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**Artistic Community Knowledge Structure
Revealed: A Semantic Network Analysis of
'La Escocesa', Barcelona**

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This paper was prepared as part of CGES project Semantic and Communication Networks of Creative Communities. The project questioned, to what extent and how creative styles depend on particular properties of such structures studying four diverse artistic communities located in St Petersburg, Russia and one in Barcelona, Spain. The research team has carried fieldwork and collected data on a well-established creative community La Escocesa, based in Barcelona, Spain. Comparative analysis combined the collected material and the material on creative communities in St. Petersburg collected in frames of the project 'Communicative Practices of Knowledge Creation in a Modern City Social Space' (Faculty of Sociology, St. Petersburg State University).

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Abstract

Artists are among the key knowledge-generating actors in the city space, particularly when they join in collectives. Knowledge creation in artistic groups goes in constant (re-)interpretation of the essence of art, discussions on the themes and formats for artworks, continuous interaction during collective creative processes and the presentation of artworks in the city space. This study explores the opportunities for semantic network analysis to shed light on the knowledge structures underlying the creative practices of artistic communities. Combining a set of quantitative and qualitative techniques, we study the case of the artistic community “La Escocesa” located in Barcelona, Spain. To map semantic networks as relations between co-occurring concepts, texts of semi-structured interviews with the artists are used.¹ Interpretation of the structures is given with regard to the qualitative data collected during a field study, and links the knowledge structures revealed to the peculiar characteristics of the creative processes in the community, such as positioning and identification, format of creative practices, engagement of publics, community localization in a co-habilitation space and the broader urban context.

¹ We would like to thank Elza Abdulkhakova, MA, art-critic and curator of V-A-C Fund, Moscow, Russia, for taking part in the data collection in La Escocesa on February 2013. We are grateful to Matias Zarlenga, PhD, Barcelona State University, Spain, for providing additional empirical material on La Escocesa and being very supportive and helpful during research visit of the Russian team to Barcelona on February 2013 as well as in further data processing phase.

Introduction

Theorizing from the work of Guattari (1995)², Bourriaud (2002: 101)³ defines art as ‘a construction of concepts with the help of percepts and affects, aimed at a knowledge of the world’ and producing relationships with the world through signs, forms, actions and objects. The sociology of arts shows how these conceptual relations emerge and evolve as a result of social activity – “a combined effort of creators, technology, mediators, artistic works, contexts and recipients” (Sutherland and Acord 2007: 125; see also Bryson 2007; Acord 2006).

Artists themselves also often join in duets, triads, microgroups and communities uniting their talents and resources to launch numerous series of communicative events – both professional and leisure, routinized and unique. Communities of creators have been already studied in the spatial contexts of creative cities, creative clusters, creative spaces and creative milieus (Brennan-Horley 2010; Evans 2009a, 2009b; Heßler & Zimmermann 2008), though mainly at the level of city policy and the economy – as social and economic drivers of contemporary city development (Florida 2002; Landry 2008). Artists and other creative professionals have also been analyzed as individual knowledge creators (Sutherland and Acord 2007; Nenko 2012; Gelfert 2012), in particular, in the city context (Martí-Costa 2012; Bryson 2007). However, the social knowledge-generating interactions of creative professionals in artistic communities have not yet been sufficiently theorized or empirically studied. This research gap is further broadened by the fact that creativity and arts studies typically either (1) focus on individual creative processes (Faulkner & Becker 2009); or, (2) deal with the perception and interpretation of single artworks (Griswold 1987; Young 2003; Acord 2006; Lehrer 2011; Griswold et al. 2013), including the cases when the knowledge dimension is analyzed (Nenko 2012); or, (3) study the “art world”, i.e., conventions that coordinate activities of artistic professionals (Becker 1984), statuses allocation and distribution of capital and resources (Bourdieu 1998), and the influence of social and political knowledge on art (Grierson 2007). Yet, artistic knowledge is also interactional, emerging in here-and-now contextualized communication processes (Sutherland and Acord 2007; Griswold et al. 2013). Therefore, we propose to focus on another dimension of knowledge creation in arts – communication within artistic communities.⁴ Interaction within a community allows members to discuss each other’s works and works of other artists, plan exhibitions and artistic actions, collectively reflect on the group self-identification as well as on the art field and the broader environment, etc. As a result, communication within artistic communities transforms existing conceptual constructs or brings new ones to life.

² Guattari, F. (1995), *Chaosmosis: An Ethnicoaesthetic Paradigm*, Indiana: Indiana University Press.

³ Bourriaud, N. (2002), *Relational Aesthetics* (trans. S. Pleasance and F. Woods), Dijon-Quetigny: Les presses du réel.

⁴ The suggested framework has been developed within project 10.23.476.2011 *Communication Practices of Knowledge Creation in the Social Space of Contemporary City*, funded by St. Petersburg State University.

To study these constructs we suggest using semantic network analysis, which is able to reveal the knowledge structures that artistic communities generate.⁵ Further, we will explore the opportunities for semantic network analysis to shed light on the knowledge structures underlying the creative practices of an artistic community using the case of the artistic community “La Escocesa” located in Barcelona, Spain. In the following sections, we will describe La Escocesa, describe the specific techniques and metrics of semantic network analysis that can be used to study knowledge structures of creative communities, and apply them to analyze the case of La Escocesa.

1. Artistic community ‘La Escocesa’

1.1. Community spatial embeddedness

1.1.1. The broader context of community localization

As artistic communities are localized, their communication normally takes place in artists’ studios, in their living or exhibition spaces, as well as in other city spaces. The material context and sensual experience within communities are factors which strongly shape ‘knowledge that embraces the totality of our sensual perception and experience rather than intellectual activity alone’ (Schneider and Wright 2006: 16). Thanks to this co-location, members of artistic communities get engaged in a common experience space (Mannheim 1982), they relate their cognitive structures using common objects often jointly created by them, and coordinate mental and sensual activities as well as emotional states. This provides intersubjective sedimentation (Berger & Luckmann 1991) between community members – building of common ground, necessary for knowledge to emerge (Polanyi 1958: 217). Thus, “knowing takes place within a work group that encompasses both human actors and artifacts, and humans may make their work mutually visible to each other through artifacts at hand” (Sutherland and Acord 2007). Therefore, any study of the knowledge-generating communication of an artistic community should include consideration of the context in which a community is embedded – in order to enable the researcher to interpret the semantic structures being mapped.

