

Creative Geovisualization: A Humanistic and Artistic Possibility with/in GIS, Mapping, and Geovisualization

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창의적 지리시각화: GIS, 지도화, 그리고 지리시각화의 인문학적, 예술적 가능성

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Abstract : Creative geo-visualization is the visual representation of creative forms of data and thinking with spatial information - visualization that preserves, represents, and generates a more nuanced, contextual, and deeply contingent meanings of place and people with humanistic and artistic approaches. Creative geovisualization expands the capacity of geovisualization and maps by building a new space that intersects digital spatial humanities, critical mapping, and the convergence of geography and arts. Various encompassing concepts and debates around non-representational theory, creative geographies, and deep maps and spatial narratives are discussed as a theoretical ground of this discussion. I also present diverse modes of creative engagements and practices as a newly generated form of geographic visualization, particularly through the use of emerging digital mapping technologies. Creative geovisualization allows us to go beyond the Cartesian understanding of space, and move towards imagining and producing qualitative, artistic, and humanistic visualizations that engage different forms of embodied, processual, relational, and even affective geographies. This reifies that the power of visualization and mapping are more than *re-presentation* of reality, but becomes creative as it evolves in process and takes a creative turn.

Key Words : Creative geovisualization, Deep maps, Non-representational theory, Geography and arts, Spatial humanities

요약 : 창의적 지리시각화는 창조적인 형태의 데이터와 사상을 공간 정보와 함께 시각적으로 표현하는 것이다. 인문학적, 예술적인 접근을 바탕으로 장소와 사람이 가진 보다 미묘하고 문맥에 맞고, 또한 깊게 의존하는 의미를 보존하고 표현하며 창의하는 시각화이다. 창의적 지리시각화는 디지털 공간 인문학, 비평적 지도화, 그리고 지리학과 예술의 접합점 등을 가로지르는 새로운 공간을 만들어냄으로써 공간 시각화와 지도의 역량을 더 확장시키고 있다. 이러한 논의의 이론적 기반이 되는 비재현 이론과 창의적인 지리학, 깊은 지도(deep maps), 공간적 서술(spatial narratives) 등 다양하고 포괄적인 개념들과 논쟁들을 토의하고자 한다. 또한 새로운 디지털 지도 기술들을 이용해서 새롭게 만들어진 지리 시각화의 형태로, 다양한 양식들의 창의적인 참여와 실행 사례를 제시하고자 한다. 창의적 지리시각화는 데카르트식의 공간에 대한 이해를 넘어서, 형태화되고, 과정 속에 존재하며, 관계적이고, 때로는 감정을 보여주는 지리학과 관련하는, 질적이고 예술적이며 또한 인문학적인 시각화를 상상하며 만들어가는 방향으로 이동하고 있다. 이는 시각화와 지도화의 힘이 현실을 재표현하는 정도가 아닌, 과정 속에서 차츰 진화하며, 창의적으로 변화되어 감을 분명히 반영하고 있다.

주요어 : 창의적 지리시각화, 깊은 지도(deep maps), 비재현 이론, 지리학과 예술, 공간 인문학

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I. Introduction

Maps intrigue us, perhaps, none more than those that ignore mapping conventions. These are maps that find their essence in some other goal than just taking us from point A to point B. They are vehicles for the imagination, fueled up and ready to go. We look at these maps, and our minds know just what to do: take the information and extrapolate from it a place where they can leap, play, gambol-without that distant province of our being, the body, dragging them down... The coded visual language of maps is one we all know, but in making maps of our worlds we each have our own dialect... I map, therefore I am (Katharine Harmon (2004), in *You are here*).

Maps and mapping are inseparable part of us and our lives, as Harmon (2004) suggests above, and it is a motivation (even a motto) that I have in opening up a conversation about “creative geo-visualization.” Creative geovisualization is situated in the intersection of geographic visualization and mapping, art, and digital humanity. Creative geovisualization is the visual representation of creative forms of data and thinking with spatial information - visualization that preserves, represents, and generates a more nuanced, contextual, deeply contingent meanings of space and people with humanistic and artistic approaches. The relationship between geography, art, and humanity has a long history; however, the juxtaposition of these three has been more intensified than ever before by critical and creative reconfigurations of maps and mapping that are often resonating with the humanistic and artistic questions, thinking, and practices (Bodenhamer *et al.*, 2010; Sui, 2010; Daniels *et al.*, 2011; Dear *et al.*, 2011; Burdick *et al.*, 2012; Hulme, 2013; Tally Jr., 2013; Hawkins, 2014; Rossetto, 2014; Bodenhamer *et al.*, 2015; Travis, 2015).

