

# EXPERIMENTAL STRUCTURE OF DISCOURSE: MAPPING THE DISCOURSE FORMATIONS OF BAUHAUS IDEALS

Ka-man lam\*, Jyotsna Gorle\*\*, Michael Wilde\*\*\*, Patrick Saad\*\*\*\*

\*Bauhaus-Universität Weimar, Faculty of Architecture and Urbanism, Geschwister-Scholl-Straße 8, D-99423 Weimar

E-mail: kamanlam@buffalo.edu, ORCID 0000-0002-9054-3206

\*\*Bauhaus-Universität Weimar, Faculty of Media, Bauhausstraße 11, D-99423 Weimar

E-mail: jyotsna.gorle@uni-weimar.de, ORCID 0000-0003-1180-2781

\*\*\*Bauhaus-Universität Weimar, Faculty of Media, Bauhausstraße 11, D-99423 Weimar

E-mail: michael.wilde@uni-weimar.de, ORCID 0000-0001-8330-2845

\*\*\*\*Bauhaus-Universität Weimar, Faculty of Media, Bauhausstraße 11, D-99423 Weimar

E-mail: patrick.saad@uni-weimar.de, ORCID 0000-0002-3232-1234

DOI: 10.24427/aea-2020-vol12-no1-02

## Abstract

In the relativistic world of the 21<sup>st</sup> century, if the Bauhaus would still be upheld as doctrine, we must face the truth: it can hardly be considered a provocation. Rather, we most often find ourselves caught between contradictory wishes to preserve an intact past and to make sense of a resolute avant-gardism. This paper proposes that the Bauhaus, as a discursive knowledge body, be structuralistically analyzed with Foucauldian Discourse Analysis. Our claim is substantiated by: first, that a Foucaultian concept of discourse offers an alternative to the practice of history and theory; second, that the publication of Bauhaus reveals a discursive structure in a Foucaultian sense; third, that discourse-analysis-search-engine can perform the analysis on the Bauhaus corpus, contributing to emergent epistemological positions; fourth, that this revealed structure of discourse could be mapped and re-materialized to invite interferences on today's territory of Bauhaus Discourse. The research and development process in the accompanying project "Bauhaus Orbits – scenographic apparatus for discourse analysis" ([bauhausorbits.de](http://bauhausorbits.de)) will be discussed.

Keywords: Epistemology; Digital Humanities; Graph Algorithms; Spatial Interface; Map-territory relation; Software Studies; Media Architecture

## Acknowledgement:

This project was developed in relation to the framework of the DFG-research project Prozessorientierte Diskursanalyse, by the Chair Theory of Media Worlds (Prof. Henning Schmidgen) and the Chair Web Technology and Information Systems (Prof. Benno Stein) at the Bauhaus-University Weimar. We thank the research group for insights that greatly assisted our work.

## INTRODUCTION

Today, with the advent of ubiquitous computing and data analysis, "the union of art and technology" has forged new alliances in new disciplines far exceeding the initial vision of the slogan's promulgator, Walter Gropius [W. Gropius 1923, p. 1]. It is a familiar history: under the influence of mechanization and destruction of World War I, the Bauhaus was created as a laboratory to reinvent the most fundamental elements in human creative potentials. Through educating the new "liberal-artist/designer"<sup>1</sup>,

<sup>1</sup> The notion of design we know today was more commonly regarded as a liberal art. "Walter Gropius was one of the first to recognize the beginnings of a new liberal art in design. In an essay written in 1937, he reflected on the founding of the Bauhaus as an institution grounded

they chart possibilities to embrace and design for a humanized technological future. This notion is most evident in Moholy-Nagy's closing volume of the Bauhausbücher, *From Material to Architecture*, and the English title in 1957, *The New Vision and Abstract of an Artist*. There he writes, "*in conclusion, we may say that the injuries caused by a technical civilization can be combated on two fronts: 1. By a purposeful observation and a rational safeguarding of organic, biologically conditioned functions — through art, science, technology, education, politics. 2. By relating the single results to all human activities.*" [M. Nagy & D.M. Hoffman 1947, p.26]

While modernists have often been criticized for their utopian projects and purification of disciplines as in the nature-culture divide<sup>2</sup>, writings of Bauhaus' artist-authors reveal to us how they approached subject matters, from biotechnics, media to anatomy<sup>3</sup>, in at times idiosyncratic, but synergistic, almost rhizomatic manners.

Here, contrary to the most common conception of the Bauhaus as an advocate of modernist architecture analogous with their contemporaries, the raw publications draw attention to some neglected yet plausible perspectives: are there hidden structures, in particular structure of discourse ordering the vast terrain of didactic, pedagogy, design theory, practices and ideals the Bauhaus stood for? If yes, in what ways can we map it, prove its existence, and materialize/model it for future knowledge production (in design, art or science)?

In order to provide provisional answers to these questions, our hypothesis is that the Bauhaus was constituted of discursive practices; and their formations should be analysed with a theory of discourse, the method Discourse Analysis, as well as computation and visualization.

We will substantiate our claims in four parts: first, that a Foucaultian concept of discourse offers an alternative to the practice of history and theory; second, that the publication of Bauhaus reveals a discursive structure in a Foucaultian sense; third, that a discourse-analysis-search-engine can perform the analysis on the Bauhaus corpus, contributing to emergent epistemological positions; fourth, this revealed structure of discourse could be mapped and re-materialized to invite interferences on today's territory of Bauhaus Discourse.

## 1. FROM DISCOURSE TO THE HISTORY OF IDEAS

We center our research on a discursive Bauhaus history through the lens of the Foucauldian concept, "discourse". But why so? We shall start from an introduction of Foucault's place in the philosophy of ideas, and an explanation of what Foucauldian discourse is.

For architects, the theoretical work of social theorist Michel Foucault should not be unfamiliar. His work has transformed historiography and research in architecture, art, or human sciences at large since the pinnacle days of structuralism/post-structuralism<sup>4</sup>, through widely-accepted terms such as archaeology, genealogy, power/knowledge, control, and biopower. The concept of "discourse" was outlined in his only methodological treatise, "The Archaeology of Knowledge", in which archaeology is the overarching analogy that describes a different methodological approach to the history of knowledge, through "questioning the documents" and "the intrinsic description of the monument" by way of a concerted "restitution of a historical discourse" [M. Foucault 1972, p. 6, 7, 62].