The artistic community *La Escocesa* is located in Barcelona, Spain, which is considered to be the “cultural capital” of Spain and capital of Catalonia, a significant locus for modernism and avant-garde movements, active and attractive for contemporary artistic initiatives. Thanks to its rich cultural history, there are considerable symbolic resources for the development of art. However, the economic resources of the city are rather limited due to ongoing economic

⁵ Initially we proposed this at the Interdisciplinary research seminar *Scientific Environment Network Structures of Art: European and Russian Studies*. St. Petersburg, Russia, April 30 2013 (Basov N., Nenko O. *The Structures for Creative Styles. Analysing Semantic and Communication Networks within Artistic Communities of St. Petersburg*) and XXXIII Sunbelt Social Networks Conference of the International Network for Social Network Analysis (INSNA). Hamburg, Germany, May 21-26 2013 (Basov N., Nenko O. ‘Creativity of ... Structures? The Effects of Semantic and Communication Networks on Artistic Communities Creative Styles’).

crisis, which negatively influences the art-market – which is not as large as in other recognized European contemporary art capitals, such as London, though quite established.

Barcelona has a long history of neighboring communities, and of social political movements, as well as separatist movements stressing the regional or national identity of Catalonia. The policultural city environment allows significant diversity of interpretations and perceptions of city life. At the same time, the level of tolerance of historically non-local cultural groups is not high and results in contestation of the city areas. Several levels of cultural differentiation are significant for city dwellers in constructing distinctions, for example: the existence of a double series of cultural events (Spanish and Catalanian), double translations (Castilian and Catalan), etc.

The official cultural policies of the city are aimed at wider profit-guaranteed redevelopment of the territory, for example, establishing institutionalized creative clusters; the existing points of grass-rooted artistic creativity – artistic communities, artistic ateliers, bureaus – are a peripheral target for municipal support; and this low level of support, together with the economic crisis, results in being under-resourced. Nevertheless, there is institutional support for artistic and creative initiatives from the civil society – the neighborhood associations, networks and alliances of city creative actors.

The tradition of civic engagement and public communication are good preconditions for quite intensive informal communication between artists. The latter mostly focus on communicating their identification as creative actors in the city space; collective discussion of artworks is not so widespread. Most of the artists are preoccupied with individual professional growth and recognition, though some of them try to stay in alliances and not to take commercial paths (which would lead to atomization). In the neighborhood, local actors design mechanisms for active and regular involvement of city publics into the events and festivals organized by different creative organizations of the area. Projects focused on rethinking city space are not very frequent, but are still present, because there are more opportunities to go out into the public spaces.

Additional impact of local embeddedness on La Escocesa community is by the specifics of the Poblenou city district where it is situated at 345C/ Pere IV str. The Poblenou district, quite close to the central ones, used to be an industrial area with the working class dominating its population. The industrial and working-class history of the area manifests itself through strong neighborhood consciousness, hence the availability of active neighborhood associations and rather strong separatist opinions. Neighborhood associations vary from political to cultural ones and actively involve the public in their events.

With the beginning of the municipal area redevelopment policies – the 22@ Plan – aimed at constructing several creative clusters, Poblenou started to be gentrified. Earlier industrial buildings were populated by informal communities

of artists who rented the buildings; since the 22@ Plan, the buildings have been destroyed and most of the communities were left without place to embed. A turning point was the so-called Can Ricart conflict when artistic communities united into an opposition movement and refused to leave their buildings. Mass media made this event resonant in public and supported the unfortunate dwellers of the area. Thus the city government was forced to buy several industrial buildings back from the developer and pass them to the communities of artists, La Escocesa being one of them. The agreement was achieved that communities continue working in the buildings paying a symbolic rent, but they were obliged to implement a new organizational format – the so called ‘fabrique de creacio’⁶ – that together were to constitute a network and interact with the city government committee ICUB. This new format presupposed: (1) professionalization of communities; (b) regular renewal of artists in each community via the mechanism of annual open calls; (c) organization of public events and neighborhood involvement.

La Escocesa comprises approximately 20 artists working there, closely communicating with each other and collectively running their common building.⁷ Observations of the physical and symbolic environment of La Escocesa and interviews show the common place as unified and collectively shared; though there is diversification of space it is felt like a ‘home’.

Most of the artists in La Escocesa do ‘contemporary art’ though they do not share any precise definition of it. Community creativity comprises a great variety of artistic styles and formats of work: fine arts, sculpture, installations, conceptual art, serigraphy, photography, street art and graffiti, performance. Having street-art as a separate domain of artistic practices is one of distinguishing features of La Escocesa.

1.1.2. Community co-location space

The space of La Escocesa is designed for sharing everyday practices and maintains communal living. Shared spaces are artistically marked by installations, decorations. There is also creative management of communal life – visualization of rules adopted in the space, cohabitation schemes. There is signifying of the borders of community, e.g. decorating entrance and exterior walls with graffiti, street-art (Fig. 1).

⁶ <http://www.bcn.cat/fabriquesdecreacio/cal/>

⁷ www.laescocesa.org



Fig. 1. Entrance to La Escocesa space

The inner space itself has a significant level of differentiation. First, there is a division into two floors where the studios are placed; it is significant that the studios of the 'first' generation are mostly placed on the first floor (Figs 1, 3), while the 'second' – on the ground floor (Figs 2, 5, 6).