Geographers have long explored ways of visualizing spatial information under the name of ‘geographic visualization’ or ‘geovisualization’. Geovisualization particularly emphasizes our ability to see the (geographically) visualized information closely and personally, and to reveal unknowns

throughout/from the visual (MacEachren, 1995; Slocum *et al.*, 2009). Compared to the traditional maps, key characteristics of geovisualization also include the integration of multi-format data, such as textual, tabular, photographic, and audio and video data, with spatial information. Qualitative GIS/geovisualization research develops mixed methods framework for incorporating GIS with qualitative data and analysis. It demonstrates that any research method or form of representation and analysis need not be strictly “quantitative” or “qualitative” (Cope and Elwood, 2009). Being situated in the larger context of critical GIS and critical cartography that has revolved around the epistemology, ontology, and methodology of GIS, and its social implications over the past two decades (Schuurman, 1999; Kitchin and Dodge, 2007; 2009; Elwood *et al.*, 2011; Jung, 2013; Cho, 2015), qualitative GIS is not just a subfield of critical GIS; rather, it creates new openings in geographical research. Qualitative GIS/geovisualization expands the capability of geovisualization and maps that better represents people’s experiential and interpretive knowledge of geographic spaces by showing the inherent impossibility of framing any research method or form of representation and analysis. My particular response to qualitative GIS was on developing a hybrid platform that integrated various forms of data, analysis, and representation often seen as incompatible (e.g., qualitative and quantitative, and visibility and numeracy) (Jung, 2009). For example, from this perspective, mapping does not only represent objective/tangible/visible things, but can present subjective/intangible/invisible/unseen materials, and it is particularly made for a purpose that influences the final form (Boyd Davis, 2009). Qualitative GIS/geovisualization research lays the conceptual groundwork for creative geovisualization as a form of knowledge making that is much broader, and undergirds framework that we can explore innovative and creative possibilities with/in geovisualization intersected with critical theories, critical visual methodologies, arts, and digital spatial humanities. By incorporating ‘imagination’ and ‘creativity’ into mapping, we may move beyond where most innovative mapping practices have started to integrate multiplicity

of personal sensation and abstract numeric forms of data, and get the insights that can flow from the intersecting space of geography, arts, and humanities.

A newly emerged digital mapping technology also provides an additional fomenting possibility of representing and imaging the world. A number of approaches and methods from the advent of digital domains (geographic knowledge in particular) have given a new and ontologically different life to geography. Using geospatial technologies like GIS, GPS, and Geospatial Web, lay people can easily “visually construct, deconstruct, deterritorialize, and reterritorialize spatial realities” (Aitken, 2015: 107), and the outcome is a profound experiential and epistemological shift. New digital mapping technologies also have begun greatly to alter the ways we measure and represent space, and it has been implemented in a variety of disciplines. We may now have a new realm of images with extended, but still valid, reconstructions of the real (Aitken and Craine, 2006; Craine and Aitken, 2009). The conceptual and methodological (unprecedented) possibilities are opened up by the use of GIS technology through an exploration of the theoretical possibility of humanist GIS and digital media (Silver and Balmori, 2003; Cooper and Gregory, 2011; Gregory and Geddes, 2014). Literary GIS provides a promising example, which is well resided in the recent trend of ‘spatial turn’ in arts, humanities, and social sciences that crosses critical spatial thinking, the spatial integration of the information, and the cross- and interdisciplinary sharing of spatial analysis, methodology, and representation (Goodchild and Janelle, 2010; Shin, 2016). Literary GIS shows, in particular, how literary critics have appropriated in an endeavor to facilitate further understanding of ‘geographic’ creative writing. For example, discourses in literary GIS might enable readers to unpack the deep-rooted complexities embedded with the literary representation of space and place. It is not just linking ‘space’ and ‘locations’ to the literature; however, the discussion of literary GIS shows a gesture towards the new possibility of more abstract and subjective or even emotional accounts for the qualitative and creative dimensions of spatial narratives.

The discussion of creative geovisualization is timely: it draws from the earlier work of critical GIS and qualitative GIS/geovisualization, and engage with the recent discourse of spatial humanities and the geography and arts engagement. More importantly, we can reflect and pay particular attentions on what and how these ‘emerged’ and ‘emerging’ innovative and interdisciplinary scholarship in geography permits to show a new potential for GIS, maps, and geovisualization.

This paper is composed of four sections. This introduction being the first, the conversation about this new development will begin by examining new epistemological grounds of creative geovisualization in the following section. Key theoretical texts and debates around non-representational theory, critical mapping, deep maps, spatial narratives, and a recent geography and art engagement will be discussed. In the third section, I will focus on presenting various practices of engaging with creative geovisualization that can be integrated for the creative geographic representation of people and place, and that generates a new form of geographic visualization through the diverse use of digital mapping technologies. These collaborative efforts will suggest various forms of *creative* geovisualization that make us go beyond the descriptive Cartesian understanding and depiction of space, and move us towards imagining and producing qualitative, artistic, and humanistic visualizations, which engage different forms of experiential, relational, processual, and even affective geographies. Throughout our embodiment and sense of being in the world, this process will also invite us to a new interdisciplinary way to think about our understandings and hybrid experiences of both physical and digital (and virtual) place we live, and imagining and mapping of them. I will conclude in the final section by highlighting the importance of creative geovisualization that will open up new theorizations of mapping and geovisualization as processual, as well as “performative, emergent, narrate, and [even] affectual” (Perkins, 2009: 127), along with a growing need for demonstrating empirical examples of everyday ‘creative’ mapping practices.

