

Brazilian Geodesign Platform: WebGis & SDI & Geodesign as Co-creation and Geo-Collaboration

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Abstract. The paper presents the main motivations for the development of a Brazilian platform for Geodesign, based on adaptations of observed needs, review of processes and facilities to face the challenges of spatial inequalities and complexity. The study is motivated by the analysis of difficulties and criticisms on the applied framework tested in robust number of workshops developed. It starts by the literature review in order to understand the main values and keywords that were constructed along time in the use of technologies of geospatial information in planning and, as a result, defines the main resources and facilities that should be considered to a new format of Geodesign. The new platform itself is presented, and the paper illustrates and discusses the proposed framework according to four steps: Reading Enrichment, Dialogues as Creation of Ideas, Voting as Selection of Ideas, and Statistics as Final Decision. It compares and justifies a new framework in Geodesign in face to main models generally used and discusses possible development to a close future.

Keywords: Spatial inequalities · Framework · Participatory planning

1 Introduction

Based on experiences developed by Geoprocessing Laboratory from the School of Architecture in the Federal University of Minas Gerais, Brazil, in case studies in Geodesign since 2015, when we first tested the framework proposed by Steinitz [1] in a local case study [2, 3], we analyzed results and understood we had to review the framework and platforms to face the challenges of complex areas of spatial inequalities.

Steinitz stablishes a framework of 6 models, 3 of them are constructed before the workshop to answer the questions: "How should the study area be described?" (Representation Models), "How does the study area operate?" (Process Models) and "Is the studying area working well?" (Evaluation Models). During the workshop the participants construct the other 3 models: the Change Models to answer "How might the study area be changed?", and the system calculates the "Impact Models" answering "What differences might the changes cause", and finally participants construct "Decision Models" to answer "How should the study area be changed".

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We worked on 43 experiences of Geodesign workshop in 35 projects. From these, 28 were proposed and conducted by the coordination of the laboratory, 4 were proposed by other researchers with our support and in 3 we acted as participants. Of the 35 experiences one was developed in analogical method, one in ArcGis, one in CityEngine, and 32 in GeodesignHub [4], a web-based platform developed by Ballal based on Steinitz framework [5, 6]. After each workshop we applied questionnaires or did notes about performances. The main difficulties and criticism we had to face were about Evaluation Models (92% of participants were not happy with using them), about time (98% of participants noted the importance of extending the time for interpretation and decision) and about the ambiguity in the use of Impact Models (85% didn't use them with knowledge and consciousness). They had difficulty to understanding the difference between policies and projects (observed in 90% of the studies).

The main difficulties in the use of Evaluation Models were about opinions and judgments, because they are a combination of spatial information resulting in a map in which the legend is: feasible (for the very best places to draw ideas of policies and projects), suitable (for the good places to draw proposal), capable (for the acceptable places to draw ideas, even if they were not the best), inappropriate (places not indicated to receive the proposals) and existing (places in which the potentialities or vulnerabilities are already solved). The model presents a scale from the most important to the last important place for proposals, what is an opinion, even if it was constructed by an expert or by stakeholders. We had experiences in which participants took part in the construction of the models, and even in those case studies there was criticism about Evaluation Maps, considered reductionist and inductors of decisions. To solve this problem, we started to include a broader collection of maps, presenting initial information about the place to the participants, using platforms of WebMaps and WebGis in parallel to GeodesignHub platform [7–9].

The main difficulties about Impact Models where about targets, costs and the matrix of impacts itself. While deciding about the ideas of projects to compose a design, the participants must analyze if they are achieving the targets (the amount of area in hectares they are expected to propose per system), the cost of their design and also if the proposals of projects are in the "right" place according to Evaluation Models. The Impact Analysis screen presents a scale from deep purple to deep orange indicating if the impact is positive, positive, neutral, negative or extremely negative. The first problem is that these calculations of impacts (targets, costs and spatial analysis impacts) are presented just for projects, and not for policies, and this is quite confusing for participants to understand. Most of them declared they selected some diagrams just to meet the target. Others declared they were not considering the Impact Model results because they did not agree with the judgment about the best place to put contributions, a problem that was also related to Evaluation Models.

Among the critics there was also a problem about time, that even when we did all the activities in a more slowly process and giving the participants more time between the meetings, they complained about that [9]. So, the question could be not exactly "time", but more possibilities of constructing an understanding, of presenting their considerations, of registering their ideas. In few words, to really be part of it. We understood we had to review the participation framework. But we had to study from the

beginning, understanding deeper the sense of Geodesign and trying to get, from literate review, some keywords that should be considered in a new proposal.

