ID 1569 | SOCIAL TOPOGRAPHY: LEARNING SPATIAL INEQUALITY THROUGH 3D REGIONAL MODEL

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ABSTRACT: The aim of this research is to develop a digital sand table to facilitate dynamic decision making capable of eradicating spatial inequality. The proposal's innovation lies in the interface it creates between a theory of spatial inequality and a unique laboratory that facilitates 3-D visualization of the mapping of social disparities. This interface, and the unique platform for the formulation of socio-spatial policy it yields, stands to constitute a turning point in the manner in which decision makers 'see' (literally and figuratively) space and subsequently make policy. This proposal's point of departure is the premise that the world 'out there' contains inequality that continues to expand and intensify on different scales in different parts of the world. In recent years, scholars have reported an increase in inequality, as observed, for example, on various scales in the United States and different countries in the European Union (OECD, 2016: 74; Hopkin & Lynch, 2016). Inequality is also intensifying in Israel[1] and its southern periphery[2].

1 THE PROBLEM: TRENDS AND DEFINITIONS

On a simple level, social inequality can be defined as a situation in which those with the highest incomes earn increasingly more while those with the lowest incomes earn increasingly less. But the situation may also be more complex. For example, some individuals or households may see increases in their income, but increases that are smaller than those experienced by others with higher incomes. This is the essence of inequality: a growing distance between groups (Tasan-Kok, Van Kempen, Raco & Bolt, 2014: 22). This proposal joins a school of scholars who have addressed the phenomenon of spatial inequality (Linda Lobao, Gregory Hooks, Ann Tickamyer, and Jamie Peck).

The study of inequality, these scholars explain, asks "who gets what and why?" (Lobao, Hooks, and Tickamyer, 2007: 1), whereas the study of spatial inequality asks a third question: "where?" In this way, studying inequality from the perspective of spatial inequality means interrogating: "who gets what where?"

This school is based on a first generation of urban and rural sociologists who have sought to advance spatialized sociology (Gans, 2002) based not on a reification of "society" or "space" but rather on an intensification of the link between the two, as well as on the work of geographers who posit that "social relationships are space forming" (Soja, 1989). Scholars of spatial inequality argue the importance of bringing the region back into sociological discussion. Regions includes cities, open areas, and villages; creates territories, such as districts and regions, that help scholars identify networks of divisions and power relations that structure inequality yet remain under the radar. "Some geographers argue for theorizing social relationships in space as a 'power-geometry,' 'a complex web of relations of domination and subordination, of solidarity, and co-operation'." (Lobao, Hooks, & Tickamyer, 2007: 9; citing Massey, 1994: 265).

Sociological and geographical studies interrogating Israeli society have adopted and developed the concepts of center and periphery (Tzfadia, 2012) as a means of conceptualizing the inequality that links ethnicity, class, and geographical distance. These concepts have established a foothold in both Israeli academics and public discourse as an effective means of characterizing inequality in the country. Indeed, the concepts of "center" and "periphery" have constituted a basis for movements of social change, which

[1] The first is the Gini Index, which indicates that as of 2014, Israel was ranked fourth of all OECD countries in terms of inequality, after the United States, Turkey, and Mexico (Keeley, 2015). It also highlights a high incidence of poverty (18%) and an extremely high percentage of employees who earn minimum wage (OECD, 2016: 53-57). At the same time, the share of capital held by the public is on the rise, as are the wages of managers. In Israel, in other words, the strong are getting stronger and the weak are getting weaker.
[2] The southern Negev region, which reflects sharp social disparities both in comparison to the country's Central region and on a regional scale. For example, 29.9% of all salaried employees in southern Israel earn minimum wage, in comparison to 18.6% in the Central District and Tel Aviv. The gap is more pronounced among women, with 38.8% in the south, 23.6% in the center, and 22.2% in Tel Aviv (Bank of Israel Report, 2014: 120).

have placed questions regarding the division of resources on the public agenda (see, for example, the HCJ land ruling; Hananel, 2009; Meidani, 2005).

The proposed study will make three primary contributions:

- Methodology: The project revolves around the development of a new methodology for the study and eradication of inequality based on the visualization of data with an emphasis on 3-D models.
- Theory: The project contributes to the field of knowledge regarding social inequality by proposing the concept of "social topography" as a new language for capturing socio-spatial relations.
- Policy Making: In conjunction with the concept "Social Topography," the new methodology will contribute to the formulation of policy aimed at eradicating inequality. To this end, I will develop a digital sandbox to help improve the dynamic process of decision making.