While a dictionary states that "discourse", from Latin *discursus* ('running to and from'), means

*on the idea of an architectonic art: 'Thus the Bauhaus was inaugurated in 1919 with the specific object of realizing a modern architectonic art, which like human nature was meant to be all-embracing in its scope. . . . Our guiding principle was that design is neither an intellectual nor a material affair, but simply an integral part of the stuff of life, necessary for everyone in a civilized society.'*" Scope of Total Architecture (New York: Collier Books, 1970), 19-20. The term „architectonic," in this case, transcends the derivative term „architecture" as it is commonly used in the modern world. Throughout Western culture, the liberal arts have similarly been described as „architectonic" because of their integrative capacity. Gropius appeared to understand that architecture, regarded as a liberal art in its own right in the ancient world, was only one manifestation of the architectonic art of design in the twentieth century" [R. Buchanan 1992, p.1].

<sup>2</sup> The main critiques of sociologist of science Bruno Latour in his seminal work [B. Latour 1992].

<sup>3</sup> "And what is the relationship of muscle to bone? Through its ability to contract or shorten itself, the muscle brings two bones into a new angular relationship. If one considers further there aim of kinetic organisms, one comprehends in the relationship of bone to muscle the mediary function of the tendon..." [P. Klee 1953, p.28].

<sup>4</sup> The field rests its foundation upon Ferdinand de Saussure's structural linguistics, whose concepts concerns the understanding of language as a system of signs (La Langue), signifiers (sound-image) denoting the signified (concept). Saussure's concepts have been extended into many fields in the humanities, and led to critiques towards structures and objects of knowledge as a whole, known as post-structuralism.

<sup>5</sup> Hermeneutics is the theory and methodology of interpretation. 20<sup>th</sup> century hermeneutics was largely shaped by the emergence of Heideggerian hermeneutic ontology, which stresses the idea that human subjects are formed by deep historical practices that can never be made completely explicit. Heidegger's calls his methods, which interprets meanings in the historical practices, Hermeneutics.

"1. Written or spoken communication or debate. 1.1 A formal discussion of a topic in speech or writing. 1.2 a connected series of utterances; a text or conversation.", Foucault has significantly enlarged that definition with his theory. To Foucault, "Discourse" is a rule-governed system of statements, an object on its own, formed by discursive strategies, concepts, enunciative modalities [Fig. 1], bought into being by means by "discursive practices". Discursive practices bring statements to "a plane of emergence". There, statements dispense, circulate, and that what is said, is an exclusive event, influencing the discourse in a reciprocal relationship. Discourse analysis is hence a neutral description of Discourse objects and their formations, for example, the social construct of punishment, madness, or control. Architects have broadened Foucault's material understanding of discourse formation to physical order such as floor plan, Programm, parti, form [P. Hirst 1993, p. 54].

Nevertheless, we should be aware of the method's limitations. According to critic and philosopher Hubert Dreyfus, The Archaeology of knowledge was Foucault's attempt to purify his earlier analysis on institutional knowledge - how institutions organize and legitimize particular speech acts and thus knowledge - into a universal and formalized theory about human activities at large [H. Dreyfus, et al. 2006, xxiv]. After "Archaeology", Foucault "sharply turned away" from furthering an abstract theory of discourse and archaeology, to reformulate theories that thematize the relationship among truth, values, theory, power and

the social institutions in which they emerge, one of which is the materialist concept "disciplinary technology" [H. Dreyfus, et al. 2006, p.135]. Hence the question: if discourse analysis as an end in itself was discarded by its founder, why adopt it, and to what end? Here, we shall live up to our earlier promise of situating Foucault among other approaches in the history and philosophy of ideas. In short, We see Foucault as an interpreter of epistemological breakthrough in the natural sciences to the human sciences with an unfinished project. In as early as 1935, the Polish-Israeli Immunologist and pioneering philosopher of science, Ludwik Fleck, spoke of the role "Denkstil" and "Denkkollectiv" take in shaping the production of scientific knowledge [L. Fleck 1935]; likewise, American physicist Thomas Kuhn, with his well-known theory concept of paradigm [T.S. Kuhn 1962]. There are many other ways to read the history of ideas. For Foucault, while humanities in his time were dominated by either Structuralism's tendency to generalize, critical theory's post-Marxist agenda, or Hermeneutics' quest for deep historical meaning<sup>5</sup>, a theory of discourse and discourse practice would aim at a neutral description of how we know what we know - what makes the current condition of knowledge production possible? Therefore we argue, when discourse analysis is taken more as a descriptive method than an interpretative one, it offers an alternative to the practice of theory, especially with the aid of improved empirical means.

1.1. Drawings, Diagrams, Photographs

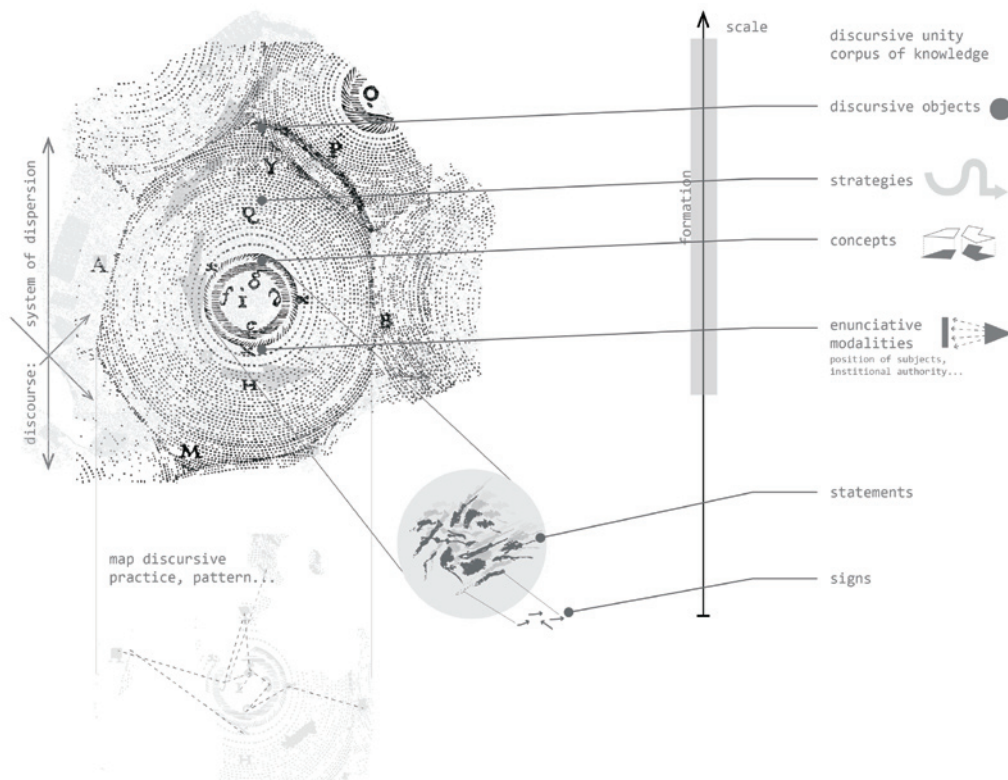


Fig. 1. Discursive unities are imagined as living beings in Foucault's system. A vitalist view adopted. Collage and diagram made by author. Diagram of the vortex extracted from R. Descartes, *Discourse on Method: Dioptrics, Meteorology, and Geometry* (1637).