2 Methodology - Reviewing Concepts and the Role of Geodesign

Studies in spatial analysis, since the 1970s, have been based on the systemic scientific approach, which proposes that the investigation of a reality happens through the decomposition in the main variables that characterize it, and in the study of the relations between them [10]. In this sense, the advent of geoinformation technologies, more specifically the use of Geographic Information Systems, have a wide association with systemic approach, as they represent reality in layers of information, which are combined in interpretative syntheses that favor diagnostic and prognostic studies. It is possible not only to consult a geographic database, but also to generate new information from the inclusion of new actors and new points of view in the process.

When using the potentiality of GIS (Geographic Information System), Cowen [11] argues that there are steps related to "database approach", "toolbox approach", "application approach" and "process-oriented approach". The data-base approach fulfills the function of dissemination and consumption of geographic information. The toolbox approach allows that users of different knowledge to apply algorithms and perform the production of information from the data. The application approach studies information consumption that meet the uses and praxis established by specialist knowledge. Finally, the process-oriented approach establishes a work framework to be followed to accomplish a mission.

In this sense, it can be said that the advent of GIS has expanded from the production and consumption of data to the support of information construction and the inclusion of new actors. In parallel to GIS development the recognition of different stakeholders in a planning process started to have the support of a PSS (Planning Support System), based on clear definition of actors, tasks, responsibilities, flow of use and production of geographic data. The PSS is designed to address complex planning problems by associating three general components according to a systemic planning approach: GIS, models and visualization instruments [12–14]. The PSS employment proposals already include discussions on the collaborative aspect [16].

Parallel to technological development, interest in the territory also expands, from the point of view of its physical and anthropic values, its environmental resources and its potentialities and vulnerabilities, especially in face of the awareness of its limitations. The regulations on the obligation of citizen consultation in decisions that are of collective interest are published for different planning scales. In Brazil, the defense of this inclusion of new actors and collective decisions in planning begins with the Federal Constitution of 1984, called "citizen's constitution", whose principles related to regional and urban planning are concretized in the City Statute, law 10.257 of 2001,

which defines that citizens' participation and shared decisions in planning are mandatory.

However, there was still a challenge to be faced: the production and consumption of data could be favored by GIS, the planning process could be structured according to a PSS, but there was a lack of investments in information visualization resources, more specifically on geovisualization. Visualization is defined in science as the condition that allows users to "see the unseen" which, by representing the main components, favors the understanding of complex elements [15]. When the geographical attribute is included, the expansion of the condition of geovisualization aims to provide a way to reveal the unknown, through self-learning in a dialogue between the subject and the represented object, passing through the stages of presentation, synthesis, analysis and construction of knowledge [16].

In this sense, studies were carried out to favor the creation of representations of spatial reality that would be useful to create a common understanding of planning issues, improve communication between different actors in multidisciplinary participations [17]. Proposals related to the term Geodesign emerged along this line of using geoinformation technology resources and expanding geovisualization conditions to get together different actors for participatory and shared planning.

The term Geodesign was used for the first time in 2008 at the NCGIA Specialists Meeting on Spatial Concepts and GIS and Design, based on a methodological reference framework for planning and territorial design of urban and environmental landscape, applying an integrated process [1]. It is supported by the use of spatial information systems that favor the analysis, the construction of alternatives, the participation and collaboration of different actors, followed by the evaluation of the possible impacts of the choices made and the wide communication of partial and final results.

But should Geodesign be understood as something new, or a result from previous studies in the use of Technologies of Geoinformation that were developing some facilities to consider new values from society in a general sense, and not only among GIS people?

Trying to answer that, we found a paper that helped us to construct a timeline and to define the main values that stated to be part of the interests in scientific production, that could be the basis for the emergence of Geodesign [18]. The authors presented a descriptive picture of the evolution of principles that were incorporated into the use of geoinformation technologies, more specifically the GIS, from 1958 to 2006, and demonstrated which and how the interests start. They presented the scientific publications and their authors according to a chronological evolution and, from that, we extracted the main ideas that emerged along time. They did not quote Geodesign because they published the review in 2006, but we included the term in their timeline, created a list of keywords that could synthetize the evolution, and aggregated them in the main ideas of: process/procedures, GIS resources, geovisualization, citizens' participation and, finally, Geodesign (Table 1).