II. Epistemological Grounds

1. Non-Representational Theory and Maps: Representing Non-Representable

The beginning point of an analysis of ‘creativity’ in geography and creative mapping/geovisualization is closely related to a series of “non-representational theories.” Non-representation theory has become an overarching term for a diverse range of work including more-than-textual, more-than-human, multi-sensual, and multi-representational theories (Lorimer, 2005; Anderson and Harrison, 2010; Cresswell, 2012). In relation to mapping and geovisualization, it shows how the historical division between empiricist and critical approaches in cartography has shifted to ‘post-representation’ perspectives on mapping (Kitchin and Dodge, 2007; Elwood, 2009; Kitchin and Dodge, 2009; Seigworth, 2011; Kitchin *et al.*, 2013; Caquard, 2015). For example, it provides a new perspective to maps and mapping: a way to ‘re-theorize’ mapping. The heart of post-representational theory and cartography is its re-consideration of maps and mapping as ‘processes’ and ‘performances’ (Crampton, 2009; Perkins, 2009; Corner, 2011; Gerlach, 2014).

This post-representational perspective on cartography and mapping moves from a representational to a ‘processual’ understanding of maps, from ‘ontology’ (what things are) to ‘ontogenetic’ (how things become) (Caquard, 2015: 229). The crux of this argument lies in the claim that “maps have no ontological security; they are [always] of-the moment; transitory, fleeting, contingent, relational and context dependent.” (Gerlach, 2014: 24) In this regard, maps are never fully formed or fixed, and their work is never complete. This rethinking of maps seems to be rooted to the concept of ‘transduction’ by Adrian Mackenzie (2002). ‘Transduction’ is referred to kind of operation, in which a particular domain undergoes a certain kind of ontogenetic modulation (e.g., relational problems that we endlessly confront with) (Mackenzie, 2002: 341). It is quite powerful re-conceptualization of mapping that “it [maps] doesn’t *re-present* the world or

make the world [by influencing how we perceive the world]; it is *co-constitutive* production between inscription, individual and world; a production that is constantly in motion, always seeking to appear ontologically secure.” (Kitchin and Dodge, 2007: 335)

Another way to think about the co-option of non-representational theory and maps is to think about *performance*, both conceptually and methodologically. Paraphrasing Hallam and Roberts (2014: 34), we need “to diagram maps as continually in making.” This perspective moved maps away from accounts of their neutral or mirroring images of the world, but instead assigns a more active role to them. Extending the ‘rhizomatic’ perspectives by Deleuze and Guattari (1987), non-representational theory makes us see the ‘performative’ registers of mapping, and also the possibility that maps and cartographies can generate limitless (immaterial) geographies. We can move away from our perspectives on maps as the *being* to the *becoming* that celebrate and displaying “emergent processes” on maps and ‘mapping’ (Seigworth, 2011: 316). Maps can proceed, perform, and become inherently *creative* as they emerge and evolve in process. It is a difference of ‘emergent cartography’ in comparison to the essentialist cartography (Kitchin and Dodge, 2009).

Non-representational theories keenly point out the limitations of “representation,” but such theories also note that we need not preclude our attention to representation. Indeed, it is the opposite: it is not a dismissal of ‘representation,’ but is instead attending to its emergence, becoming, process, and performance (Whatmore, 2002). It poignantly critiques the binary scaffolding of Cartesian convention, and more importantly, figures ‘representation’ as emergent and transformative. Engagement with non-representational theory demands geographers to continue to experiment and insist on the processual and flexible possibility of maps (rather than the finished and fixed); on the performative (rather than pre-established); and on the possibilities of emerging and evolving (rather than being predetermined) (Anderson and Harrison, 2010; Cresswell, 2012).

2. Deep Mapping & Spatial Narratives

Efforts to map stories and human experiences of place have been part of geography and cartography for a long time. However, as Bodenhamer *et al.* (2015) advocated, the concept of “deep maps” can be the next step beyond traditional mapping and GIS. ‘Deep mapping’ is a term first used by William Least Heat-Moon (1991) in *PrairieEarth*, where we see histories, stories, and imaginations with locations and places in Kansas. Bodenhamer (2015: 3) introduces deep maps as a finely detailed, multimedia depiction of a place and the people, and objects that exist within it. Deep mapping is thus about spatial stories, memories, knowledge, and identity that represent the “grain and patina of place” through juxtapositions and interpretations of the historical and the contemporary, the political and the poetic, and the discursive and the sensual (Pearson and Shanks, 2001: 64-65). Aitken (2015: 103) similarly defines that deep maps are push to map moments, movements, and pieces of humanity through emotions, poetic, and the political. He particularly wants to explore the visceral, virtual, and embodied through a mapping of feelings that may move us some way into ‘geopower’ and beyond. What he suggests is a way of negotiating spatial politics through experiencing material relations as ongoing, affective, and embodied (Aitken 2015: 111).