## 2. FROM POSITIVITY OF DISCOURSE TO AN ALTERNATIVE BAUHAUS HISTORY

To describe the formation of discourses within the Bauhaus, we shall refer to any hints of such groupings. To begin with, we define a manageable scope by limiting our understanding of “statement” to utterances, text and images. A relevant but less explicit “statement” in physical space such as spatial order, plan, section, material properties, detailing, formal design, or schema are put aside. In this way, the raw information (or data) particularly of use to us is less the craft-object, the projects per se, but the lecture series at Bauhaus [P. Bernhard 2017], the book series “Bauhausbücher”, the Bauhaus journals published at Dessau, and related texts which mention the Bauhaus, be those the school’s contemporaries or offspring. In the language of Foucault, this forms our definition of the “Bauhaus corpus”, where a body of knowledge could emerge.

Foucault’s conception of a discourse operates at another level than that of books or in the oeuvre of artist-author. A book, Foucault theorized, is far more

a network of reference than a physical object. But this network should not be considered discourse yet. What counts as discourse are the system of statements, the discursive practice, rule-governed enunciation, etc. rather than conventional groupings that directly appear to us.

To gather empirical positivities of discourse, in Foucault’s language: When we confront ourselves with the raw data of the Bauhaus corpus, for example, a speed read of Moholy-Nagy’s “von Material zu Architektur” and Gleizes’ “Kubismus”, we are returned with a list of titles, behind it almost a dispensed structure which orders the knowledge body, as mentioned in the introduction: biotechnics, nature, wellbeing, utopia, constructivism, El Lissitzky, the new man. How they are elaborated shows some interrelations of primary concerns that ordinary art history or exhibition of objects can rarely tell. We assume that hidden structures do exist, ordering this corpus of knowledge. The biggest assignment then is to model it and map it.

### 2.1. Drawings, Diagrams, Photographs



Fig. 2. Approaching Bauhaus history from a Foucauldian lens. A conceptual collage made by author



Fig. 3. Definition of “Bauhaus Corpus”. Collage made by author



### 3. FROM DATA-DRIVEN RESEARCH TO EMERGING EPISTEMOLOGY

Data science, or, more commonly known as Big Data or data analytics, is the empirical means we propose to further the unfinished project of Foucauldian discourse analysis. As with any rapidly emerging information technology, be it search engine of today and the millennium, cinema in the work of Guy Debord, photography in that of Moholy-Nagy, or print in Victor Hugo's time, they all assign significantly different structures or roles to knowledge and creations - in a nutshell, multivarious positions in epistemology<sup>6</sup>.

#### 3.1. Emerging epistemological positions in architecture and the social sciences

Different epistemological positions have emerged since data analytics has penetrated research culture at large. In architecture, the 2014 Venice Biennale's central exhibition "elements of architecture" might have best illustrated a different organization of architectural knowledge. There, "Fundamentals"<sup>7</sup> of Architecture were broken down to "periodic tables" and catalogues of elements compiled by student researchers, hence the critic's label "an Architecture 1.0 without buildings" [Dezeen & M. Fairs 2014]. Such a curatorial approach has proven to be radically different from past issues, receiving both positive and negative reviews. In one of the most critical commentaries, the research is likened to online search results, failing to demonstrate a proper research vigour<sup>8</sup>. Although many others praised Biennale's novelty, and attributed it to Rem Koolhaas' curatorial direction, the uniqueness of such might in

fact be socially-determined – after all, what is it to do research in the age of Google, Wikipedia, Big Data?

The natural and social sciences have a rich history of assessing impacts of digitalization on new scientific methods, as well as their strengths and limitations. Digital Geographer Rob Kitchin summarises current debates surrounding Big Data into two potential paths [R. Kitchin 2014, p. 3]: one that claims to establish a new empiricism directly informed by the abundance of "neutral" data, thus rendering past scientific procedures, i.e. hypotheses, models, experimentation and theory, obsolete; the other calls for a data-driven science that "radically modifies the existing scientific method by blending aspects of abduction, induction and deduction". Kitchin criticises the first approach, because data gathering and machine learning analysis are not generated free from theory nor sampling biases. Applying them as given in a purely inductive<sup>9</sup> mode of science would be fallacious, in spite of some successful applications in business and governance. With respect to knowledge production, Kitchin strictly contends that only the second hybridized approach could contribute to meaningful scholarship – a data-driven science that generates hypotheses and insights from the data rather than from existing theory, then subject its findings to further theoretical examination and test. Such an approach has already been adopted in the Environmental Sciences, in the widely applied Geographical Information System (GIS) and the subsequent evaluation frameworks<sup>10</sup> known as critical GIS<sup>11</sup> and radical statistics<sup>12</sup>, which combine "quantitative techniques, inferential statistics, modelling and simulation whilst being mindful and open

<sup>6</sup> Epistemology is the branch of philosophy concerned with the theory of knowledge. It studies the nature of knowledge, justification, and the rationality of belief.

<sup>7</sup> Theme of the 14th International Architecture Exhibition, directed by Rem Koolhaas.

<sup>8</sup> A commentary made by the Storefront for Art and Architecture, NYC in their Spring newsletter 2015. Unfortunately their archive discloses recent materials only up to 2010.

<sup>9</sup> Kitchin summarises a set of ideas at work in the empiricist epistemology of Big Data, which suggests that data mining could produce scientific conclusions without further experimentation, and that science can advance even without coherent models. See: "through the application of agnostic data analytics, the data can speak for themselves free of human bias or framing, and any patterns and relationships within Big Data are inherently meaningful and truthful." [R. Kitchen 2014, p.4].