Table 1. Timeline in technologies of geoinformation and planning - constructed from the review and adapted from Balram and Dragicevic [18]:

TIME	MOTIVATIONS / ROLES	RESOURCES
1958	Expansion of the argument	Representation
1960	Insertion of sketches and modeling	Precursors of the Planning Support System (PSS)
1960	Consensus maximization	Delphi Method
1963	Produce, manage and transform data	GIS (Geographic Information Systems)
1966	Interest in thought processes and structuring	Mental Maps
1969	Judgment of potentialities and vulnerabilities	Overlay of variable layers
1969	Interest in expanding participation	Definition of actors, tasks, stages
1971	Interest in decision-making processes	Decision Matrix, precursors to DSS (Decision Support Systems)
1982	Interest in the man / machine interface	Visualization and interface
1985	Shared decision processes	Framework decision support
1985	Maps based on the World Wide Web	Hypermaps
1989	Combining variables	Multicriteria Analysis
1992	Expansion of GIS as a structure of thought	Geographic Information Science
1992	Decision support	Communication in planning
1993	Argumentation	Citizens' participation
1993	From technical representation to local tradition	Incorporation of the citizens' vision
1994	Geographic information on the web	Web Geographic Information Systems
1994	Virtual reality and scenarios	Visualization and geovisualization
1996	Deliberation of the participants	Citizens' participation
1997	Citizen participation	Collaborative Spatial Decision Making
1997	Citizen empowerment	Ladder of empowerment
2001	Expansion of geographic data visualization	Geovisualization
2002	Scenarios and simulations	Agent interactions
2003	Geospatial technologies for group processes	Geocollaboration
2008	The term Geodesign appears	Geovisualization, Geocollaboration, Citizen participation, Web-based platform for consumption and production of information.

Colors according to classification:

Process/procedures
GIS resources
Geovisualization
Citizens' participation
Geodesign

From this table we understood how the idea of Geodesign was been developed in scientific production and that it was supposed to be based on geovisualization, geo-collaboration, citizens' participation, web-based platform for consumption and production of information. From this understanding we decided that Brazilian platform of Geodesign was going to be a support to connect SDI & WebGis & Geodesign in order to provide integrated and georeferenced information, enabling a wide availability of data to support discussions about the territory. We decide to name it: "GISCOLAB - WebGis & SDI: Geodesign as cocreation and geocollaboration".

3 Development and Analysis - Brazilian Platform of Geodesign

The Brazilian platform of Geodesign was developed in the PhD thesis of Christian Rezende Freitas, under the supervision of Prof. Ana Clara Mourão Moura [19]. The logic of the platform was constructed in Laboratory of Geoprocessing and Christian Freitas presented his ideas about the new tendencies in the use of Geoinformation Technologies in territorial planning: new forms of production, sharing and use of spatial data. The idea is to use the structure of SDI (Spatial Data Infrastructure) with the complete services of access and production of data in a process of Geodesign negotiation (Fig. 1).

In the platform the thematic maps are distributed according to "Contexts", that are the main axis of discussion in the workshop. It is noteworthy, however, that the user can search layers from one context to another and, mainly, as it is a SDI (Spatial Data Infrastructure), the user can search layers through the Metadata Catalog (data about data). In the example, the main Contexts are "Production", "Inhabit", "Culture" and" Environment", and there is also the context of "Decision" for viewing partial and final results of the negotiation process (Fig. 2).

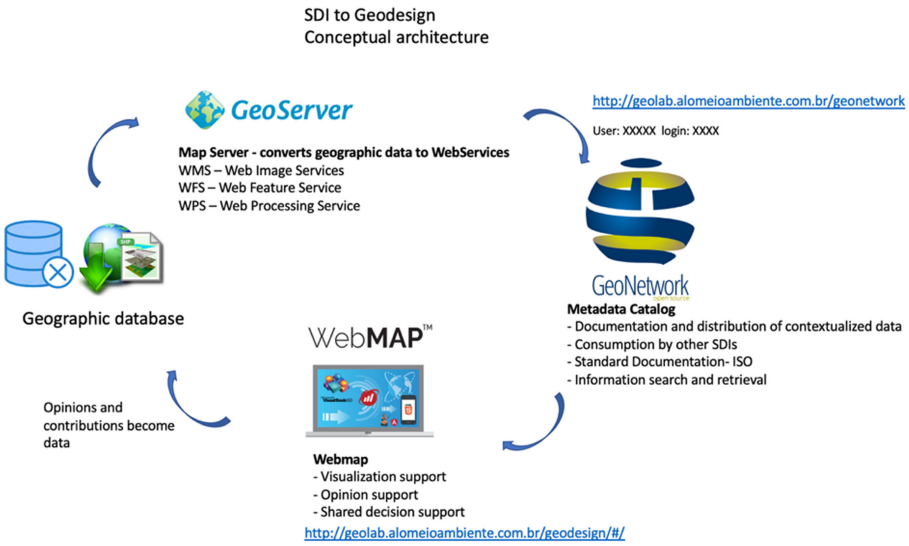

Fig. 1. SDI to Geodesign: the conceptual architecture. Source: Freitas [21]