Spatial humanists and critical geographers have embraced the challenges of depicting place, emotion, events, and people’s differing perspectives (Olsson, 1992; Bodenhamer *et al.*, 2010; Gregory and Geddes, 2014; Harris, 2015; Shin, 2016). These scholars consider space not passive that has an active role to produce and determine a significant change. All spaces contain embedded stories, and they all reflect the values and culture in the various political and social arrangements, and are always socially constructed. Here, ‘spatial narratives’ allow us to see, qualify, and highlight any thread or set of them that they encourage the interweaving of evidentiary threads (Bodenhamer, 2015). Some of important geographic concepts, such as space and

place, sense of place, spatial delight, representation of space, all epitomize the value of spatial narratives. The goal of humanistic scholarship is less to produce an authoritative or ultimate answer than to prompt new questions, develop new perspectives, and advance new arguments or interpretation. Here, spatial narratives permit the scholars to qualify, highlight, or encourage them to see the “intrinsic connectedness of temporal and spatial relationships.” (Bodenhamer *et al.*, 2015: 13) It is important to remember that spatial narratives are not only just an inscription of spatial objects, but they are (in fact) spatially-situated stories.

The opposite of ‘deep maps’ can be ‘thin’ or ‘shallow’ maps that are conceived, designed, created, and maintained by experts for general audiences (Harris, 2015). Thin maps are not necessarily bad or wrong maps, because they could be accurate and precise map; however, they may not fully represent the substance of place and people, for example, the ambient aspects of place that are often represented through qualitative and affective data, such as sound, emotion, smell, and feelings. Therefore, in many ways, deep maps seek to “map the unmappable.” (Harris, 2015: 33) Here, geovisualization and mapping offers an important method, not mapping precisely measured Cartesian space, but to chart and explore what is unknown and intangible. The new GIS and mapping technologies may allow to probe the situated and nuanced knowledge that resides in contested and dynamic memories and to understand spatial meanings. Maps, powered by a new spatial technology (e.g., locating media), may become portals into (spatial) narratives rather than illustrations of what scholars have written, making spatially aware semantic connections among data and moving toward more complex forms of spatiotemporal or spatio-temporal analysis.

Brown and Knopp’s (2008) “Queering the Map” project is another good example of spatial narratives. By merging queer geography and geovisualization, they discuss the process of map projection and consumption to multiple forms of representation, multiple ways of knowing, and

multiple interpretation (Brown and Knopp, 2008: 55). They demonstrate that GIS and mapping can be integral part of a politics of 'uncloseting' urban spaces that otherwise heteronormatively represented and imagined. Here, powerful 'spatial narratives' are created that tell the rest of the story related to the mapping project (that are often hidden and untold), not just "letting the map speak for itself" (Brown and Knopp, 2008: 44).

Deep mapping moves our spatial narratives beyond the linear constraints of written language in the fixed space into a more fluid and reflexive process in which we can see, experience, and fully imagine our understanding and perception of place. It is simultaneously a platform, a process, and a product. It will be a way to engage evidence within its spatio-temporal context and to trace paths of discovery that lead to a 'spatial narrative'; and it is the ways we make the visual results of our spatial inquiry and narratives (and also statements). Deep maps are integral to the resurgent interest in space and place, which contextualize spatial narratives and individual experiences. The deep map discussion will also offer the new possibility for a unique creative scholarship and practice that embraces multiplicity, complexity, subjectivity, artistry and humanity.

3. The Convergence of Geography and Arts

The potential of the geographical study of art works and the artistic study of geographic works is fully considered in contemporary (inter-)disciplinary discussions and practices around embodied experience, practice, and more-than-human worlds. Hawkins (2011) terms these growing bodies of works as 'creative geographies' where geographer and artists collaborate each other to make-work, carry out research, develop exhibitions or practice a diverse range of creative techniques. Reconsidering the relationship between arts and geography especially helps us appreciating of the artistic perspective 'and' practices to geographer's critical thinking. Arts and artistic practices are generally understood as a generative

and transformative force in the making of objects. The relationship between arts and geography has a long history, and it is exemplified by maps and mapping practice (Cosgrove, 2005). However, art is often regarded as a 'finished' object, not as an assembled practice or a field where creative knowledge is continuously generating (Phillips, 2004; Hawkins, 2012). Hawkins (2011) understands geography and art as what Rogoff (2000) terms 'interlocutors,' active critical entities, lively things rather than mute objects of study, fixed 'disciplinary structures or objects.' These geographies of arts perspectives take seriously art as 'constitutive' rather than 'reflective' of meaning and experience, 'productive' rather than 'representative' of culture, and think through the challenges that it offers in the move away from essentialist subject positions (Hawkins, 2011: 473). In other words, art works can offer us a rich means to de-stabilize intersubjective, relational way of understanding art work and world. The artistic thinking and practices offer geographers much potential for thinking and doing geography differently "at another register or through the permissions provided by another angle" (Rogoff, 2000: 78).