Fig. 2. Scheme of La Escocesa studios, ground and first floor (painted on the wall in the hall)

Second, there is a functional division of the space; besides the artists' studios, there are shared spaces: an office where managers work, and also space for artists to work with computers; halls on both of the floors with zones of kitchen and dining room (Fig. 6); an exhibition place on the ground floor (Fig. 7); a roof – space for relaxation and communication (Fig. 5) (plus, one of the studios is placed there).



Fig. 3. La Escocesa shared space. Hall, ground floor



Fig. 4. La Escocesa shared space. First floor, dining room



Fig. 5. La Escocesa shared space. Roof



Fig. 6. La Escocesa shared space. Kitchen, ground floor



Fig. 7. La Escocesa shared space. Exhibition space, ground floor

The outer space contains the patio (Fig. 8) (accessed from the kitchen) and the yard around the building (Fig. 9).



Fig. 8. La Escocesa shared space. Patio



Fig. 9. La Escocesa shared open space. Yard

1.2. Community structure

The main feature of La Escocesa structure is probably its division into founders and newcomers according to age and previous involvement in the life of the community; this difference to some extent corresponds to differences in attitudes towards the goals of community membership – community building or individual professionalization. The founders, or the first generation includes people who became La Escocesa members before the redevelopment threat. Their collective was based on self-organization and communal solidarity neither with constraint and indulgency in collaboration, nor with the need to align to the rules of the city government and official institutional networks. The artists were not constrained by the requirements of professional competence. After the development of ‘Plan 22@’ and agreement with the city council, the artists started to come and go due to the newly introduced mechanism of contest-based selection of artists for residency in La Escocesa. New artists were selected by the jury for their professional positions in the art field; the newcomers were also mostly young in age.

The boundary between the first and the second generations within the community manifests itself in differences in: (a) attitude towards art – art as a hobby / mission and art as a profession; (b) model of labor – combining art with other professions and focusing on art exclusively; (c) attitudes towards artistic career – higher and lower degrees of striving to make a career utilizing the collaboration networks of the community to achieve commercial success.

The introduction of ‘Plan 22@’, which was met by strong resistance from of the artists, was a dramatic moment in the evolution of the community's structure.

While the resistance movement brought the artists of both generations together and raised group solidarity even more, the resolution of the conflict embodied in the agreement with the city government led to the loss of independence by La Escocesa and changes in the original conception of the community.

Currently, La Escocesa is run by a collective board of its artists, which meets on regular basis once or twice a month to make decisions about important issues of community life. The power of taking ongoing decisions is given to the administrative director and financial manager of La Escocesa. The manager of the community regularly represents La Escocesa officially in the 'fabrics of creation' network and city council committee for organizing culture ICUB (Culture Institute of Barcelona <http://www.specifi.eu/partner/institut-de-cultura-de-barcelona-icub>). Thus the power structure has features of being formalized.

We also observe the emergence of a division of functions between the members of the community. E.g., a group of artists is responsible for information management in La Escocesa: they take care of the community website, social media, and also collect and disseminate useful information via internal mailing list about artistic events and different opportunities for artists. Another example is a (paid) job of one of the artists, which consists in providing mechanical support and conducting repairs in the building.

Nevertheless, the sense of communality did not vanish and now La Escocesa seems to be caught between its communal spirit rooted in its history and the professionalization accompanied by bureaucratization – the path taken by the closest organizational partner Hangar.

1.3. Communication with publics

La Escocesa artists often organize public events and often speak of interacting with people – the audiences, including residents of Poblenou neighborhood. There is a special event taking place in Poblenou twice a year called 'Open studios' held by the creative initiatives. As a part of these events members of the publics visit La Escocesa and see the places where artists work, observe the process of art creation, talk to artists, take part in making artworks themselves. Some of the artists offer guided excursions around the space and tell its story.



Fig. 10. Members of the publics attending the 'Open studios' event in La Escocesa

There are also separate public events launched by La Escocesa artists, for example, a festival of street-art on the walls around La Escocesa's space, organized by the street-art subgroup within La Escocesa. Recently, exhibitions in the special zone of the ground floor were started. Members of the publics (residents of the local neighborhood) are rather active and regularly visit La Escocesa.

2. Semantic network analysis: A method for studying the knowledge structures of artistic communities

Structures of knowledge and meaning may be studied with a variety of methods including discourse analysis, structural semantics, cognitive linguistics, content analysis, etc. We suggest using analysis of semantic networks to analyze the knowledge structures of artistic communities. This approach allows us to reveal significant and sustainable structures of meanings in artistic communities (including visualizations of these structures as network diagrams), compare their form and contents, and to trace their linkages to the peculiar characteristics of creative processes in the community.

Semantic network analysis has been developing for over twenty years and has an elaborate toolkit, in particular, computational program software. We use the branch of this methodological area based on the conceptual associations approach, according to which a semantic network is a set of concepts – separate words or combinations of words (Carley 1997; Doerfel 1998; Diesner 2013). Linkages in the network are associations between concepts (Carley 1997; Carley, Columbus, Azoulay 2012). The meaning of a certain concept is revealed through its connections with other concepts (Wittgenstein 1953, 31-36; Steyvers & Tenenbaum 2010). We map the linkages between concepts in

the tradition of collocation analysis (Sinclair 1991) – based on spatial closeness of relevant words in texts (co-occurrence) considered as an indicator of association between concepts (Krippendorff 2004: 206).