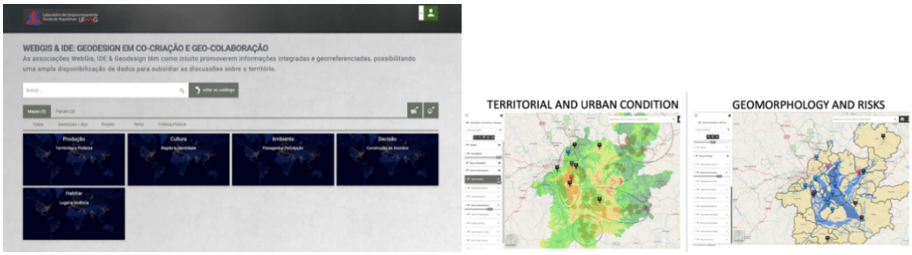

Fig. 2. Brazilian Geodesign platform. Examples of thematic maps that are in the "Contexts". Source: The authors

The platform is developed from the logic of SDI following the patterns of data production and consumption, although it should be recognized as a "Thematic" SDI, as the data are not only the institutional ones, but those produced by the conductors of the workshop according to the main characteristics of the case study, not only representation models but also process models. When an institutional data is used directly, it is consumed via service (WMS – web map service) through a link for its visualization as a cartographic support. All thematic layers made available went through technical elaboration of content production, so even if they have references of data origin, they are new maps.

Once the platform is structured, the framework is based in 4 steps: "Reading Enrichment", "Dialogues as Creation of Ideas", "Voting as Selection of Ideas" and "Statistics as Final Decision" (Fig. 3).

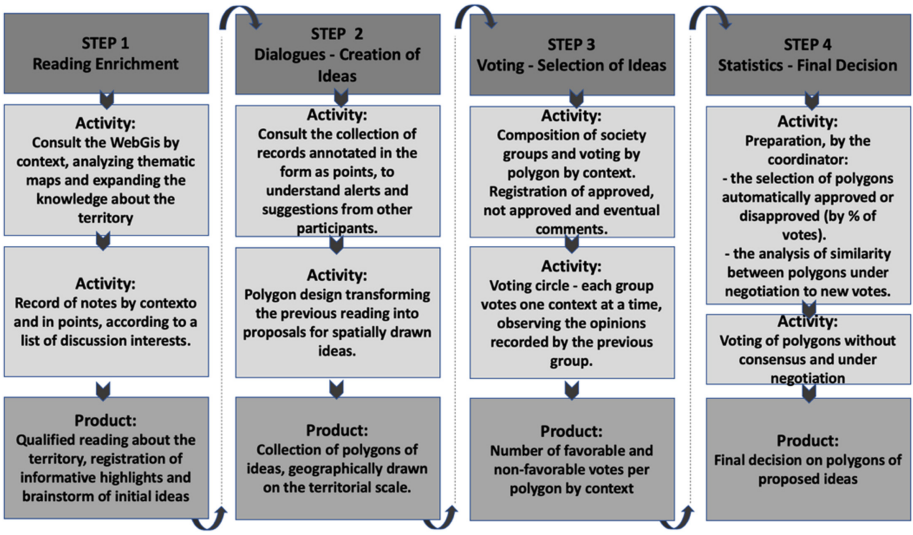

Fig. 3. The workshop framework. Source: The authors

The goal of Step 1, "Reading Enrichment", is to make the participant use the WebGis resources to read data about the place, to inform himself about the main characteristics of the place, and to be an active participant presenting notes based on what he knows about the territory: alerts and suggestions to many different themes of the case study. The goal of Step 2, "Dialogue – creation of ideas" is to make the participant draw polygons of proposals, to import existing polygons, or even to analyze the polygons that different actors presented (i.e.: proposals presented by institutions or public administration). The goal of Step 3, "Voting - Selection of Ideas" is to make the participant analyze and write comments to the list of proposals presented in the dialogues, that is a way to create a debate of ideas, presenting technical arguments and opinions that can be read by everyone, and mainly to register the individual vote about "like" or "don't like". The goal of Step 4, "Statistics as Final Decision" is to run statistical analysis about percentage of votes and to separate the proposals that are automatically disapproved, approved, and those that must go under negotiation. To give support to the negotiation it is used the analysis of topological similarity of polygons, to inform participants about each polygon and its topological relation with all other polygons.