Kwan (2007) considers the possibilities of practicing GIS as visual art that particularly expresses emotion, withholding any discernible spatial representation. She developed mapping technology that helped to entail meanings, memories, and emotions in a digital environment. She believes geographers can seek to take visual products and the processes that underlie their creation seriously to understand the social and technical conditions of their production and the significance of their use in alignment with visual methodologies more generally (Rose 2001). Geographic visualization becomes more 'expressive' than 'representational' and 'analytical' as it specifically takes visual, artistic, and humanistic forms (Kwan, 2007).

With a collaboration with an art theorist and artists in Seattle, WA, I have also learned and experienced how the artwork, artistic thinking and practice can offer much potential for critical thinking and 'doing' geography

through a very different analytic framework (Jung and Hiebert, 2016). Our interdisciplinary and collaborative work, *Re-mapping Imaginary and Imagined Communities*, brought together sympathetic trends in qualitative geographic visualization and contemporary generative artistic practices. We particularly used participatory digital methods to represent and analyze a diverse array of creative and multi-modal data (e.g., maps, photographs, paintings, interview texts, audios and videos, brainwave data). In working with artists, I could envision myself co-producing works, for example, a new digital form of qualitative geovisualization that is capable of representing complexity in ways that help us better understand the social implications of emergent forms of media. We could also see that we would develop art exhibitions and learning and practicing various creative media technologies. However, I did not expect it would completely open up a new way to think about and question our understandings and experiences of communities and urban spaces, and mapping of them. It is not just an outcome (e.g., art product), but a new perspective or ways of seeing the world (e.g., epistemology) that should flow from the intersection of geography and the arts, and in larger interdisciplinary discussions including the creative engagement in geography and digital geo-humanities.

III. Modes of Creative Engagement

We can see a wide array of approaches of how these powers of visualization and mapping become more than re-presentation of reality, and how this process takes a quite creative (and often artistic) form.

1. Emotional and Affective Visualization

Theories in humanistic and feminist geography bring attention to the ways that people identify their embodied sensory engagements with their environment, for example, the discussions of space and place and sensuous geo-

graphy (Relph, 1976; Tuan, 1977). Bartos (2013) particularly argues that studying space through the scale of the emotional and sensual body helps explore some of the ways a sense of place may arise. Following Relph's (1976) definition of a sense of place as an *affective bond*, Bartos emphasizes the importance of emotions and an emotional attachment to place.

Previously discussed non-representational theory also confirms that affect is (always) mediated, in the sense that it is shaped by the participants in an encounter, rather than being exclusively organized through some form of representational-referential system of significance. "Capacities to affect and be affected" are not pre-discursive, in the sense of existing outside signifying forces (Anderson, 2015: 85). Therefore, affect should be treated as a generative and mediated entity beyond representation. Seigworth (2011: 315-316) proposes that traditional maps are notoriously limited in displaying in "emergent processes" or "affective capacity," and argues for the necessity of affective maps that display the imagining of other ways of being and other logics of difference, for all manner of becomings, unbecomings, and multiplicities. By considering affect and affective meaning as the perceptions, interpretations, or expectations we often ascribe to a specific physical and social setting, it is made clear that affective geovisualization allows visualization and articulation of the complexity of affect that cannot be reduced to one single logic and representation.

Bruno's (2002) discussion of the affective geometries and mobilities that are unleashed by film and other forms of moving image culture prompts renewed understanding of not only the ways we might read or merely map the spaces of film, but also how these immaterial geographies might shape renewed understandings and engagements with landscapes more generally. Bruno provides a detailed theoretical exposition of the ways in which the affective properties of the cinematic medium can host psychic and emotional mappings of self and subjectivity. For example, according to her, mapping is "a terrain that can be fleshed out by rethinking practices of cartography for travelling cultures, with an

awareness of the inscription of emotion within this motion. Indeed, by way of filmic representation, geography itself is being transformed and (e)mobilized...a frame for cultural mappings, film is modern cartography” (Bruno, 2002: 16). In *Atlas of Emotion*, Bruno (2002) clearly presents the shift from “sight” to “site,” and from the “optic” to “haptic,” and thereby moves away from the perspective of the gaze and into diverse architectural motions. In fact, her *Atlas of Emotion* is not a map merely of spaces but of movements within culture and historical trajectories (Bruno, 2002: 6). In a similar vein, tender mapping visualizes and embodies a narrative voyage in the form of a landscape, an itinerary of emotions, which is the topos of the novel. Tender mapping makes a world of “affects” “visible to us” (Bruno, 2002: 2). Tender mapping is also a transformative partial mapping that resists a univocal and totalizing vision. For example, the “tender” mapping of *Mademoiselle de Scudéry* is a cartography that dwells in movement and includes the intimate exploration of difference in gender maps (Bruno, 2002: 207). The tender cartography excluded neither women nor their spaces (nor children or their spaces) because it was a terrain that was defined geographically and mapped as a “room of one’s own” (Bruno, 2002: 209).