Being not a word-counting, but a structure-based technique, conceptual associations approach allows revealing the core semantic constructs of an individual or a group without depending so much on a particular thematic focus of the text and words repetitions. It also allows to a significant extent overcome many problems related to textual data collection and processing, including purposeful discourse-biasing tactics by text producers. In case of interviews, among these problems are the normal influence of an interviewer (and the particular questions) on the narrative produced by the interviewees, as well as possible attempts of an interviewee to influence the results of analysis. Thanks to this strength of the method, it was possible to map semantic network of La Escocesa basing on transcripts of interviews with the community members. The interviews taken were semi-structured in-depth, lasting about 1-1.5 hours each. We posed a set of most broad questions covering the topics of creative community life, artistic practices, role of artist, understanding of art, relations with publics, place where community is located, and so on. Thus, rather long narratives on broad art- and community-related topics were produced during the interviews. The majority of the interviews were taken during February 2013 and some were taken earlier, during 2012. Primary data was obtained in Castilian, Catalan and English languages and afterwards translated by professional translators into English.

To map the semantic network of the community in this study we processed the whole corpus of texts by all community members (interviewers' questions removed), thus laying on semantic networks of all individual members during the mapping procedure (for other example see: Carley 1997: 538). Using Automap (Carley et al. 2012) the texts generated by community members were aggregated, directed graphs with values based on the frequency of word co-occurrences were created, simple thesauri were applied for names and titles, as well as delete lists were applied rhetorically for web symbols, numbers, articles, particles, prepositions and pronouns. Finally, Porter's stemming procedure for English language was run. Then various metrics were analyzed using ORA.

For analysis, we use a set of quantitative and qualitative characteristics of the semantic network and its separate components.

Semantic network analysis usually takes into account concepts that occur a certain number of times (Nelson et al. 1999), so to quantitatively analyze the structural basis of knowledge of the artistic community in this paper we considered the most frequently used concepts (relative frequency within text) linked with the strongest ties. These are revealed by collocation analysis no matter

Further in this section we present a set of semantic network analysis measures and techniques, and suggest ways to interpret them to conclude about different

aspects of community knowledge structures.⁸

Network level metrics and analytical foci allow to get insights on the general characteristics of the community knowledge structure. Here, the following aspects are worth considering: *Number of network nodes* (amount of concepts generated in texts) allows an estimation of the discursive activity of the community and is linked to the complexity and variability of the content of narratives produced in the course of communication by members of the artistic community. Linked to this, is the measure of *relation of the number of concepts to the amount of words*; this is the percentage we expect to show the level of discourse heterogeneity. *Centralization* (by betweenness, total degree, eigenvector) reveals presence of concepts dominating a semantic network. Considering centralization, we can evaluate cognitive focusing level of community, as well as to what extent stereotypes and/or symbols are present in the knowledge structures of a community. Centralization by betweenness shows the presence and level of centrality of concepts that bridge other concepts more often than the rest. Such concepts span semantic structures. When centralization is high we assume knowledge has a certain “backbone”, is to a significant extent based on several symbolically important elements. Centralization by degree shows the presence and level of dominance of concepts that have more linkages with neighboring concepts than other concepts; this means they are mentioned more often in combinations with various other concepts, representing repetitive elements of knowledge. *Density* of semantic network may show degree of discourse elaboratedness. *Clustering coefficient* refers to presence of simple coherent structural clusters (triplets) in community semantic network; we suggest using this measure to estimate the extent knowledge is aggregated into small knots of meaning. Comparing this coefficient to the one medium for natural language word association networks calculated in Word Net and equaling 0.02 for English one can estimate if the level of knowledge aggregation in a community is low or high, – and to what extent. *Size and amount of complete conceptual cliques in a semantic network* – sets of concepts (normally sized from 3 to 6 concepts), which have all possible connections to each other – also allows estimating presence of tight knowledge structures. The *fragmentation* measure of a semantic network is the proportion of disconnected nodes in it; this measure may indicate the level of knowledge disintegration.

To get insights into the contents of community knowledge, it makes sense to focus on the ego level looking at positions of specific concepts and identifying concepts in key positions, as well as on largest cliques contents and semantic network cores. Certainly, the most *central concepts* (by betweenness, closeness, total degree, eigenvector) are of interest, as well as their semantic

⁸ We initially proposed and discussed most of the measures and techniques at the Interdisciplinary research seminar Scientific Environment *Network Structures of Art: European and Russian Studies*. St. Petersburg, Russia, April 30 2013 (Basov N., Nenko O. The Structures for Creative Styles. Analysing Semantic and Communication Networks within Artistic Communities of St. Petersburg) and XXXIII Sunbelt Social Networks Conference of the International Network for Social Network Analysis (INSNA). Hamburg, Germany, May 21-26 2013 (Basov N., Nenko O. 'Creativity of ...Structures? The Effects of Semantic and Communication Networks on Artistic Communities Creative Styles').

surrounding. To grasp how group structure is collectively reflected, concepts signifying *names of community members* may be compared by their (relative) frequency and various dimensions of centrality in semantic network, i.e. find members mentioned more often in texts and those whose names are used to span the knowledge structure, who are not necessarily the same individuals. We also suggest checking semantic network positions of *key concepts*, most important for the specific thematic field under study, and analyzing their semantic surrounding. In the study of creative communities, these are related to different aspects of the creative process and to the field of art, including the following: (a) *creative roles* (e.g., 'artist', 'critic', 'curator', 'public') are significant to reveal interpretations of organization of creative work, understanding of art and the art world by the community, and to reveal knowledge structures related to specific positions and identities; (b) working, living and presentation *places* ('gallery', 'studio', 'loft', 'space', 'place', 'city', 'street', 'house', 'square', 'yard', 'park', 'home', 'urban') as well as *geographical places* (cities, countries) show how community interpretation of artistic practice in urban and broader context and reveal knowledge structures related to contextual embeddedness; (c) *key events* related to the art world (such as 'biennale', 'exhibition', 'presentation', 'festival' as well as community-specific events) bring to light knowledge structures related to planning of professional activities; (d) general *art-specific concepts* ('art', '(art)work', 'project', 'create') are significant to understand community image of the art world and outline knowledge structures related to the professional art-field; (e) *knowledge-related concepts* (e.g., 'image', 'sense', 'meaning', 'knowledge', 'know', 'understand') show how knowledge process and content are perceived and to which extent these are reflected by the community; (f) *emotions-related concepts* (e.g., 'feel', 'emotion', 'stress', 'joy', 'enjoy', 'happiness') may help to outline the role ascribed to emotional experience in creative practices and community life; (g) *artistic practice concepts* in general and in particular forms (e.g., 'creation process', 'object', 'text', 'picture', 'canvas', 'installation', 'performance', 'sculpture' and community-specific concepts) constitute knowledge structures related to particular artistic practices; (h) *community name* (community-specific) is relevant to grasp the conceptual foundations of self-representation, as well as the importance and peculiarities of community self-identification; (i) *group integrity labels* (e.g., 'share', 'collective', 'union', 'common', 'joint', 'together', 'group', 'trio', 'duet') are especially valuable to trace reflections on, and understandings of, collective identity and collective creative process; (j) *internal-external labels* (e.g., 'other', 'our', 'us', 'them') reveal the basic demarcations signifying the boundaries of community identity; (k) *points of reference*, in particular, authorities (community-specific) and art places/institutions (community-specific) are also relevant to outline the community's identity and its image of its own position in the art field.