This study is based on a previous study that was also funded by the Ministry of Science[1], which involved building a 3-D model of the Negev. The current project proposes to develop this model into a dynamic platform to assist in the decision making process. By relying on existing technological platforms and theories, we can travel the long road from the research stage to the decision making stage. The proposed study also relies on another significant research effort in which I have been engaged in recent years, along with a number of colleagues: exploration of the labor crisis in the Israeli periphery and analysis of workers' struggles for their right to work in the periphery (Cohen and Aharon-Gutman, 2016; Cohen and Aharon-Gutman:2014).

This socio-spatial research written in the heart of a technological institute that brings significant added value to the table, both because of the access to unique technological platforms it facilitates and the methodological capacities of neighboring faculties, such as computers, civil engineering, etc.

2 THEORY: SOCIAL TOPOGRAPHY

This study will make a concrete contribution to the work of the abovementioned social inequality school using the concept of "social topography," which, I posit, enhances our ability to understand society and space as one texture.

To the best of our knowledge, the first person to use the term social topography was French planner, architect, and writer Gaston Bardet (1907-1989). Bardet (1951) contemplated how to give expression to the alchemy that occurs at the meeting point of man and the built environment. Whether in the case of cities or rural regions, Bardet maintained that this meeting point could be structured as the accumulation of people on land: "some men on land, that is to say the urban texture" (Bardet, 1951: 238). This intersection between man and the built environment – this "urban texture" – exists in villages just as it exists in metropolises. In both cases, people and the physical space that surrounds them are interwoven into an integrated social topography (1951:238):

"I came to understand that this urban fabric was made up simply of the interweaving of human activities on the land and on the map I need to represent them. Out of this was born the principle of social topography".

Social topography is not the random expression of human elements on a map; rather, it had to do with their interrelationship. Only an analysis of these elements as one assemblage could succeed in representing the urban texture.

Bardet also developed the concept of "profils sociogiques" (sociological profile), which he regarded as a tool for expressing man's movement within the maze of large social structures. Most importantly, he believed in the possibility of constructing a sociological profile for different localities. For Bardet, social profile was a visual expression (Image 1). Through the use of his images, he sought to give expression to social rhythm, dynamics, and flow. Considering the means at his disposal in the middle of the twentieth century, Bardet was without a doubt ahead of his time (Bullock, 2010: 355) in his proposal of a dynamic alternative to the inflexible concepts then in use.

[1] "The Challenge of Capital Conversion: How and under what conditions can groups and settlements acquire and trade capital for the enhancement of regional development".

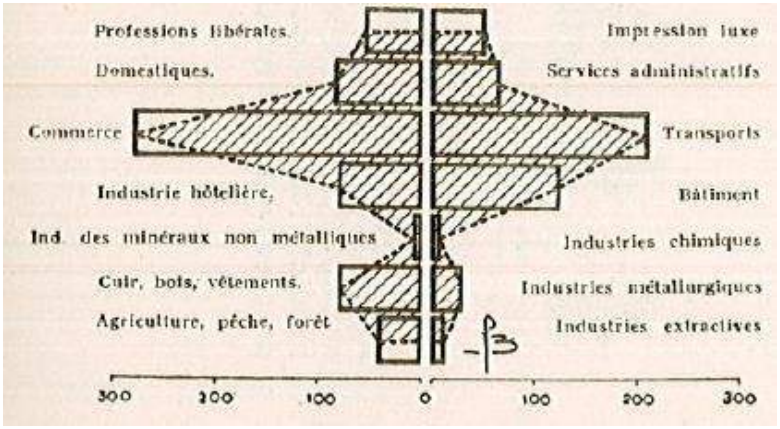


Image 1: A Visualization of social topography according to Bardet (1951).

It is from these models that urban planning, which is always strategic, emerges. The moment the model within which planning occurs is one of social topography, the urban planning that evolves is a direct response to the social element that "dilates with the soul of the social." The results, he maintains, is "a human geography created by man" (Bardet, 1951: 355).