Nold’s (2009) *Emotional Mapping* and Giaccardi and Fogli’s (2008) *Affective Geographies* also prove why emotion, affect, embodied practice, and art are crucial part in geographic research. The idea of plotting sensuous data like emotion as a series of high and low peaks on the map and interpolating to create a 3D imaginary surface is exciting; however, more importantly, it provides an ability for us to expose and re-present the perceptions, interpretations, and meanings that we ascribe to a particular space. *Metacity/Datatown*, published by the Dutch architecture group MVRDV (Winy Maas, Jacob van Rijs and Nathalie de Vries) present more innovative experimental works on the contemporary cities that profiles a new digital map called ‘datascape’ by merging information, aesthetics, artistic talents and statistical insights (Costanzo, 2006; Amoroso, 2010).

In addition, in their theorization of affective geovisualization, Craine and Aitken (2009: 152) particularly addressed how visualization might affect our embodied “affectivity” directly and intensely, and which forms of visualized geographic data set might be most rewarding. Coming from the perspectives of visual geography and media geography, their suggestion was more anchored in the intersection of GIS maps and media (particularly film) as geographic and visual engagement with data. Craine and Aitken (2009: 154) argue that seeing maps of any area makes us being “lost to the task of imagining what it would be like to be in this place [on the map].” What this means is that affectivity is the crucial element that triggers the dynamic interaction between our body and map images, and any visualized geographic data set (e.g., GIS maps, movie) can impact our embodied affectivity directly and intensively. Craine and Aitken (2009: 152) clearly explain that affectivity introduces the power of creativity into the embodied and experiential processes. However, media need not be the only form of affective geovisualization; we might imagine other various forms of affective geovisualization in order to be able to see the interconnection between visualization, visualization techniques, and children’s emotion and affects. Affective geovisualization provides a framework for simultaneously exploring and engaging with the visual and emotional; it can act as an alternative form of spatial and visual narrative that allows us to see more than what we have already known and seen (Craine and Aitken, 2009: 155); furthermore, it can clearly show the relationship between affects and geovisualization.

2. Inductive Visualization

A humanistic alternative to GIS, mapping and geovisualization provides promising examples of telling ‘spatial narratives’. Spatial narratives are flexible frameworks that produce and reproduce narratives in different ways for different purposes and audiences; visualization is often a critical way of representing knowledge about

place and space, and presenting its relations as a way to create spatial meaning through abstraction, exploration, and interpretation (Schuuman 2004; Elwood 2006; Knigge and Cope 2006). If our spatial narratives are advanced and realized through geographic visualization, it would carry tremendous power to represent the spatial knowledge and stories that we ascribe to particular places.

“Inductive visualization” has presented an innovative mode of creative geovisualization, in particular, by (continuously and creatively) considering various forms of “visualization” of data that we often cannot represent in GIS maps (Knowles *et al.*, 2015). Inductive visualization is, therefore, a creative, experimental exploration of the structure, content, and meanings of course material (Knowles *et al.*, 2015: 244). It particularly considers various ‘visualization’ of data that we often cannot represent in GIS and maps, and what visualization can do for the humanistic inquiries and perspectives on space and place, and perceptions of them. Knowles and co-researchers particularly showcased the spatial turn in Holocaust Studies including the examples of Tableau diagram of Einsatzgruppen attached on Lituanian Jews in 1941, the built environment of Auschwitz, the route showing the movement of Jews from various camps, or even the visualization of the silences in survivors’ accounts (Giordano *et al.*, 2014; Knowles *et al.*, 2015). These are all fascinating examples of representing what people experienced and that what mapping was troubling to do, hitherto. For example, Figure 1 shows how the degree of guards’ aggression affected marchers in an evacuation column, how they responded to a friend’s violent death, and the relative importance of personal relationships.

Here, oral historical interview data are transcribed, key words are analyzed and sorted by people and place, and several interesting and innovative visualization techniques are used to identify “feelings” and “emotions” in various forms such as photos, texts, drawings, visual diagrams, mapping, artwork and installation, tables, and combinations of each of these. In particular, the movement of emotion in space, “the motion of emotion,”