Qualitative analysis of cliques content, together with simultaneous consideration of such quantitative measures of cliques as their number and size, brings to light conceptual knots, which probably represent the essence of community knowledge. Semantic network core analysis is a qualitative technique of visual inspection of semantic network graph with complexity

significantly reduced by filtering out the links below a certain strength and nodes below a certain frequency, in order to get a readable structure for qualitative analysis. Normally, we color and size nodes according to centrality, and ties according to strength (concepts co-occurrence frequency). Semantic network core analysis allows us to see the strongest relations between the most frequently used concepts at a glance and thus reach conclusions about the key knowledge configurations of a community.

To visualize semantic networks data, as well as to calculate network metrics, we use ORA (Carley et al. 2008).

3. Knowledge structures of La Escocesa: Applying semantic network analysis techniques

In this section we apply several of the techniques of semantic network analysis presented above to study the knowledge structures of La Escocesa community.

First, to get a general view of the community knowledge structure, basic quantitative metrics of its semantic network are to be considered. These metrics can give insights about the community knowledge and might be thoroughly interpreted through comparative analysis of the same measures calculated for other artistic communities or – as in our case – average parameters of randomly generated networks (Table 1).

Because semantic network analysis of communities is scarce, there is no known comparison for density that can be accurately made. In network theory, systems with low density and decentralized structure may have limited efficiency of information flow (Valente 1995).

Table 1. Network-level metrics for semantic network of La Escocesa comparing to average parameters of random generated networks⁹

Parameter	La Escocesa	Average for random generated networks
Words	58 125	n/a
Concepts	2 308	2 308
% of concepts	3.9%	n/a
Density	0.0008	0.0008
Clustering coefficient	0.0667	0.0007
Fragmentation	0.532	0.054
Centralization, betweenness	0.0629	0.0292
Centralization, total degree	0.006601	0.001813

⁹ To gain networks to compare with, Erdos-Renyi model was used to generate 100 graphs with same density and number of nodes as La Escocesa semantic network by setting a link between each pair of nodes with equal probability, independently of other links.

Clustering coefficient is high, compared to WordNet density (0.02) and considerably higher than the average in random networks, which signifies the presence of aggregated semantic structures in La Escocesa knowledge. High clustering indicates that many of the concepts that are directly linked to a common neighbor are also directly linked to each other. The fact that the amount of triplets in the semantic network is much higher than average in random generated networks probably indicates that the community generates a vast canvas of basic knowledge structures, the mold for more complex knowledge structures to exist.

Fragmentation is showing that the proportion of disconnected nodes is several times higher than that in random networks. This means that concepts in La Escocesa semantic network are sufficiently more sparse than they could be by chance, and that knowledge structure is rather disperse.

Both betweenness centralization and centralization by total degree are several times higher than random networks suggest. This means that in La Escocesa network, significantly more concepts lay on the network paths comparatively more than other concepts; and this dominance is much higher than average. At the same time, there are many concepts much more often directly referred to than other concepts in the network. All in all, centralization metrics reveal rather strong focusing of community knowledge on symbols spanning knowledge structures as well as on a set of stereotypes.

As we can see from semantic network metrics, La Escocesa knowledge is rather focused on a number of most crucial meanings. It is certainly of interest, what those meanings are. Qualitative analysis of the most *central concepts* in the network, their position and semantic surrounding can reveal knowledge foci of the community. Here we consider central concepts by different betweenness and authority centrality (Tables 2 and 3).

Table 2. Top concepts by betweenness centrality in La Escocesa semantic network

artist	0.062
people	0.035
other	0.017
us	0.016
work	0.015
art	0.015
now	0.014
mani	0.013
paint	0.011

Table 3. Top concepts by authority centrality in La Escocesa semantic network

artist	0.620
people	0.568
work	0.436
project	0.324
place	0.312
ateli	0.205
wai	0.202
differ	0.180
particip	0.169

From the ego metrics we see, that concepts ‘artist’ and ‘people’ are the most central in both centrality measures. Comparison of key concepts mixing different centrality measures (see Fig. 11) shows that these two appear to be most central according to most centrality metrics, which means that La Escocesa knowledge is structured around two main subjects of artistic interaction: themselves – ‘artists’ – and their audience – ‘people’. Less significant (yet still important) concept – ‘work’ – adds artwork / artistic process to the two subjects heading the list.

When we look into semantic surrounding of important concepts, we immediately see the traces of how La Escocesa members sustainably elaborate this artist-people central knowledge “gene”. For example, taking the concept ‘know’ and analyzing its semantic surrounding (Fig. 12¹⁰), we immediately see these concepts with very high betweenness centrality around, with a rather strongly connected triplet including concepts ‘know’, ‘people’ and ‘artist’ that shows double-directed relations between the concepts, that are produced by such co-locations as ‘people’-‘know’-‘artist’, ‘artist’-‘know’-‘people’ which show us a piece of knowledge where people and artists are symbolically joined with cognizing process.

