Gamification Analysis in Ui And Ux for ParkingSpot Apps

Emanuel Himawan Saptaputra,
Visual Communication Design
Bina Nusantara University
Jakarta, Indonesia
emanuel@binus.edu

Arsa Widitiarsa Utoyo
Visual Communication Design
Bina Nusantara University
Jakarta, Indonesia
Arsa_w@binus.ac.id

Nia Karlina,
Visual Communication Design
Bina Nusantara University
Jakarta, Indonesia
Nia.Karlina@binus.ac.id

***Abstract*—Advances in personal computing and information technology have been updated and published online or via mobile devices. Consequently, we must consider interaction as a fundamental complement of representation in cartography and visualization. The user interface (UI) / UX (user experience) describes a series of concepts, guidelines and workflows to critically reflect on the design and use of an interactive, map- based or other product. This entry presents the basic concepts of UI / UX design that is important for cartography and visualization, focusing on issues related to visual design. First, a fundamental distinction is made between the use of an interface as a tool and the broader experience of an interaction, a distinction that separates UI design and UX design. The phases of the Norman interaction framework are not a different form of interaction structure. Finally, three dimensions of the user interface design are described: the fundamental interaction operators that form the basic blocks of the interfaces, the interface styles that these primitive operators implement and the recommendations for the visual design of an interface.**

***Keywords*—UI, UX, design, interactive**

I. Introduction

Advances in personal computing and information technologies have radically transformed the way maps are produced and consumed, as many maps are now highly interactive and distributed online or via mobile devices. The user interface (UI) / UX (user experience) describes a series of concepts, guidelines and workflows to critically reflect on the design and use of an interactive product [1], map or other. UI / UX is a growing profession in the geospatial sector and in the broader technology sector [2], and UI / UX designers need to interact with stakeholders and direct users to major web design and software engineering projects (see Additional resources). This entry reviews the conceptual principles behind UI / UX, emphasizing visual design by following other entries in the Cartography and Visualization section and completing the technology-oriented UI entry that GIScience covers in the Programming and Development section.

UI and UX are not the same, separated in their focus on interfaces with respect to interactions. An interface is a tool and for digital mapping this tool allows the user to manipulate maps and related underlying geographic information. An interaction is broader than the interface and describes the bidirectional dialogue between question and answer or result request between a human user and a digital object mediated by an information device [3]. Therefore, an interaction is contingent, since the response is based on the request, creates loops of interactivity and empowers the user agency in the mapping process with changes that depend on their interests and needs [4].

Therefore, human beings use interfaces, but experience interactions, and it is experience that determines the success of an interactive product [5]. The design of the user interface describes the iterative set of decisions that lead to a successful implementation of an interactive tool, while the UX design describes the iterative set of decisions that lead to a positive outcome with the interactive, productive and Satisfactory to achieve this result as a result, UI / UX is often invested as UX / UI to emphasize the importance of designing the overall experience rather than just theinterface.

Within GIScience, interaction is more commonly treated by the impulse of geographic visualization research (see Geovisualization). Interactivity supports visual thinking, allowing users to outsource their reasoning application to a wide range of unique map representations, thus overcoming the limitations of any map layout. Geovisualization encourages this interactive reasoning for the purpose of exploration rather than communication (see cartography and science), with the aim of generating new hypotheses and spontaneous points of view on unknown geographic phenomena and processes [6]. As a result, much of the early research on cartography and visualization interaction is specific to scientific discovery, considering experts as target user groups.

Currently, UI / UX design requires consideration of use cases beyond exploratory geovisualization and users beyond experienced researchers. The interaction allows users to view multiple locations (sometimes all) and map scales, as well as customize the representation based on their interests and needs. The interaction also allows users to process cartographic design, improving access to geographic information and dissolving the traditional boundaries between the cartographer and the user map (see cartography and Power). Increasingly, interaction allows geographic analysis, combining computers with cognition to scale the human mind the complexity of the mapping phenomenon or process (see Geovisual Analytics). As a consequence, interaction has been suggested as a fundamental complement to cartographic representation, together with the organization of contemporary cartographic practice and erudition [7]. To see the additional influences on UI / UX design in cartography and visualization, see Geocomputering, Usability Engineering and Web Mapping.