3.1 Step 1 - Reading Enrichment

The participant receives the task to do this step before the first meeting with the group, by himself, with enough time to use the WebGis platform and open the contexts, visualize each map, to select layers and change the position of them, to apply transparencies and to change the referential base map. He takes his time to study the data. He can include more data from other platforms (using WMS – web map services) and recover data from one Contexts to another.

The participants receive a pdf explaining how to develop this first activity, with the link and the login information to use the platform. It is quite easy to be used, very intuitive. We tested this step in three opportunities: in two of them we sent the pdf instruction to participants and stablished a time to receive the doubts in the laboratory, and in one of them we created a WhatsApp group to put ourselves at their disposal to any doubt. Just one person (in a total amount of around 56 person considering the three experiences) had doubts in the very first contact with the tools, what is less than 2% of the participants, but the difficulties were solved with our help and the person was able to take part on all the steps.

After analyzing the data (representation and process maps) the participant can contribute inserting a pin (a point element) following a list of standardized symbols and colors presented by the conductor, in each context. They use the "Annotation" interface so that the point elements are geographic records of ideas, suggestions, alerts, opinions, new information about the place. Dynamically all the participants have access to the set of points and can be informed about what other people say, before the second step. It works like a brainstorm of initial ideas (Fig. 4).

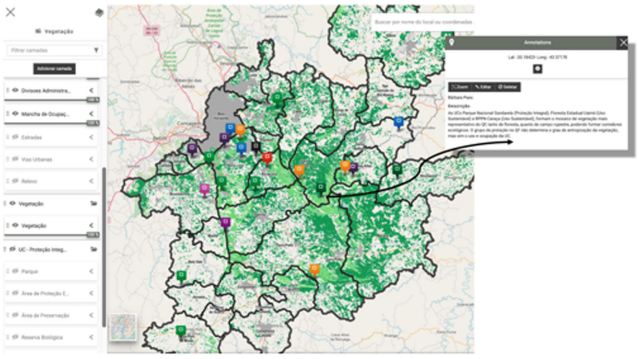

Fig. 4. Step 1 – Annotations using standardized symbols and colors. Source: The authors

3.2 Step 2 – Dialogues – Creation of Ideas

The participant, individually or in a group (what must be decided by the coordinator, as each workshop can have a dynamic composition of actors in different steps), analyzes the general ideas in the collection of points and draws polygons of those ideas that he or his working group deems relevant. The expectation is that the proposal polygons are elaborated by those who know the territory, for geographical assertiveness in terms of position, scale and content (Fig. 5).

It`s also possible to import polygons designed by others, or even to draw the polygons using the tool of preference (i.e. Google Earth) and import them as contributions. They use the " Dialogues" interface and it`s very easy to use the tools to draw and save, but it's important to highlight that polygons are representations of ideas that must come with the identification of the author, its name and a good description of the proposal. While in other systems the idea is based on graphic representation, this application was planned to encourage not only the drawing, but mainly the description, because it will be seriously be taken into account in the next step of voting.

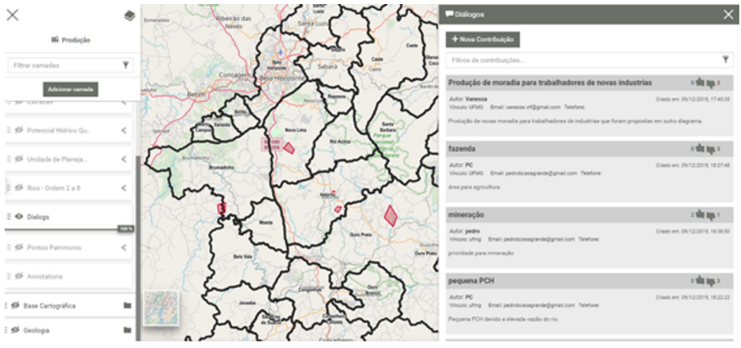

Fig. 5. Step 2 – Elaboration of polygons of ideas in the form of dialogues, containing graphic representation, author, title and description. Source: The authors

3.3 Step 3 – Voting – Selection of Ideas

The voting process can be conducted based on individual manifestation or group manifestation, according to the decision of the conductor. In the last experiments we decided by individual voting in this step and group voting in step 4. We understood that it was particularly important to make people really take a position and to feel they were listened and considered.