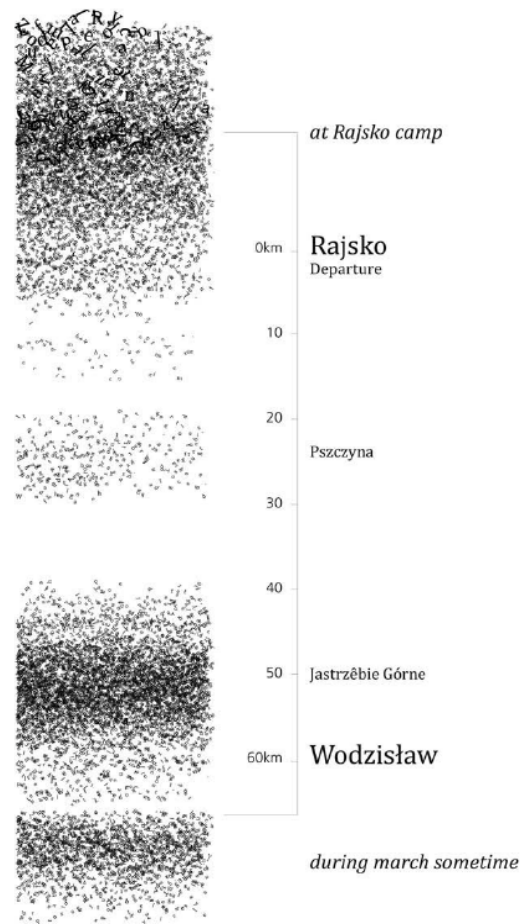


Fig. 1. Visualization of five women’s testimony about their experiences during a forced evacuation from an Auschwitz labor camp in January 1945. In Knowles *et al.* (2015) *Inductive Visualization*

in *Geographies of the Holocaust Studies* (Giordano *et al.*, 2014) is a strong example of creative geovisualization that is a creative, experimental exploration and visualization of the meanings of geographic data. As Knowles *et al.* (2015: 254) noticed, “The most dramatic stories, those that carried the greatest emotion and personal significance, happened in just such specific places, places too small to appear meaningfully on any conventional map.” It is not just a scalar issue, but an inherent limitation of conventional maps and visualization that are difficult to work with (identify) qualities of people’s experiential time and place. Inductive visualization is

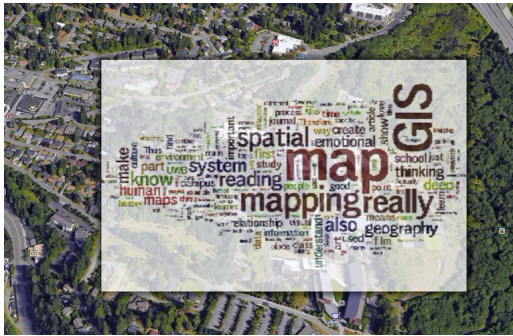


Fig. 3. An example of the “Words Map”

prominence to words that appear more frequently in the source data. For example, the most frequently appeared words or phrases will be appeared as the largest in the word clouds image. For the inputting texts, I asked students to use all the writings of their thoughts on the readings and class discussions about “creative geo-visualization” they have posted and reflected throughout the quarter. This included pre-discussion post, reflections about key themes and discussion topics, and their raised questions that contributed to the constructive class and group discussions. Once they created their words clouds, students were asked to create ‘Words Map’ by either georeferencing their words clouds image in GIS, or creatively integrating with a spatial information (See, Figure 3). In Figure 3, one student placed his Words Map on top of the location of the University of Washington-Bothell campus by using Google Earth.

Students also wrote a short essay reflecting the creation of their Words Map, and demonstrating the process of their learnings about key topics in the class (e.g., deep maps, spatial humanities, emotional maps). They had to make sure to respond to the following three questions: (1) How well does your Words Map represent your understanding of the key topics we discussed in class?; (2) What are the things that are now fully represented/visualized in your Words Map, in terms of your own understanding of key topics?; and (3) What are the limitations and possibilities of the Words Map as a creative visual rendering of the words on the maps? Many students regarded this activity as “geographical



Fig. 4. Wine Maps with a Map Cake

drawing,” and shared their experiences that it was interesting and helpful exercise that led them (un)expected outcome. Even though it could be quite a naïve example of creative geovisualization, I was grateful to hear that this activity at least gave students an opportunity to grasp what creative geovisualization is, and what it can and cannot do. I particularly saw a lot of transitioning and processes that one can be forever changing with additions of new interpretation and visualization. One can take away a new perspective with creative geovisualization, for instance, the most noticeable words as keywords students learned about the topic; however, one can be also thankful for finding out little things that are not clearly represented in the visualization, which are equally important aspect we can reveal with the visual.

Words Map also took such a ‘creative’ turn by one of my students who had incorporated both a word map and an artistic representation of her movement throughout the United States and the location where she has lived with the bottles of various wines. (Another student baked a map cake in the shape of the globe; See, Figure 4 for the display of the wine maps next to a map cake.)

Her words map took describing features and notes regarding style, aroma and taste of each flavor of wine that she created in a particular place she lived. For example, her cranberry/raspberry wine has been described as a perfect balance of light sweetness and tart, refreshing cranberry, and it represents her residency in Massachusetts State. Her plum wine was characterized

by its plum aroma and semi-sweet plum flavor, and it was well resonated with her memory of New Hampshire. Placed these describing words, and generated a words map by creating a contrast between commonly used words and the less frequent, she created four additional words maps: Maine for wild blueberry, Washington for apple, Tennessee for beet wine, and Rhode Island for strawberry rhubarb. She printed, rolled, and placed these words maps into six individual wine bottles and displayed them in a wine carrier. She has brought a bottle of apple wine to class to show (and offer to taste) the final outcome of one of her wines.