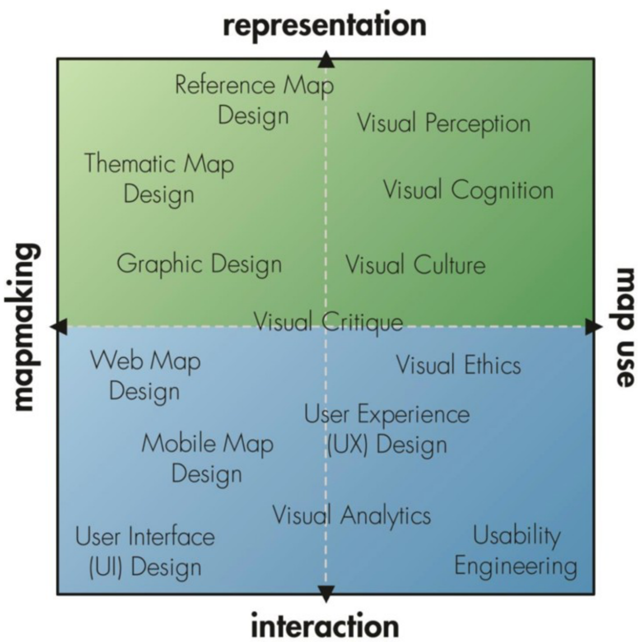

Figure 1: Map Design Fudamental

II. DESIGNING THE USER EXPERIENCE

A. Stage of Interaction

An interaction requires the user to use perceptual, motor and cognitive skills while watching, manipulating and interpreting an interactive map. A useful framework to conceptualize a cartographic interaction as a bidirectional dialogue or conversation, decomposing a single exchange of interaction into seven distinct and observable phases:

1. Form the objective: the objective is what the user tries to achieve with the interface and, therefore, represents the user's motivation to use the interface (a need, interest, curiosity, etc.). The objectives are described as "high level" activities and may include exploration, analysis, synthesis and presentation (see Geovisualization).

2. Form the intention: the intention is to read the specific map that the user completes to support the objective. As a result, intentions are described as "low level" activities. Intentions include identifying a map feature, comparing two map features, classifying a series of map features, etc. Therefore, an intention produces a specific geographic vision, such as the detection of a difference, change, anomalous value, anomaly, correlation, trend, cluster or peak.

3. Specify an action: the user must translate his intention into the functions (described below as operators) implemented in the interface. The interface requires great advantages, or signals for the user on how to interact with the interface, so that the user can specify which operator best supports the intention before performing the action.

4. Execution of an action: the user must perform the specified action using input processing devices, such as a pointing device (for example, mouse, touch screen), manipulation device (for example, keyboard, keyboard) or is executed, the processing device processes the request and, if successful, returns a new map representation to the user.

5. Perceive the state of the system: once returned, the user shows the new representation. Here, you need strong feedback or signals to the user about what happened as a result of the interaction, to clarify how the map changed after the request. It is through this provision of feedback that the map participates in the bidirectional interaction dialogue.

6. Interpretation of the state of the system: after having perceived the modification of the representation of the map through feedback, the user must make sense of the update. One way to describe this stage is to complete the intention: once a new map is returned, it can be used to perform the user's low-level task and, if successful, generate a new geographic view.

7. Evaluation of the result: the evaluation compares the intuition with the expected result to determine if the objective has been achieved. This includes a critical assessment of intuition ("seems correct?") And a meta-evaluation of the overall objective ("Do I have my answer?"). After this evaluation, the user can review their goal and initialize a new interaction exchange, restarting the seven-step sequence.”.

Norman described the faults between the user and the map (stages 1 to 4) as the "abyss of execution", or the lack of correspondence between the user tasks and the compatible operators, and the failures between the user and the user "abyss" of evaluation ". or the lack of correspondence between the result of the operator and the expected result of the user. Table 1 works through the interaction stages of Norman and lists the design solutions. UX available when an elimination is observed in a given stage.