<sup>10</sup> "These approaches employ quantitative techniques, inferential statistics, modelling and simulation whilst being mindful and open with respect to their epistemological shortcomings, drawing on critical social theory to frame how the research is conducted, how sense is made of the findings, and the knowledge employed." "quantitative methods and models are employed within a framework that is reflexive and acknowledges the situatedness, positionality and politics of the social science being conducted, rather than rejecting such an approach out of hand." [R. Kitchen 2014, p.9].

<sup>11</sup> An introduction to the field goes: "Thus, critical GIS, a term introduced by Nadine Schuurman (1999), is concerned with various impacts of GIS technologies on people... Today, 'critical GIS' crosses many disciplinary and intellectual landscapes of cartography and geography but remains concerned with power embedded in the production and use of technology. It desires a reconstructed GIS that is compatible with the emancipatory scholarship advanced by feminist researchers, post-structuralist scholars, Marxian scientists, and post-colonial thinkers." [Harvey, F & et.al 2005, p.1].

<sup>12</sup> "The Radical Statistics Group, usually abbreviated to Radstats, was formed in 1975 as part of the radical science movement associated with the establishment of the British Society for Social Responsibility in Science (BSSRS). The researchers and statisticians who started Radstats shared a common concern about the political implications of their work and an awareness of the actual and potential misuse of statistics." Current concerns of the group includes: "The mystifying use of technical language to disguise social problems as technical ones;

with respect to their epistemological shortcomings, drawing on critical social theory to frame how the research is conducted, how sense is made of the findings, and the knowledge employed". Such a data-driven framework, which is reflexive, and acknowledges the situatedness, positionality and politics of the social science being conducted, is regarded by Kitchin as a potentially fruitful path forward.

### 3.2. Outlining a data-driven research

In our case of re-structuring the Bauhaus history, the framework of the Foucauldian discourse engine is broadly similar to the data-driven research<sup>13</sup> Kitchin entails – research that generates hypotheses from data, and subject them under further experimentation, simulation and critical thinking. To streamline and simplify the R&D process, we summarize the best potentials of a data-driven research framework in the following questions and answers:

- *What are the hypotheses?* - that textual analysis can reveal a discursive structure in the Bauhaus publication, enabling comparison (in)between: the power and reach of the statements made by the authors, its effect in Bauhaus and the intensity of its impact outside Bauhaus; comments/criticism about the books/authors inside Bauhaus, East Germany and the West; books written by authors who do not belong to Bauhaus with in-house books; the intensity of praise/criticism of the statements made by algorithmic sentiment analysis.
- *What are the experiments and instruments?* - data modelling and analysis by means of Graph Database, in an attempt to evaluate attributes and relations among entities ranging from statements, authors, institution to concepts. By employing and analysing new attributes and navigation data, test whether alternative parameters other than time could meaningfully assist sequential cognition. Furthermore, test whether spatial dimension of information design contributes to communication by evaluation studies or eye tracking devices.
- *What kind of results, resistance, and feedback will the experiment generate or encounter?*

*unter?* - the search results returned by the engine and user data, how sense is made of the findings.

- *Where to locate the design?* - the design of the experimental setup as well as the final project.
- *How is criticality at play in the process?* - the design of the experimental setup aims at a reflective assessment and critique of Weimar's and Germany's recurring revisits of the Bauhaus, through a macro-world view enabled by Big Data and the social theory of Michel Foucault. It aims at an ultimate machine where the past is automatically digested to remind researchers of future directions.

Following these lines of thought, we would like to experiment whether a search engine might be capable of these Foucault-inspired analytical capabilities. We outline our approaches as follows:

As with any kind of digitization project, we first index an information environment in which entities and their attributes are clearly defined. We give the most present unit in Foucault's system, "statement", a straightforward and rather-simplified definition as sentences - they could be questions, quotations, or closed statement ending with a full stop. *Statement* speaks of particular discursive concepts, to affirm it or negate it. In line with Foucault, *statement* should be regarded as an exclusive spatial-temporal event unique to the speaking subject's particular time and space.

Graph theory-derived Graph Database is the particular tool we use. Put simply, Graph theory brings relational entities into forms of graph, which consists of nodes and edges. Each node represents an entity and each edge represents how the nodes are associated. Graph as a data structure could be seen as a complex assemblage of correlations, differentiated from the more rigid hierarchy such as tree structure. Today Graph data structures are commonly used in search engine technologies, in particular entity-tagging and structuring standards such as RDFa, linked-JSON, where searchable Indexes and attributes became an a priori condition for information to be found, situated and circulated.

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*The lack of control by the community over the aims of statistical investigations, the way these are conducted and the use of the information produced; The power structures within which statistical and research workers are employed and which control the work and how it is used; and the fragmentation of social problems into specialist fields, obscuring connectedness.* [Radical Statistics Group, n.d.]

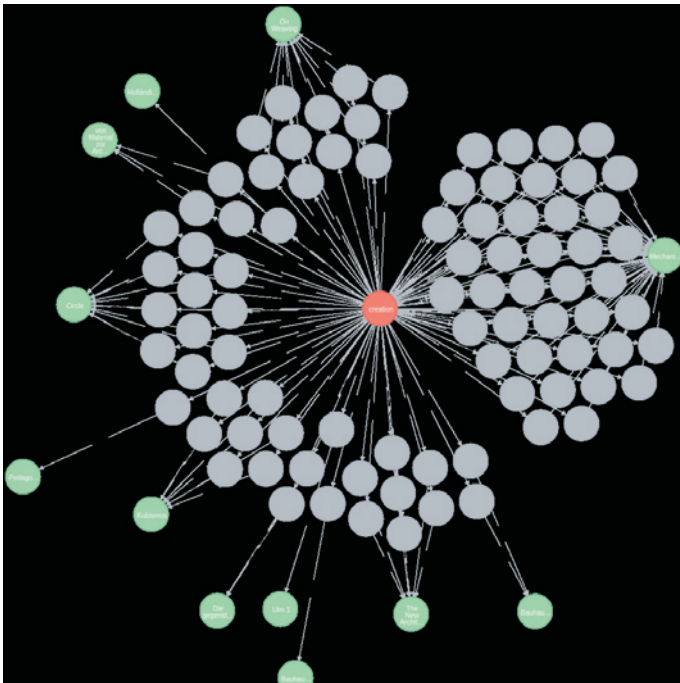
<sup>13</sup> Kitchin uses the term "data-driven science(s)". However, the concept is not completely transferable to design and humanities, since meanings of research still differs in the humanities and the sciences today. A closer analysis of whether research in design or humanities could be considered scientific is beyond the scope of this paper. Instead, we use the umbrella-term "research" to oversee some of the most common characteristics of scientific methods: hypotheses, matter of fact, instruments, and experiments.