In this step we asked the participants to open the "Dialogues", analyze the polygons of ideas and write comments about them. They are not obliged to write comments, but they are very encouraged to do it, because this step is developed in presential workshop or in a session of a videoconference, in which they are separated by groups, according to their expertise and interests, and could call for debates or sharing opinions with other participants from his group, although when registering the own comments or votes each participant has to manifest individually on the platform (Fig. 6).

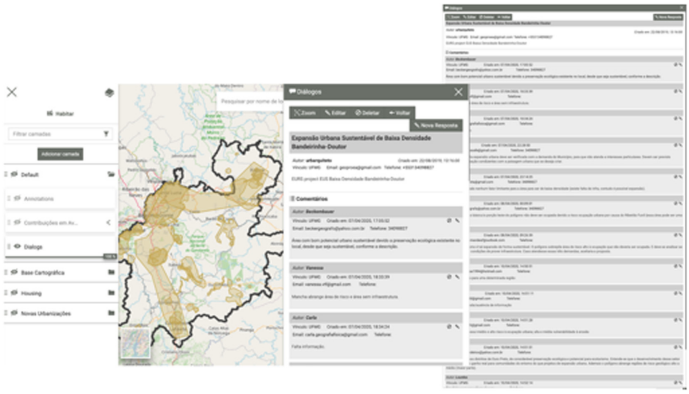

Fig. 6. Step 3-Dialogues–registration of comments with opinions, doubts, technical information, suggestions. Source: The authors

Before this presential or virtual meeting we consult the participants about their expertise or preferences in the main thematic of the workshop, so that they are separated in groups representing interests (i.e. production, inhabit, environment and culture).

The work in groups followed the logic of registering notes and voting in cycle. This means that a participant starts to contribute in context "A", that was the one he was first selected to, but must go the other contexts, like "B" and "C", in the sequence. For example, someone that was initially part of "inhabit" group starts by registering comments and voting ideas of this context, but after that he goes to "culture" context, after that to "environment" context, and finally to "production" context. While he is

following this cycle, another participant that has expertise or more interest in "culture" starts by registering comments in this context and in the sequence, he goes to "inhabit", "environment" and "production" contexts. The logic for this cycle process of writing comments and voting is because when you know better about a context, you are the first one to register your observations that will be read by other participants (Fig. 7).

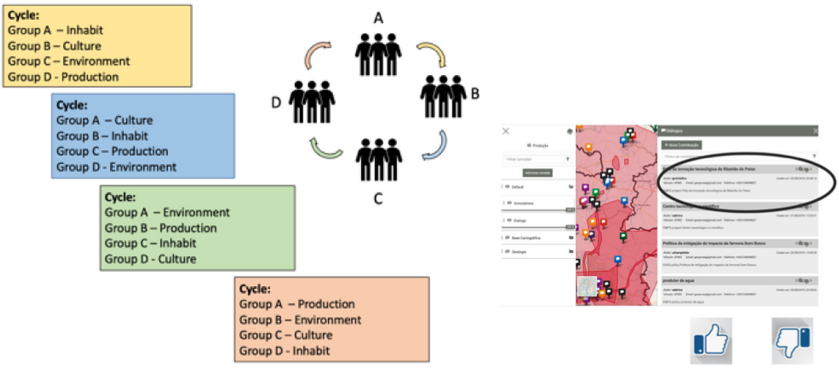

Fig. 7. Dialogues – groups voting in cycle, even in individual voting. Source: The authors

The process is based on the Delphi method, proposed in the 1950s by the American military industry Research and Development (RAND) with the objective of making structured listening and sharing responsibilities by maximizing consensus of opinions. The name comes from the Oracle of Delphi, as the objective is to issue opinions or suggestions for decision making. The procedure is made up of rounds of opinions, in which partial responses about what the majority thinks are shown to participants who have the chance to adjust their opinions [20, 21]. We observed numerous comments in each polygon of the Dialogues, what is an indication of interest and participation, motivated by the process.

3.4 Step 4 – Statistics and Final Decision

After the step of individual comments and voting, the conductor runs a script based on ETL (Extract Transform and Load) that calculates the votes and the percentages. The scripts separate those diagrams that are automatically rejected, those that are automatically selected and those that are under negotiation and must be analyzed again in another round of discussion and voting. The rating ranges can be decided by the conductor, and we used the limits of under 40% for not selected, over 60% for selected and from 40 to 60% of voting to be reconsidered and analyzed again. The ETL tool interacts with the platform and, after running it, the polygons to be negotiated are highlighted to the participants (Fig. 8).