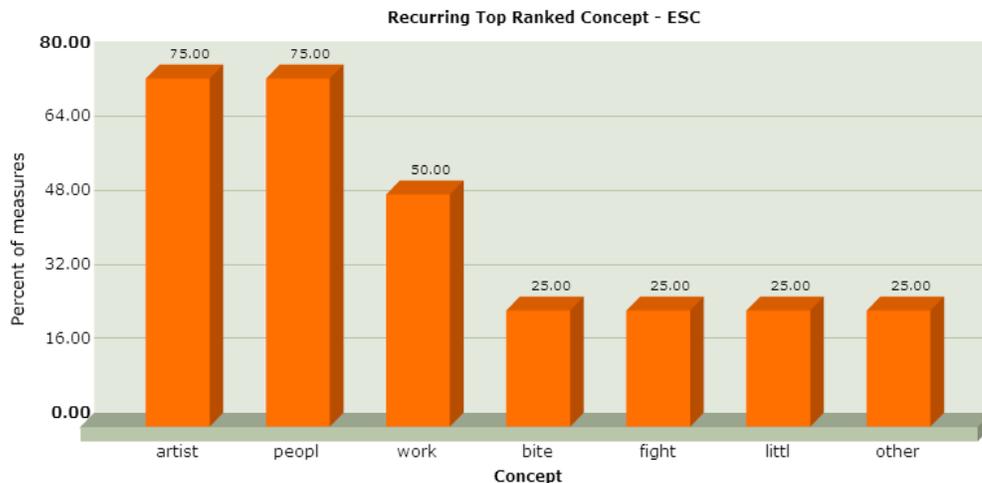


Fig. 11. Recurring top ranked concepts in La Escocesa semantic network

¹⁰ “Sphere of influence” visualization command in ORA.

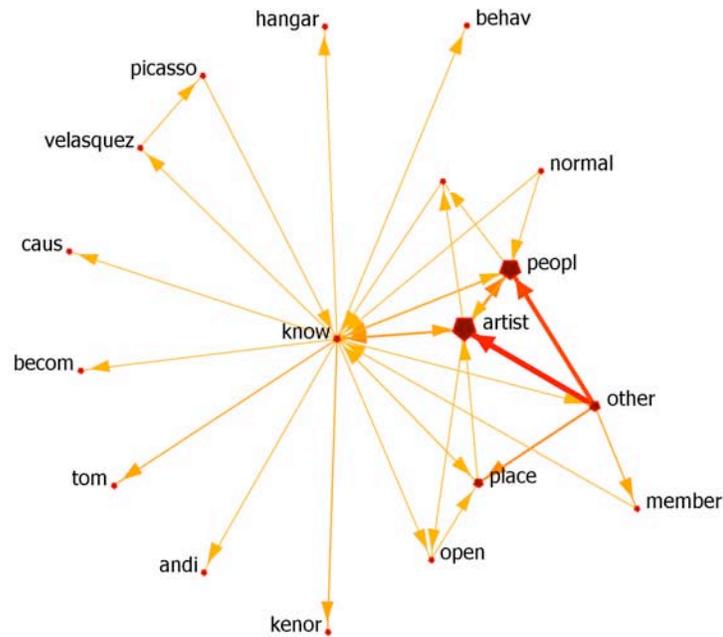


Fig. 12. Semantic surrounding of the concept 'know' in La Escocesa semantic network

Node size – by betweenness centrality, tie color (from orange to red) and width – by tie strength

To grasp how community structure is reflected in its knowledge we can compare *community members name-concepts* relative frequencies (see: Table 4). These show that the group structure is seen as having no explicit leaders, for there are no name concepts that would have significantly higher frequency than the others. One of the most frequently mentioned members is administrative director of the community. The most frequently mentioned artist is a young leader of the street-art group, who was organizing a collective exhibition of La Escocesa members at the time of the data collection.

Representatives of the second, 'professionalized' generation of the community are mentioned more frequently than members of the first generation. Members of street-artists collective are mentioned more frequently than others, but that might be explained by the cross-references within their subgroup. Some of the preliminary conclusions verified by the qualitative empirical data are as follows: in La Escocesa leadership is symbolically constructed as distributed, and there are some differences in popularity / perceived importance of different subgroups.

Table 4. Relative frequency of mentioning community members' names in La Escocesa semantic network

Street-artist 1	0.04
Administrative director	0.03
Fine arts artist 1	0.02
Street-artist 2	0.02
Street-artist 3	0.02

Street-artist 4	0.02
Street-artist 5	0.01
Street-artist 6	0.01
Fine arts artist 2	0.01
Fine arts artist 3	0.01
Fine arts artist 4	0.01
Fine arts artist 5	0.01
Fine arts artist 6	0.01
Fine arts artist 7	0.01
Fine arts artist 8	0.01
Fine arts artist 9	0.01
Photographer	0.01
Sculptor	0.01

Creative roles concepts are important to reveal community self-reflection structures and self-identification. Further we consider such concepts as ‘artist’, ‘curator’, and ‘people’ (this latter concept was selected by us due to its high centrality).

The ‘artist’ concept is the most frequently mentioned, as compared to other concepts (see Table 5 and Fig. 13). This concept has significant betweenness centrality and degree centrality compared to other concepts in the semantic network, meaning that the concept is extremely important as it both spans community knowledge structure, often providing links between other concepts in the network, and constitutes semantic surrounding of many other concepts, referring to it.