Having parsed the entire Bauhaus corpus into types of statements, we perform a topic modelling algorithm (Latent Dirichlet allocation) on them to predict underlying concepts these statements pertain to. In addition, Sentiment analysis (TextBLOB library<sup>14</sup>) is performed to evaluate how a sentence affirms or negates the topics it speaks of. Like knowledge graphs one commonly encounters in popular search engine applications today, statements are tagged in advance with metadata, meaning data about data, to denote the time and space they are situated in. Figure 4 shows our graph model's visual representation of statements arguing for the concept of "creation", where additional hierarchy could be introduced by sorting in time, place or sentiments. Figure 5 shows parts of the graph structure of our preliminary Bauhaus discourse model.

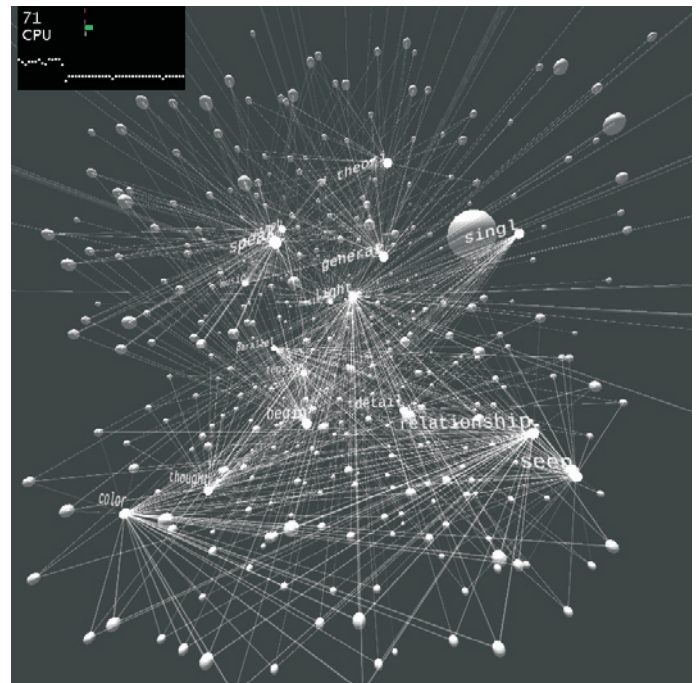
To conclude what emerging epistemologies mean to our primary subject, we contend that Bauhaus, data and software are not as distant from one another as one may think. In fact, a fascinating connection between the old avant-Garde of the 1920s and the new avant-Garde in New Media studies could be drawn, thus argues media historian Lev Manovich [L. Manovich 2002]. The avant-garde's proclamation of the "new", as in Moholy-Nagy's

"New Vision", Herbert Bayer's "New Typography, Le Corbusier's "New architecture" to the emergence of the "new media" amid the computer and Internet era, are unique occurrences substantiated by radically changing socio-economic structures and consequently a need for new cultural expression. Both experimented with new media techniques of their time: light, photography, film, steel and concrete in the former case; and hypermedia, databases, search engines, data mining and visualization in the latter. An inherent difference between the two, Manovich argues, lies in the modernists' obsession with sensing and representing the world, and the new media's intrinsic inclination towards accessing and manipulating the vast amount of information made available by computation. Manovich went further, declaring: the new avant-garde is software. To creatively and meaningfully leverage the potential of new media brings us in closer proximity with true avant-gardism than most other media. While Avant-gardism may not affect actual social change, new practices of acquiring and producing knowledge will for sure change the epistemological territories to a certain extent.

### 3.3. Drawings, Diagrams, Photographs



**Fig. 4.** Our graph database's visual representation of statements (in grey) arguing for the concept of "creation" (in red), discussed in different publications (in green). Screen shot made by author.



**Fig. 5.** Graphs of top ten most discussed topics visualized in the interface's programming environment. Screen shot made by author.

<sup>14</sup> TextBlob is an open-source python library for processing text data, developed by Steven Loria.

#### 4. FROM MAPS TO TERRITORIES

The graph database gives our discourse model an expressive visual quality, by spatializing correlational relations among entities. In human history, the need to spatialize information has formed deeply rooted practices in Art, architecture and the sciences, from the production of cartography, diagrams, schema to the umbrella term, maps. In thinking about the implications of maps and the process in map-making, one recalls the magical-realist fable of Jorge Luis Borges<sup>15</sup>: when the obsessive cartographer's map becomes as large as the territory. In effect, is this sarcastic fable already happening, in the cyberspace of Facebook, Twitter, and in stimulation technologies such as BIM<sup>16</sup>, GIS<sup>17</sup>, VR/AR<sup>18</sup>? Has the map become the territory? And what does it mean to design the Borgesian map of Bauhaus discourse today in relation to any reality to be addressed?

Our answer is twofold: first, maps might be idealized forms of territories. Second, maps are an instrumental, conceptual vehicle driving organizational changes and prepare us for action. Hence, the open, dynamic process of thinking along with maps precedes the map-product itself.

##### 4.1. Theory as maps of Idealized territories

To elaborate on the first point: utopian ideals/preliminary design blueprints are analogous to maps of idealized territories. This statement is grounded in blueprints from modernists' grand master plans to today's computational simulations. In most linear models, the ideal map stays as it is until resistance is met. Architectural theorist Michael K. Hays likens the role of theory to the map-territory relation. He wrote: "*An architectural concept is still a concept of something: an idealized or total system of architecture is still a kind of map of reality, even if the particular coordinates of that map lack a one-to-one correspondence with the everyday world*" [M. Hays 2000, p.xiii].

To summarize Kays' analogy, when we think of theories as maps rather than mere history: we expect demonstrated paths to particular ends, al-

though the accuracy of such maps and paths shall be proved and challenged by realities in cycles of scientific validations.

In the case of historical Bauhaus-Weimar, the "Bauhaus discourses" were the idealized maps that did not withstand resistances from its immediate political realities. However, as maps, they chart possibilities of an idealized system, and directed societies' attention to an idealized territory to be found elsewhere, whose underlying conditions shall be agreed upon.