The concept of social topography did not establish itself with the scholars of its time, and in recent decades scholars have been making minor use of it in various contexts, such as archeology (Little, 2005), psychology (Steger &Kashdan, 2006), sociology (Humphreys, 2005), and anthropology (Hindson, 1983).

In the social sciences, the concept of social topography is associated with the man who developed it in that realm: Pierre Bourdie. In an article examining Bourdie's use of this concept, Helmut, Gerhards & Romo (1995) highlight a fundamental premise of field theory: that social actors are located within the social realm, that is to say, within the topography of social relations that are shaped in accordance with their resources of economic, social, and cultural capital (Ibid., 860). In the same article, Helmut, Gerhards & Romo follow Bourdie's lead in arguing that "sociology is a social topography" (Ibid., 893; Bourdie, 1989: 16).

Bourdie's language of fields reflects a structuralist notion, which conceptualizes the dynamics of the individual within cultural and economic structures as movement within space. In this way, social structure is translated into social topography fueled primarily by segmentation and hierarchy (Ibid., 865). Forms of capital undergo segmentation that does not exist on a plane but that rather is hierarchal in nature, meaning that segmentation and hierarchy are linked. We tend to speak of "high culture" and "low culture," or "mainstream culture" and "marginal culture," which are all expressions of hierarchal segmentation (Ibid., 865). The same dynamic lies at the core of social topography. It occurs in fields such as culture, education, fashion, and economics, resulting in a social topography within and among all fields.

The proposed study applies this way of thinking – drawn from imagined sociological space and institutional and organizational space – to geographical space. In doing so, it links geographical location to socio-economic hierarchy, which we refer to as inequality. In this way, it seeks to produce a model that gives spatial expression to large social structures (such as unemployment, poverty, and education), not as abstract structures, but rather in an effort to understand the correspondence between socio-economic and spatial structure. The model's dynamic nature enables us to express and study dynamics and movement, as well as the process through which hierarchal segments are produced in the course of struggles within the fields. This allows us to give expression to the manner in which the outcomes of this social struggle for primacy and control in the field in question change the large structures in which people live their lives.

3 VISUALIZATION: A NEW METHODOLOGY FOR AN OLD PROBLEM

Social research today is based primarily on the written word, which is mediated to people through reading texts and listening to lectures. These two media require readers or listeners to paint a picture in their mind's eye. That is to say, readers and listeners must engage in a process of translating from the abstract to the concrete, and in fact to transform it into a visual object. This gap is entrenched in our culture and, as

is frequently the case, is mediated by language. We often find ourselves asking a person who has read an article: “Were you able to see the picture that emerges from the text?” It is the picture, then, and not the written word, that is perceived as the thing itself (Sontag, 1979: 91). Realism is a powerful resource for research, and on this basis we highlight the importance of visualization in socio-spatial research. On the level of research and analysis, visualization helps us “see things in ways we had not seen them before” in the sense of the accessibility of knowledge: it makes research insights accessible to increasingly wider audiences, and in this way contributes to the democratization of academic knowledge (Moody and Healy, 2014). It also serves to reduce the distance between science and policy, as policy makers also “now see the picture” and can no longer remain indifferent to it.

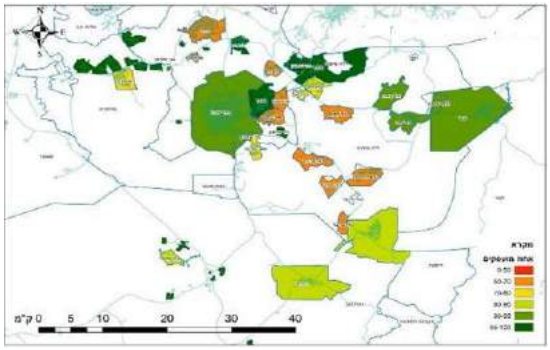
VizLab centerpiece is a 3-D immersive theater consisting of a 2.4 x 7.0 m screen with a 75° field of view and three high-definition Projectiondesign projectors. The laboratory provides a 3-D experience in which one participant, followed by tracking cameras, can “move” through the image or manipulate a 3-D object on the screen.

THE FIRST ATTRIBUTE: 3-D TECHNOLOGY THAT IMBUES SOCIOLOGY WITH VOLUME

The stating point was a 3-D model of the Negev. Image 2 is a 3-D representation of train-tracks, roads, industrial areas, nature reserves, etc. The model included a picture of the future of the Negev, based on a spatial representation of plans that have been officially deposited and approved. This model produces integration in a multi-variable environment, the need for which Singer-Villalobos (2014) has effectively articulated by noting that “modeling a city is a big data problem.”