Table 5. Semantic surrounding of the ‘artist’ concept in La Escocesa semantic network

Betweenness centrality	0.062
Relative frequency	1
Strength of ties with key neighbors:	
other	12.0
work	6.0
commun	5.0
peopl	5.0
ateli	4.0
particip	4.0
know	4.0
differ	4.0
new	4.0
project	4.0

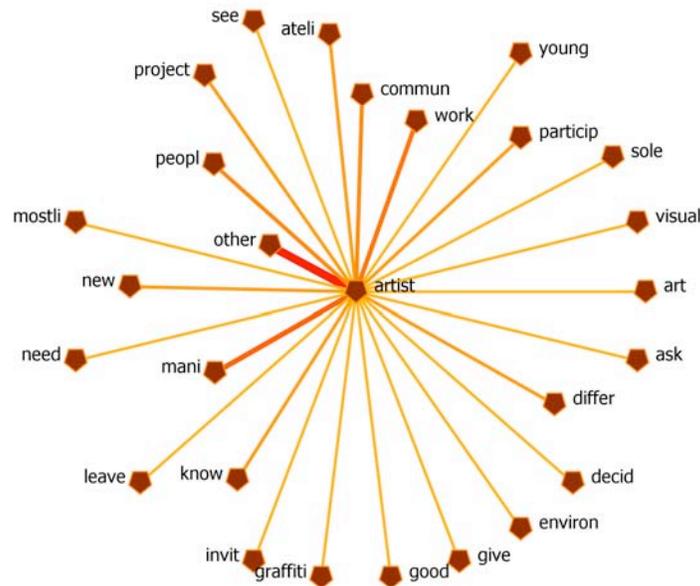


Fig. 13. Semantic surrounding of the ‘artist’ concept in La Escocesa semantic network¹¹

Tie color (from orange to red) and width – by tie strength

La Escocesa members put the ‘artist’ concept in close semantic relation with the concept ‘people’, which might be interpreted as that the artists are involved in stable and regular relations with their audiences (see Fig. 13). Other main semantic links of ‘artist’ include ‘work’, ‘particip’, ‘know’; as well as the concept ‘ateli’ (the latter additionally shows that artists to a significant extent are operating in the setting of their studios; as we know from the qualitative data, La Escocesa members regularly run a special event – ‘Open studios’ – oriented towards public involvement). Altogether, this may indicate that the image of an artist in the community has communitarian connotations linked to work with people, mediated by participatory events in the community localization space.

The concept ‘people’ is less frequently mentioned than the concept ‘artist’ though it is still the second frequently mentioned (Table 6). Betweenness centrality is twice lower than that of the ‘artist’ concept though also rather high (for other creative roles concepts in La Escocesa semantic network this is not the case).

Table 6. Semantic surrounding of the ‘people’ concept in La Escocesa semantic network

Betweenness centrality	0.034
Total degree	0.005
Relative frequency	0.75
Strength of ties with key neighbors:	
other	9.0
work	5.0

¹¹ In the picture the links weaker than 3 are hidden.

artist	5.0
mani	5.0
few	4.0
us	4.0
know	3.0
grow	3.0
talk	3.0
think	3.0
participate	3.0

One of the most significant concepts related to ‘people’ are, again, the concepts include ‘work’, ‘particip’ and ‘know’, resembling those in the semantic surrounding of the ‘artist’ concept. This reveals that La Escocesa members have an elaborated perception of people as actors with whom they work , in particular in the format of ‘Open studios’. According to the qualitative data, this might be related to the specific traits of artistic practices of community members: quite a few of them involve a participatory approach. Additional explanation for the solid structure connecting ‘artist’, ‘people’, and ‘work’ concepts might be found in the sustainable attitudes of the local community of Poblenuou and broader Barcelona towards active public involvement.

La Escocesa members do not mention the concept ‘curator’ frequently, the centrality metrics of this concept are below significant. This indicates its unimportance for the community. The equally low distribution of the frequencies of ties to few neighbors in its semantic surroundings, shows that there is a low level of concept elaboration. This may represent the absence of a curator’s functions in professional commercial artistic activity of La Escocesa and missing curating mechanism (Table 7). Here semantic network analysis reveals knowledge inertia and operational closure of knowledge (see: Basov & Tippmann 2013): even though La Escocesa made steps towards professionalization through its involvement in the ‘fabrics of creation’ program, communication with curators intensified, and the concept has been integrated into community discourse, it still has not taken an important place in the community knowledge structure.

Table 7. Semantic surrounding of the ‘curator’ concept in La Escocesa semantic network

Relative freq	0.017
Strength of ties with neighbors:	
independ	1.0
victor	1.0
good	1.0
peopl	1.0

As for knowledge structures linked to *localization* of community artistic practice in urban and broader context, we are considering a set of concepts signifying living and presentation places such as ‘gallery’, ‘space’, and ‘atelier’ as well as

ones signifying geographical places such as names of cities and countries. In the list of techniques above we have mentioned a wider range of possible localization-linked concepts, though here we consider only the ones most significant and specific for La Escocesa semantic network.

Within the localization-related concepts 'space' (Table 8) is the most significant, most frequently mentioned and the highest in betweenness centrality than the other relevant ones.

Table 8. Semantic surrounding of the 'space' concept in La Escocesa semantic network

Relative frequency	0.1811
Betweenness centrality	0.004
Strength of ties with key neighbors:	
public	4.0
exhibit	3.0
bigger	2.0
ateli	2.0
work	2.0
downstair	2.0
product	2.0
new	2.0
enclos	2.0

The strongest link 'space'-'public', as well as 'exhibit' and 'ateli', one more time confirms the focus of the community on activities performed in public settings; at the same time there are shared representations about space as a place for exhibition practices.

The 'gallery' concept (Table 9) is less frequently used than the 'space' concept (what most obviously results from the fact that it has a more narrow meaning, while the community utilizes a variety of spaces to present and discuss artworks).