##### 4.2. Mapmaking practice as enabling interferences

Thus far, we have argued against Korzybski's famous dictum, "the map is not the territory" [A. Korzybski 1948, p. 34] in that the closed statement, used to explain the language-reality relation, disallows close analysis in maps' instrumental potentials: how the multi-layered practices of map-making (from architectural drafting, project specification, stimulation to software design) invite *interferences*<sup>19</sup>. Interferences could take up many meanings, to name a few: as giving designers/operators better overview and control over contents, as facilitating human-computer-interaction towards particular goals, or as stimulating desires and actions towards change. In all cases, their operative basis (*technical a priori*) works to mobilize actions, and potentially, call for realization of the respective design as socio-political realities.

If we would like to design software that structures the history of the Bauhaus centennial into discourse-models, and thus invite interferences, we would need to immediately qualify this intention by designing the map's territory it negotiates, and its operative basis, in other words, an interface to the software.

In searching for a site/territory of "Bauhaus Discourse", we found Oberlichtsaal, the historical lecture hall of Bauhaus-Weimar where Gropius used to organize weekly lecture series on indiscriminate subject matters, spanning from Indian philosophy to experimental music [P. Bernhard 2017].

<sup>15</sup> „On Exactitude in Science" (originally published as „*Del rigor en la ciencia*") is a one-paragraph story written in 1946 by magic-realist writer Jorge Luis Borges, on the map-territory relation [J.L. Borges 1999].

<sup>16</sup> Building Information Modelling

<sup>17</sup> Geographic Information System

<sup>18</sup> Virtual Reality and Augmented Reality

<sup>19</sup> The argument that map is part of the territory has been discussed by German media theorist Bernhard Siegert within the concept framework of Cultural Technique [B. Siegert 2011].

<sup>20</sup> As mentioned in part 2, in a graph database, graph is the underlying logic determining retrieval process and information structure.



The Oberlichtsaal (fig. 7), designed by arts-and-crafts architect Henry van der Velde, is reminiscent of the pre-Bauhaus decade, where budding ideas yet stereotyped would later ransack established myth and order. The “skylight-hall” features a skylight design and side window that are connected by a fluid vaulted ceiling in soft pastel color (fig. 7). Informed by Herbert Bayer’s exhibition Design, the 360 degree view of vision [H. Bayer 1939] (fig. 8), we propose a tunnel form that creates an intermediate layer between the imposing interior and human presence in space. This layer, thin and suggestive of a skin circumscribing void, is intended to reveal a section of site-specific discursive history, and of this history of ideas’ potentials to invite deliberations and intentionalities, in the words of Husserl’s phenomenology.

Other than a situatedness in territories, another core to map-making is, needless to say, the design of maps and navigation paths itself. The map of Bauhaus discourse is structured in an iterative trajectory, leading one from conventional structure of reading to a discursive reading (fig. 6). In detail: first, one starts with selecting two publications for a comparison, for example, *Mechanization takes command* [S. Giedion 1948] and Moholy-Nagy’s *Von Material zu Architektur*; (s)he then reads the meta-data about the publication, for instance, its time and place of publication, author and abstract; all pages of the two books are then loaded in two infinite sequences, providing an overview of the books in one glance, with the option to browse particular pages in high resolutions (fig. 15). In between the two page sequences, one finds four search-options (fig. 14): by concept, by question, by image or by utterance. When we choose to search by concepts, for example, the five most discussed concepts concluded by the language analysis algorithm (latent Dirichlet allocation) will appear, and sentences referring to these topics will fly off from pages to the abstract space of “graphs”<sup>20</sup>. One may hover over sentence-nodes to peek into details, or select a topic-node, for example, “utopia”, to focus on instances of that

topic being discussed, first in the two publication, then in the entire corpus. Then, one may apply different logic to organize these statements, by year (fig. 18), by place or by their affirmative or negative stances which have been classified by an algorithm. Instead of conventional groupings such as chapters or table of contents, the sorted graph offers a different overview of the knowledge body, whose less-known network of relations may be discovered by the search engine. Further on, one may zoom into a particular statement, read about it and return to the page it was shown. More topics being discussed in that page will be shown, thus inviting one to enter another network. Throughout the navigation process, one’s search history will be stored to eventually generate a “genealogical plot” - graphs of visited topics, sorted by time, will be interwoven together to show an alternative timeline of history.

An alternative search by question, image or utterance works similarly but enables different perceptual trajectory/engagement with the map of discourse. Questions raised in the Bauhaus corpus, i.e. sentences ending with question mark, replaces concepts as point of departure towards potential answers. Another image search application allows visitors to preview concepts by images - one finds these images or documentation of projects by concepts hidden in their captions. These visual clues then redirect one to the arguments they support. The category utterance brings original voice recordings of Gropius, Albers and other Bauhaus masters into transcript format, then an indexical database, thus allowing interactive audio-playback<sup>21</sup> triggered by search on particular concept. Finally, as signature aesthetic to the artistic-scientific research: when the system idles, a machine learning algorithm will slowly select concepts from 1919 onwards, and based on visitors’ navigation data and discussion across social media, predicts those concepts and relations that shall live on to the next century...as if a collective dream of ideals, agreement, even knowledge structure, could take place in a new territory of information society today.

<sup>21</sup> Voice recordings integrated in electro-acoustic composition.