Image 2: A 3-D regional model.

By the end of the study’s first year, we had produced two significant products: a social study based on descriptive statistics and qualitative research, and a 3-D model of most of the Negev, including an image of its future. The most powerful finding of the social study was the immense social disparities it identified in a variety of socio-economic categories, such as employment, unemployment, etc. We are accustomed to consuming the disparities manifested in these categories in 2-D as follows:



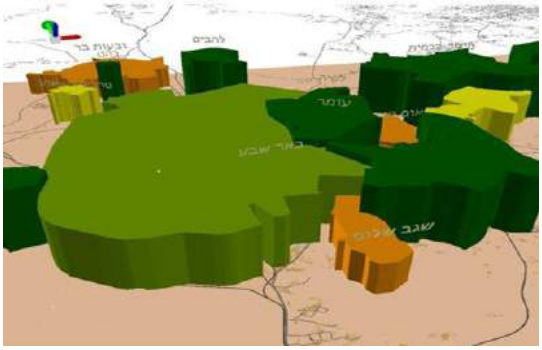


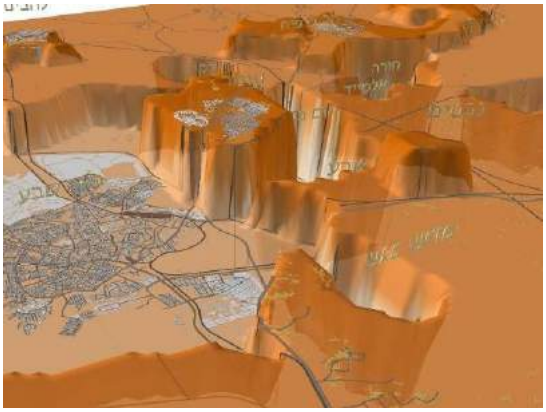
Image 3: A 2-D sociological mapping (employments rate). | Image 4: A 3-D visualization of inequality – first draft.

The 2-D mapping of employees (Image 3) is represented using two elements: geographical location and color. Despite the effectiveness of these maps (Moody and Healy, 2014), we asked ourselves how we could assimilate inequality into our physical model and the research value of doing so.

Image 4 presents our first results: a map that actually consisted of spatially-grounded histograms of sorts. We were not satisfied with this outcome, as we felt it was a “pasting” that advanced neither the research nor the methodology.

We asked ourselves whether we could take the radical step of integrating the social into our model in a way that would leave the social and the spatial inextricably bound to one another, as they are in reality, and as Bardet suggested when he spoke of urban texture as a texture that was at once both physical and social. Our aim was to transform the social into the body of the model and the basic map. In other words, we sought to convert topography into a methodology. Topography here is not only a concept concerned with the height of objects; it is also a method that facilitates the expression of hierarchies and relations of inequality over diverse realms of content.

We also adopted the terminology of geodesic mathematics, which transforms heights into terrain, and applied it to socio-economic measures according to a locality-based index. The results produced can be seen in Image 5.



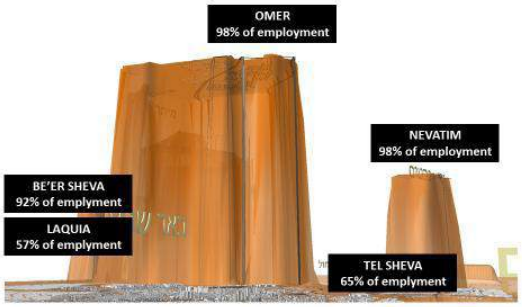


Image 5: Social Topography | Image 6: Social topography from the perspective of a resident of Beer-Sheva.