Table 9. Semantic surrounding of the 'gallery' concept in La Escocesa semantic network

Relative frequency	0.125
Betweenness centrality	0.003
Strength of ties with key neighbors:	
differ	2.0
profession	2.0
dedic	2.0
seriou	2.0
art	2.0
photograph	1.0
peopl	1.0
normal	1.0
hada	1.0
group	1.0

Within the concepts that members use reflecting on localization of their practices there is one unique concept that might not occur in the discourses of most of other artistic communities – ‘atelier’ (the studio). The ‘atelier’ concept is mentioned less frequently than the other two concepts considered above, but it is still weighty in betweenness centrality (Table 10).

Table 10. Semantic surrounding of the ‘atelier’ concept in La Escocesa semantic network

Relative frequency	0.113
Betweenness centrality	0.0018
Strength of ties with key neighbors:	
own	3.0
free	3.0
serigraphi	3.0
open	2.0
other	2.0
creativ	2.0
owner	2.0
due	1.0
space	1.0
talent	1.0

Contrary to the galleries being institutionally prescribed professional places for artworks presentation, the ‘ateliers’ are perceived as free and own(ed); as we know from the qualitative field data analysis there is a special event ‘Open studios’ utilizing ateliers and explaining the linkage between the concepts ‘atelier’ and ‘open’. Such a semantic structure reveals that community members construct an image of their ateliers as open, free and creative.

Another aggregation of semantic information that may enrich analysis of knowledge on community localization is brought by concepts marking different geographical points (Table 11). Looking at the relative frequency of different localities mentions we see that community members perceive themselves as embedded in the city of Barcelona, and the Poblenou neighborhood in particular; for comparison the relative frequency of ‘La Escocesa’ concept usage is, as expected, larger than ‘Barcelona’ and ‘Poblenou’, yet not drastically. This may be interpreted in favor of an elaborated identification with the city and the area which the artists have.

Discourse of La Escocesa members also demonstrates their concern about other locations far from their direct place of habitation – other cities and countries. Looking at these concepts one gets a knowledge geo map of links stored in community knowledge structure, a whole map of spots, where artists are involved in exhibition and/or residency practices. Observably, La Escocesa members have connection to a cluster of Spanish-speaking countries based on inclusion into the same language frame, as well as different geographical backgrounds of artists. A set of connections to a cluster of European cities and

countries is also present. With the help of additional data one could further analyze the relation between this specifics of geocultural position of Spain reflected by the semantic network to other basic knowledge structures, for example, self-identification.

Table 11. Geographical location concepts in La Escocesa semantic network

Native locations concepts	Relative frequency	Abroad locations concepts	Relative frequency
La Escocesa	0.16	Madrid	0.05
Barcelona	0.1	Mexica	0.06
Poblenou	0.09	Poland	0.02
Catalonia	0.01	Berlin	0.02
		Argentina	0.02
		Amsterdam	0.02
		Switzerland	0.02
		London	0.02
		Cuba	0.01
		Manchester	0.01
		Bulgaria	0.01
		Sarajevo	0.01
		Tenerif	0.01



Fig. 14. Geographical locations concepts in La Escocesa semantic network

core of La Escocesa, juxtaposing semantic components arranged around hyperonymy concepts 'space' and 'place' shows that they are not directly linked, but through a number of concepts – 'exhibit', 'together', 'work' – and have different concepts in their surrounding. This chain of concepts between 'space' and 'place' may be interpreted as a specific vision of the creative process artists of La Escocesa have: some place is a setting for working together resulting in exhibitions in certain spaces.

Conclusion

In the paper, we have explored the opportunities provided by a structural approach based on semantic network analysis to the study of knowledge created by artistic communities in the course of their creative and everyday interactions. Applying different techniques of semantic network analysis to the texts produced by La Escocesa and interpreting the results, allowed us to make the following conclusions on the possibilities of the method in the suggested context.

Quantitative analysis at the network level is able to characterize the general characteristics of community knowledge, i.e., centralization by betweenness and total degree, as well as clustering coefficient. These metrics show that La Escocesa generates knowledge which is highly focused on a certain set of concepts, which are important for the community members; at the same time, from the fragmentation metric we can see that knowledge structure still has rather disperse zones, which do not contain complex structures. It is noteworthy, that quantitative measures are most illustrative when are compared either to random generated networks, or to those of other artistic communities.

Quantitative revealing of central concepts and their semantic surroundings, later allows qualitative analyses, which are more illustrative to drill into a single-meaning case. E.g., we have shown how knowledge inertia and operational closure of knowledge can be traced via such an analytic technique in case of La Escocesa. Ego-concept analysis may be supplemented with visual inspection of quantitatively filtered out semantic network cores, revealing the main accentuations in the community knowledge. In our case, the analysis shows that the shared cognitive focus of La Escocesa is on discussing and practicing the relationships between artists and other people, the main subjects of the creative process linked through participatory practices, which is justified by the verb-concepts in the relevant semantic structures.

Mixing qualitative and quantitative techniques of semantic network analysis also makes sense when one would like to trace if there are stable knowledge aggregations created and shared by artists and which, of such aggregations, are the most important intellectual foci for the artists. In order to do that, consideration of the clustering coefficient should be accompanied by qualitative analysis of the semantic network core. In the case of La Escocesa, we see at least two of the most important of such knowledge aggregations, one is artists – people relationship and the other one – on situatedness of artistic work in specific place and space.

Supplementing semantic network data with qualitative field data – observations and interviews – is important to make further interpretations, e.g., to evaluate to what extent the knowledge structures revealed through semantic network analysis correspond to the specific creative style of a community. As we have seen from the community description, La Escocesa artists have an explicit

intellectual orientation towards communal integration, are deeply embedded in their shared space, are strongly inclined to engage with the publics through artistic events, and are members of a densely interconnected neighborhood.

Summing up, we can conclude that the described set of semantic network analysis techniques and measures offers wide opportunities for the capture of characteristics of community-specific knowledge structures manifested in, and linked to, the peculiar characteristics of the creative processes in the community.

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