### 4.3. Drawings, Diagrams, Photographs

Iterate away from familiar world; enter the abstract networks of thoughts

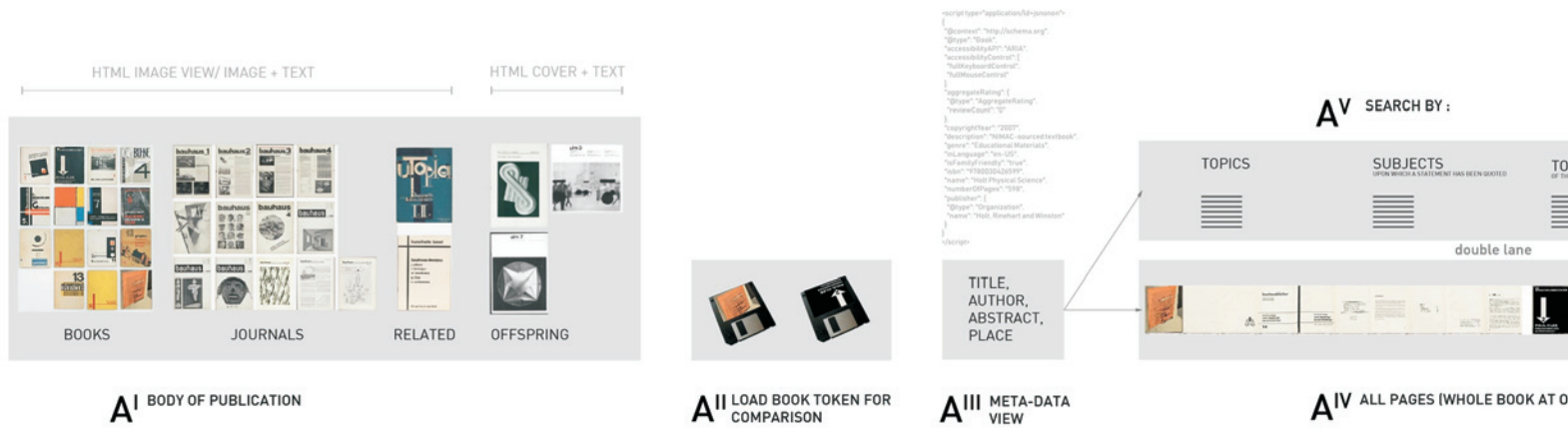


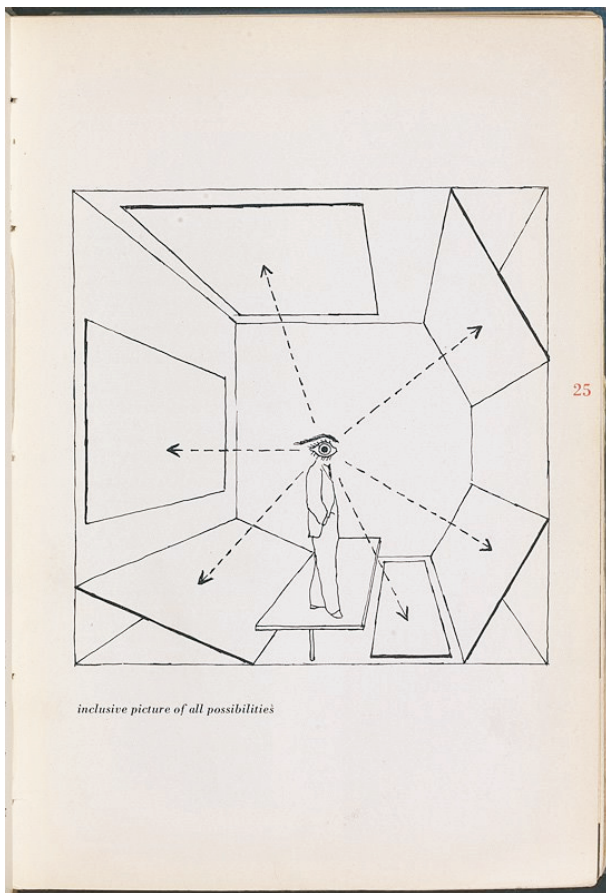
Fig. 6. Diagram describing the overall approach to dissect, structure and query the dataset towards an end product; image: by the author



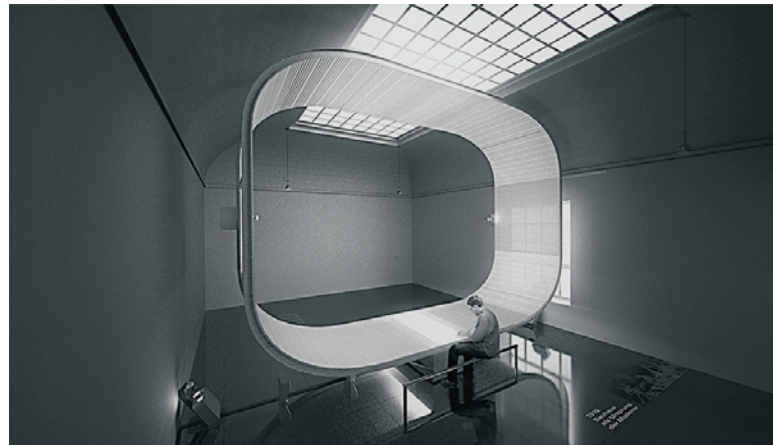
Fig. 7. The historical lecture hall of Bauhaus-Weimar (Oberlichtsaal) today; photo: by the author



(Fig. 6. continue)



**Fig. 8.** Herbert Bayer, Inclusive picture of all possibilities, as published in article *Fundamentals of Exhibition Design*, "PM Magazine", 1939, p. 25. Image courtesy of Rare Book Division, The New York Public Library, retrieved from <http://digitalcollections.nypl.org/items/90f27111-9714-4fc1-e040-e00a18064ba4>