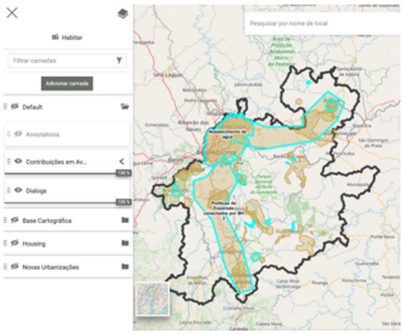

Fig. 8. Polygons to be discussed highlighted in the context. Source: The authors

Also, to give support to decision making in the second voting of polygons that are under negotiation, another ETL script (Extract Transform and Load) is used to identify similarity of polygons [22]. We applied the rule of topological similarity which checks for each polygon under negotiation whether it is within, intercepts or contains other polygons of the theme itself or of other themes, to check for possible conflicts or confluences of interests. The script is run by the coordinator before the final negotiation phase and the algorithm interacts with the platform, resulting in the visualization of results, what can be an additional support for the decision.

Working on groups and again in cycle voting using the same sequence of voting and comments, the polygons that are under negotiation are analyzed, but this time the comments and voting are not individual, but one for the entire group. The participants must declare which polygons they want to discuss about, and the decision of the group can be selected, not selected or selected under conditions. In case of approved under conditions the terms must be written in the description of the idea.

After this second round of voting another ETL script is used again to select those polygons that were voted by most of the groups, and we arrive to the final decision.

During all the process the participants have the support of a dashboard to control the performances, the partial and final results. This dashboard is based on dynamic cartography, what means that each time a data is changed, the visualization of graphics and numbers are updated. This resource of dynamic cartography also allows that while selecting a portion of the place in the map (zooming in or zooming out) the results in graphics and numbers are recalculated and presented according to the selected area: if the user wants to know about an area specifically, zooming in the screen he gets the data from that portion of the case study.

From the dashboard the participant is informed about the number of polygons (contributions) approved per context, the number of contributions that are still under negotiation, the number of contributions in that specific screen, the area in hectare, the media of voting and the highest vote among all contributions. All the process is based on geovisualization as support to opinion and decision making (Fig. 9).

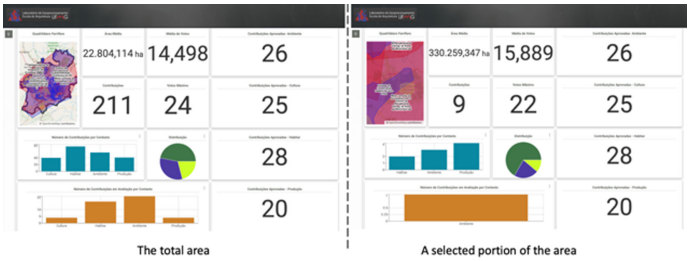

Fig. 9. Dashboard in dynamic information, according to selected area. Source: The authors

It is also important to register the possibilities of interoperability presented in the platform. The participant can upload polygons as contributions in the step of Dialogues but can also download polygons with their attributes (shapes and tables) to be used in any other system. The logic of interoperability is to make the participant feel comfortable to use the resources the way he prefers [23]. In the example, the user is downloading the list of contributions because he is interested in analyzing the polygon in some other application (QGis, ArcGis, Google Earth, and so one), or if he prefers he can download only the data table (CSV).

4 Results of the New Framework

It is important to highlight that all the steps we proposed in the new Brazilian platform attend to criticisms that we had in previous experiences, so that they are adjustments to Geodesign framework to face spatial inequalities and complexities. Now that the web-based platform and the first experiments are published and tested, to each case study and depending on the capacities and necessities of the stakeholders it can be used in different ways or to receive further resources, based on ETL tools and it's connection with the SDI & WebGis & Geodesign. Each new proposal of a step or a support to decision or opinion making can be planned as an ETL script that has interoperability with the systems that are already operative.

The goal of this new framework, the steps and procedures answered to changes to better fit our culture, based on the previous models of the traditional framework [1]:

A) Criticism of the Representation and Process Models
Representation and Process Models are carefully prepared by the organizers, using their expert knowledge in the elaboration of the geographical data, but there is a risk that they will be underutilized in the process, because the participants do not always have access to the previous cartographic collection. When they do, they are often static maps or at most as records of the elaboration of Evaluation Maps (i.e. History Maps), but they are not, in general, presented as a cartographic collection that can be more deeply interpreted in the form of enrichment of reading.

