the other terms, which indicates that they are thematic areas less integrated to the traditional lines of journalism in the sample, nevertheless, they are large enough to constitute significant groups of topics. Groups 1, 2 and 3 are connected instead, which shows the closeness of the topics and interests that they share.

5. Conclusions

The analysis of thematic approaches in Social Sciences using the keywords of productions (article type) contribute with the detection of important conceptual lines, from which is constructed a semantic identification map capable of exposing thematic scenarios and the most common and relevant topics of analysis for different disciplines [19–22]. This is a scientometric exercise that leads to the disintegration of a scientific discipline into main areas and sub-areas of knowledge, which allows to understand the main interests in scientific research at a disciplinary level. Such results are useful because they orientate researchers around methodological paradigms, theoretical movements and focuses of interest for the scientific community, providing tools to decide what guidance to give to contributions, or even which areas to reinforce with their own productions.

The social disciplines studied present networks of thematic approaches in which fragmentation is common, having multiple subgroups of terms with moderate levels of relational density and few connections between emerged groups of terms.

This clearly is not a phenomenon exclusive for the social investigation in Colombia, but constitutes a common denominator in the Social Sciences for the breadth of its object of study and even the methodological and theoretical oppositions that occur, sometimes within the same discipline.

Disciplines	Main topics
Other Social Sciences	Politic violence, Displacement, Human rights, Human development, Memory, Dispossession, Armed conflict
Psychology	Risk factors, Child development, Violence against women, Domestic violence, Mental health
Laws	Discrimination, Human rights, Armed conflict, Political constitution, Conflict resolution, Civil society, Reintegration, Dignity, Homosexuality, Matrimonial property regimes
Education	Pedagogical practice, Applied didactics, Risk behavior, Maternity, Poverty, Educational policy, Education for peace, Informational skills, Democracy, State
Sociology	Conflict and region, Criminality, Social change and region, Victims, Public services, Residual gaps, Education quality
Political Sciences	Organized crime, Paramilitarism, Forced displacement, Armed conflict, Social policy, International economic policy, State performance, Humanitarian exchange, Transitional justice
Journalism	Minority language, Power, Displaced people, Social mobilization, New media, Online news, Messages, Poverty, Public space, Journalistic coverage, News sources, Infancy, Child abuse

Table 8. Main keywords identified in Colombian Social Sciences.

It has been described that in recent years, research in Social Sciences has become more international [4]. The increase of quantitative methods and the use of information technology have eased the communication and the comparison of research results with geographically distant colleagues [33]. Nevertheless, collaboration or international source quotations are not sufficient criteria to define the contents from an internationalist trend perspective. Term networks with wide thematic variety emerge in the different social disciplines in Colombia, although they clearly share common interests related to the immediate reality of the nation. They are thematic structures highly focused on the local nature issues and impact over the region, thereof topics as armed conflict between illegal forces and the Colombian State, along with the sequels associated to itself, the violation of women and children’s rights, the peacebuilding, and the challenges for human and social development constitute the main themes of all the studied disciplines. **Table 8** gathers the most frequent keywords of the field in general, that is, shared by different disciplines.

As described previously [30, 27], the context has a dominant role over the topics and approaches postulated in the study of Social Sciences. The social scientist places among his objectives the knowledge development capable of translating or changing the experienced reality, thereof that the thematic cores identified in Colombian Social Sciences are closely related to the main social, political and economic issues experienced by the nation.

Considering the dynamic character of the knowledge networks, it can be inferred that future research lines focus on the associated processes to the construction of a post-conflict society, this in accordance with the construction of peace processes between the Colombian State and the illegal armed actors.

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Conflicts of interest

The authors do not report conflicts of interest.

Nomenclature

DGM	maximum geodetic distance
GD μ	geodetic distance mean
SCIENTI-Col	Colombian National System of Science, Technology and Innovation
SNA	social networks analysis

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