**Fig. 9.** Rendering of design at Oberlichtsaal. Image credit: author.



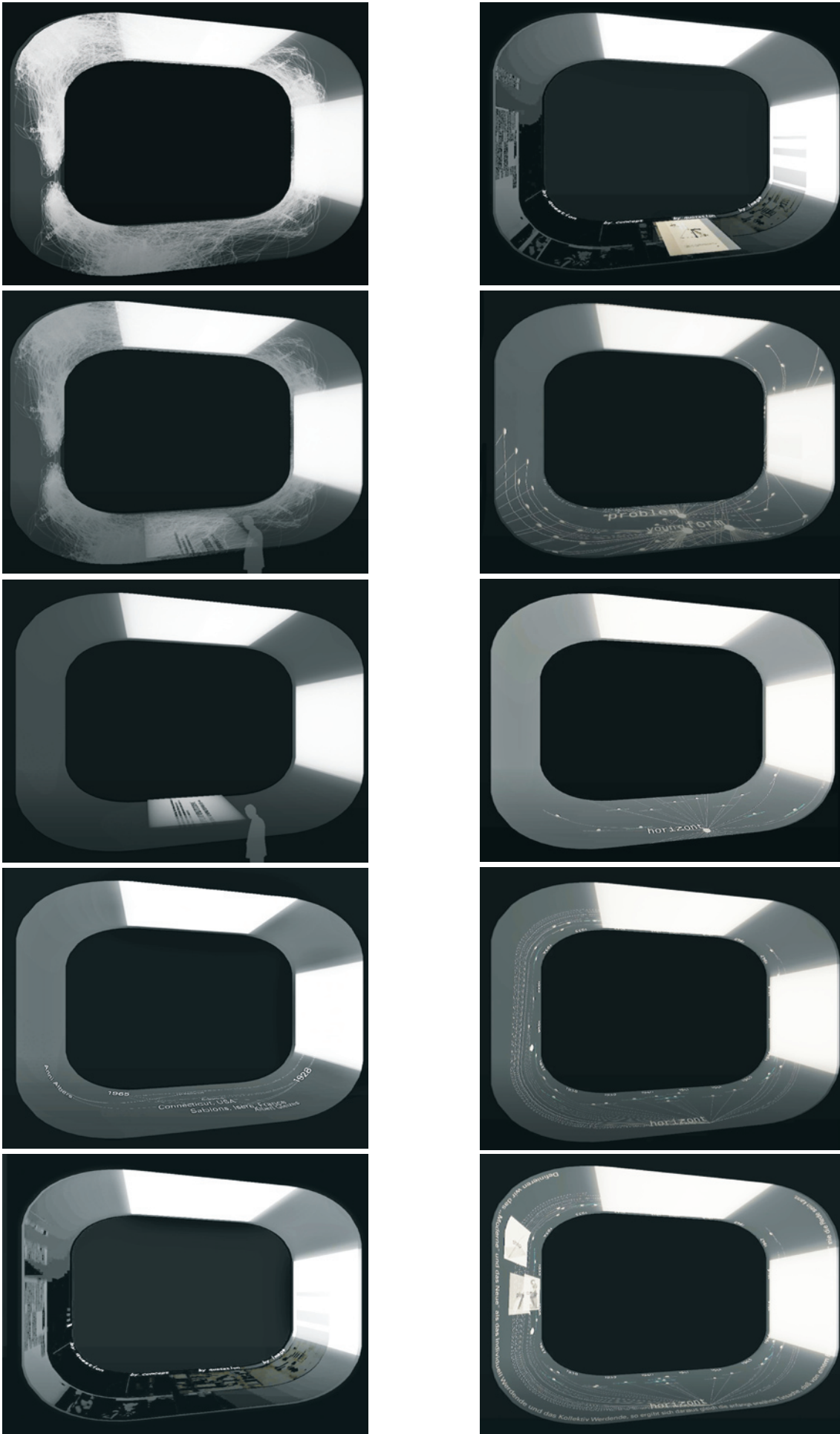


Fig. 10-20. Film stills extracted from interface simulation;  
image by the author



## CONCLUSION

Propositions connecting a vast terrain of academic fields have been broadly discussed in this paper: from the history of ideas to Foucauldian discourse; from discourse to alternative Bauhaus history; from data-driven research to emerging epistemology; and lastly, from maps to territories. To summarize, Foucauldian discourse analysis, by aiming at a neutral description of knowledge's structures, offers new possibilities in revisiting the Bauhaus as a history of ideas, as an alternative to bibliographical history or exhibitions of objects. Belonging to the overarching method Archaeology, Discourse Analysis offers another approach to new practices of theory in describing the current condition of knowledge production.

Further on, we come to the core of our analysis and we formulate our definition of a "Bauhaus corpus", where a body of knowledge may emerge and be analyzed. We explain the assorted groupings in Foucault's system, from statements, enunciative modalities to discursive practices, and relate them to hints of specific structures in the Bauhaus corpus, in an effort to map it and model it.

With the aid of computational analysis and data science, we are presented with the possibilities of furthering Foucault's project in the form of a customized search application which enables us to discover unexpected aspects of Bauhaus discourse. We question the implications of data-driven research through a survey of emerging epistemological positions in the social sciences applicable to architectural practices. While there is little doubt that the value or methods of research have changed in the information age, much critical thinking has been called for: that capability of data science and data analytics shall be directed to contributing a vigorous data-driven science. Citing current debates and developments in reflexive practices, such as critical GIS and radical statistics, we concur with the view that data-driven research should function beyond a new empiricism, but also be incorporated into established scientific methods, critique, and formulations of hypotheses and experimental setup. Drawing on the above propositions, we outline our understanding of a project-based, data-driven research, meanwhile arguing for the case of design as an experiment. We conclude from the standpoint of new media theory, that true avant-gardism are unique occurrences, when radically changing socio-economic structures necessitate experimentation with new media techniques. Therefore, any attempt to understand the production, justification and dispersion of

knowledge of historical avant-garde via new media techniques bring us in closer proximity to true avant-gardism and emerging epistemology.

Mapping Bauhaus discourses by graph database techniques relates us to the classical map-territory question. Contrary to the dictum "the map is not the territory", we contend that maps demonstrate conceptual and instrumental capacities to influence territories: first, as idealized forms of territories, and second, as conceptual vehicles driving change and inviting interferences. Interferences could take up various meanings: from overview, control, interaction to stimulating desire for change. In all cases, their operative basis requires design and mobilization. We understood the design of the software's interface as a map in negotiation with the situated territory - that is, maps of discourse in the historical lecture hall of Bauhaus-Weimar, Oberlichtsaal. We then detail the design of the map's operative basis, meaning the interface and navigation paths, in an unfolding user story. As artistic research that is embedded in academic contexts and embodied in artistic products, the project is completed with a signature aesthetics of the "discourse machine": when idles, it reflects, and selects those Bauhaus ideals that ought to live on.

This tentative report illustrates a research and development process that interrogates the Bauhaus history from a structuralist, early-Foucauldian point of view, by means of software and visualization. In the light of countless celebrations set around the Bauhaus centenary, there remains a compelling need for critical reflection on what it is to study design history. We held the hypothesis that Discourse Analysis is the answer to our prime research interest in dissecting this history analytically, and asked further: whether there are hidden structures (of discourse) ordering the Bauhaus knowledge body, and if yes, in what ways can we map it for future knowledge production. The outcome seems affirmative, supported by graphs of concepts showing networks of correlational concepts. However, we are aware of our approach's heuristic nature, considering that topic modelling algorithm takes little contextual information into account, but classifies concepts by similarity of word choice to particular clusters, that is, as if anything using similar vocabulary will be grouped to the same concept. Training far-more sophisticated AI to analyse textual or diagrammatic materials *like Foucault* would be the most ambitious yet currently unattainable goal. Nevertheless, our transdisciplinary experiments with digital media is, itself, a question on the value of human creations, in different technological time than that of the Bauhaus. While our

machine learns and reminds us of past ideals. We, humans, may push forward: for the best way to predict the future is to create it.

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