In the final presentation, she shared with class that she took pride in locating the fresh native fruits that grew in each state, and how much time she spent in farmers' markets and local farm stands along the side of the road or picking her own in you-pick cranberry bogs. Her reflective comments were quite powerful: "My environment changed continuously, but I tried to bring personal meaning to what I was trying to accomplish with each batch of wine." It well demonstrates how (deep) mapping and creative geovisualization can "reflect a hunger to represent the meaning of place as experience it-as an immersive, sensory stimulating environment that is constantly changing." (Knowles *et al.*, 2015: 239). Each batch of wine (creatively) tells a (different) story of where she once lived and what she has experienced. This might not fully represent/visualize her spatial narrative; however, it shows a particular (and important) attempt to represent (often) non-representable and (maybe) non-representative elements of (geographic) stories of her. In the context of considering what might constitute an example of engaging with creative geovisualization, wine maps, as well as other modes of creative activities and practices mentioned in this section, permit a particular examination of creative geovisualization.

IV. Concluding reflections

In this paper, I introduced "creative geovisualization" by broadening our understanding on many different

encompassing theories, concepts, and practices (e.g., non-representational theory, deep maps, spatial humanities, and creative thinking and geographies). Creative geovisualization is particularly a new space for geographers to build interdisciplinary scholarship that contributes to the discussions of digital spatial humanities and the intersection of geography and the arts, and explores the expanded role of maps and geovisualization within geographical scholarship. Creative geovisualization also presents a new possibility that provides a medium of perceptual representations, not just maps of precisely measured objects; it aims not to chart what is known but rather to explore what is unknown; it allows us to probe the situated knowledge that resides in dynamic and contested memories and to understand what Aitken (2015) has called the affective or emotional geographies of space and place, or what Moretti (2007) called 'spatial imaginaries' of cultural and literary studies from a digital humanist perspective. Alternative humanistic and artistic spatial narratives allow us to embrace new knowledge with ambitious, and these evolving cartographies in their various forms can be made visible with/in the engagement of the creative geovisualization (Craine and Aitken 2009). Creative geovisualization may not only show what we already know, but may also afford us to see and show more than we already know. This is an open-ended process that we may want to play a role, which will be always in state of 'mapping': the processual state of creating maps/geovisualization attempting to represent the non-representable and/or non-representational.

I traced several roots of creative geovisualization, and one of key theoretical frameworks was non-representational theory. Lorimer (2005) has suggested the term 'more-than-representational' to describe the fact, which attempt to cope with our multi-sensual and even affectual geographies and practices. Lorimer's point is particularly pertinent to keep in mind that non-representational theory does not necessarily reject 'representation' per se; however, rather focuses its attention on everyday performative practices. Non-representational are thus apprehended as 'multi-representational' or 'more-than-

representation.’ This (re-)conceptualization of non-representational thinking should be integral in ‘doing’ creative geographies and geovisualization (Anderson and Harrison, 2010; Hawkins, 2014).

Creative geovisualization also allows us to rethink the ontological foundations of cartography, moving from representation to a processual understanding of maps, and furthermore how to teach and learn mapping and geovisualization. We may want to balance the focus between the approaches and analyses that prioritize optimal (often, optical and Euclidean) map design and techniques of map construction and those that concentrate on how mapping and visualization unfold through a plethora of ‘contingent,’ ‘relational,’ and ‘contextual’ practices (Kitchin and Dodge, 2007). This should be practice of mapping not just what we see, for example, but rather what and how we perceive, conceptualize, feel, or even imagine. What we are particularly interested in experiencing (and celebrating) is “how mapping emerge into existence and chart in much richer [and creative] ways how they co-constitutively produce evolving *geoscape*.” (Kitchin, Gleeson, and Dodge, 2013: 495). Although it was a brief moment, I have experienced how creative geovisualization could create a participatory, collaborative, and evolving creative space in the experiment with my students in Creative Geovisualization class. The lesson was clear that we could not only explore and imagine ‘with’ maps, but also generate a map of our own exploration and imagination. This might be what Doreen Massey (2005: 15) fondly called for, “spatial delight,” that all of us want to take part in. Creative geovisualization invites us to experience and feel the personal, experiential, interpretative, and relational power of space, to (re-)imagine its ‘creative’ potential, and to unleash it.

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- 1) Similar to the purpose of this paper, this class was designed to introduce “creative geovisualization,” and

the relationship between geography, art, and humanity with a newly emerged digital mapping technology that provides a new possibility of representing and imagining geographic spaces. Critically examining the internal workings of “mapping” and “geographic visualization” and exploring their intellectual and creative possibilities, students also learned hands-on skills for the creative geovisualization by integrating a wide range of visual, textual, qualitative and quantitative, and emotional and imaginative data. This course was offered for the first time in Spring 2016 quarter at the University of Washington.

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