The 3-D representation imbued social structures with volume and produced congruence between the life experience in localities that are low on the socio-economic ladder and the modality of data representation, as reflected by the following angles afforded by the model:

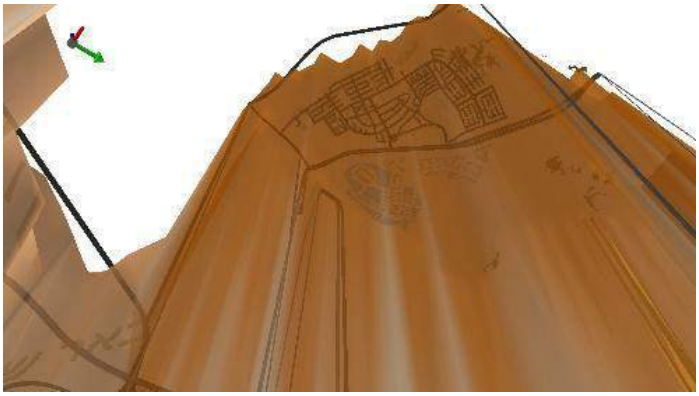


Image 7: Social topography from the perspective of a resident of Tel-Sheva, a view from Tel-Sheva toward Omer.

Images 6 and 7 represent the perspective of the residents of Beer-Sheva and Tel-Sheva when they look toward Omer on a sociological level. These images represent grounded visualization, meaning

congruence between the quantitative and quantitative research, and this, to a great extent, is the source of its power (Knigge and Cope, 2006).

THE SECOND ATTRIBUTE: MOVEMENT IN SPACE

Using a navigational device and glasses equipped with sensors, a person in the lab can navigate within the model and engage in rapid movement and transitions between different scales. The user can be inside an apartment in Yeroham one moment and out viewing the region the next. Movement within a 3-D model allows flexible analysis as a result of the quick transitions between different scales it facilitates (Base, 2014).

The movement facilitates the model's animation, allowing movement in dynamic scenarios. Movement in space is experienced as the movement of a person or a body that undergoes a specific spatial experience. Animation allows us to produce "visual narratives," as referred to from a sociological perspective (Harper, 2012), or geo-narratives, as referred to by social geographers (Kwan and Ding, 2008). In other words, we have produced a dynamic model that enables us to generate animation both of people as active agents in space and of the geo-social structures in which they function. This is significant, because it enables us to represent socio-economic structural scenarios of division of wealth and, with the press of a button, to change the social topography presented in the previous section and to analyze the impact of policy x or y on spatial inequality. This methodology lies at the core of the proposed study and is discussed in greater depth below.

THE THIRD ATTRIBUTE: THE LARGE SCREEN AND OUR COGNITIVE PERCEPTION

The third attribute facilitated by the technology employed, which lends added value to the study, is work on a large screen in a dark environment, which disconnects us from everyday life and inserts us into a "different" experience. The large concave screen yields two major attributes that play a fundamental role in fueling the Research Plan: a) the large screen facilitates emotional involvement and assimilation because, on a cognitive level, it affects us differently by producing intensities that have a particularly significant impact on our cognitive perception. b) A second attribute observed in the lab is the fact that in contrast to the augmented reality in which individuals experience intense realism alone, the large screen facilitates audiencing (Fiske, 1992) by creating a situation in which a group of people is party to a shared journey of observation and can have a discussion about it. This is of particular importance in the context of this proposal, as decisions regarding the adoption or rejection of socio-spatial policy are almost always made by integrative teams. This is especially true in the discipline of city planning, which consists of round-tables of experts from different fields, such as economics, the environment, transportation, law, and sociology. The committees in which decisions are made are similarly structured. Stated simply, in conjunction with its movement in space and its dynamic representation of social structures, 3-D realism projected onto a large screen can facilitate discussion among decision makers and yields a spectrum of attributes from which, and within which, a "different" kind of decision making process can emerge.

4 CONCLUSION

חברתית לטופוגרפיה לחזור The aim of the proposed study is to advance and promote an innovative methodology – the 'Digital Sand Table' as a Visual Means of Shaping Spatialized Social Policy. We believe that this methodology offers three major advantages. First, it gives spatial expression to the existing state of inequality in a manner that incorporates many layers of knowledge into one view, which we name as social topography. Second, it improves our ability to make decisions regarding states of inequality by visualizing the implications and impact of future scenarios. These two advantages have the potential to dramatically impact spatial inequality and social disparities on both the regional and national level. And third, due to the availability of visual technology and its consistent drop in price, the model will be a tool with a high level of applicability. Finally, it is important to note that digital sand tables for decision making do not exist today, making this model a significant step forward in developing decision makers' ability to work with an increased amount of data and, in doing so, to see the full picture.

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