In this new platform they are presented and consumed as SDI (Spatial Data Infrastructure), what means the user has a collection of data organized according to

themes and using Metadata Catalog he is able to combine themes the way he prefers and can also add new data from web-services.

B) Criticism of the Evaluation Models
Evaluation Maps in the previous framework have the standardized scales of "feasible", "suitable", "capable", "inappropriate" and "existing" [1]. The participants expressed it is reductionist to present a synthesis map that is a judgment, even if elaborated with technical justifications, as there are disagreements about the classifications performed.

In this new framework these synthesis maps are not mandatory, but if the conductor wants to have them as an additional layer in the contexts, it is up to him. In this new proposal the user selects, by himself, the layers he thinks are important as support his analysis, and he works with overlay and transparency to compose a dynamic synthesis. Each user does his analysis and synthesis.

Moreover, we observed (and had the registration in questionnaires applied after the workshops) that when a participant knows the place and the problem he doesn't use the Evaluation Maps, and instead of this he gets those information to help him just to find "where" and "what". But it is also true that when the participant does not know the area very well, he uses the Evaluation Maps indication to find a place, what means he is not totally conscious, but conducted by someone's else judgment.

C) Criticism of the Change Models
Change Models are characterized by the elaboration of polygons related to policy and project ideas for the area. It is observed the lack of perception of scale and the lack of connection between the world of ideas and reality, without saying that the ideas are inadequate, but rather that they often present detachments in relation to space reality, which is a result of fragility in spatial reading and geovisualization.

With the new framework before drawing polygons there is a brainstorm of initial ideas, suggesting "where" and "what", composed by a cloud of points symbolized according to themes, that helps the participant to draw a polygon or to analyze a contribution. The drawing or the importation of polygons comes in a second step, when the participant can count on a broader collection of base maps and is encouraged to construct a more robust contribution, as he will have to fill description boxes and some more data.

D) Criticism of the Impact Models
Impact Models assess whether the selected proposals (the diagrams or contributions) are in areas classified as some level of adequacy in the Evaluation Maps. When the proposals are not located in an appropriate area on the maps (remembering that this classification of wrong or right is according to Evaluation Map, a judgment, one point of view, even if technical point of view), the system presents a classification from most negative to most positive impact. There are no impediments to propose it, but alerts are generated.

In our opinion, alerts are not instructive in favoring the discussion of alternatives or in supporting decision-making, but comparative diagram analysis can be a way to favor

the evolution of the decision in a shared way. In the new framework, instead of classifying from positive to negative, from right to wrong, the juxtaposition of comments helps participants to understand each other's reasons, to change or not change their minds.

E) Criticism of the Decision Models
Decision Models, which are the processes of composing groups and their groupings in the Geodesign workshop, have the goal to arrive, by negotiation, at a final proposal. As the negotiation process in the previous framework happens by observing the frequency table of selected diagrams (the diagrams that are common decision to the groups are chosen as select, and those with the most frequency are negotiated), there is a risk that good ideas will be lost because they have not been properly observed. There is a reduction in the choices and, often, some important themes of the work are not properly contemplated.

In this new proposal of voting based on cycles, the person not only votes but also presents comments about the polygon or contribution, according to his expertise, knowledge or main interest. This means that those who know more than others about a theme writes comments that are going to be read by others. This logic of voting on cycles is an opportunity to register technical information, alerts, additional information, cultural information. The final voting is much more robust and qualified.

5 Discussions

The Brazilian platform of Geodesign, GISCOLAB, is an adaptation of traditional Geodesign framework [1] based on scientific studies and bibliography review to understand the main keywords correlated to the term, to be applied in complex case studies of spatial inequalities. Before developing the platform, we analyzed the results of 35 workshops, based on qualitative and quantitative questionaries' applied to participants or even in not structured interviews developed during the activities. To change the steps and facilities we went back in literature review to understand the main values and concepts that were connected to the emergency of technologies of geoinformation in spatial planning, to understand which were the achievements developed and adopted in science, in order to restore them in the proposed framework.

We understood that our keywords are process and procedures, GIS resources, geovisualization and citizens' participation. These values could be part of the scope of Geodesign framework if it is based on SDI (Spatial Data Infrastructure) in all its facilities, if it favors geovisualization and usability based on WebGis, if it dialogues with other systems based on interoperability. With these resources the platform is a robust tool for cocreation and geocollaboration. New adaptations in a close future will be done according to requirements of each case study, as it is an "Open work" [24].

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