B. Additional UX Frameworks

Various disciplines, professions and areas of knowledge contribute to the design of UI / UX, including ergonomics, graphic design, human-computer interaction, information visualization, psychology, usability engineering and web design. Additional frameworks were offered to understand UX design as UX is conceptualized and professionally formalized. For example, the law of Fitts [8] that provides a first understanding of the interactions of signaling was based on psychological studies on the movement of the human body. In addition, three levels of design (conceptual, operational and implementation levels, as discussed in the mapping of Howard and MacEachren [9] are derived from research on human-computer interaction while the five design plans (the surface, the skeleton, the structure, the scope and the strategic plans, as discussed in Mapping Tsou, are offered by the web design experience. Finally, most of the recommendations describe UI / UX as a design process that includes multiple user-centered assessments, using methods and measures established in usability engineering

(see Usability Engineering).

III. DESIGNING THE USER INTERFACE

A. Interaction Operators

As in the case of representation design and visual variables (see Symbolization and visual variables), an interaction can be deconstructed in its basic blocks (Figure 2). Interaction primitives describe the fundamental components of the interaction that can be combined to form an interaction strategy [10]. Academics in cartography and related fields (eg, Thomas and Cook, 2005) [11] identify the development of a taxonomy of interaction primitives as the most urgent need to understand interaction, in how much Taxonomy articulates the entire solution space for UI / UX design. Consequently, there is now a range of taxonomies offered in the UI / UX literature, which include specific taxonomies for cartography and visualization Andrienko et al, 2003; Edsall et al., 2008)[12]. The taxonomies of primitive interaction differ for the interaction phases that they include. Although the UX design considers primitive in all stages, the design of the user interface focuses mainly on the primitive operator of the interaction (step 3: specifies the action) or on generic functions implemented in the interactive that allows the user to manipulate the screen. Operators include panning, zooming and recovery details of functions common to web maps with "slippery" tile sets (see Web Mapping), in addition to repressions of different visual descriptions, overlay of context information and multi-faceted filtering. the series of mapped data - essential functions for the information mantra of Shneiderman [13] in search of big data visualizations (see Big Data Visualization). Figure 1 describes the common primitive operator in cartography and visualization, the synthesis of the UI / UX recommendations.

Not all maps should be interactive and not all interactive maps require the same user interface design. The interface field describes the basic number of operators implemented in an interactive product (for example, only panoramic and zoom with respect to the panoramic and more filters research and zoom), while the freedom interface describes the precision with which each operator it can be executed (for example, bringing any map scale closer to only ~ 20 preprocessed scales). Together, scope and freedom determine the complexity of the interface, or the total number of unique representations that can be created through the interface. Very similar to the management of the complexity of the information in the cartographic design (see Generalization), the complexity of the management interface is essential for the good design of the user interface

/ UX. The appropriate balance between flexibility and restriction in UI / UX design must be determined through user input and evaluation (see Usability Engineering).

B. Interface Styles

An operator is implemented in one of several interface styles, also called mode, or the way in which the user input is sent to execute the operator (Shneiderman and Plaisant, 2010 as discussed for the mapping of Howard and MacEachren, nineteen ninety six) [14]. The same operator can implement several times through different interface styles, allowing users to complete the same goal with an interface through different interaction strategies, a design concept described as the flexibility of the interface. In graphical user interfaces (for example, GUI), the interface style is the widget, menu, or form that triggers an event when an entry is received; the operator is the business logic that is executed after the event has been handled.

The interface styles are defined by their level of immediacy in the input transmission (Figure 3). Full head manipulation allows probing, dragging and other adjustments in graphic elements of the user interface. For mapping and visualization, direct manipulation can be applied to the individual characteristics of the common (map to the details of the recovery), the entire map (common for panning, zooming and reprojection), map elements as a legend (common for filtering and risymbolizing), a graphic link or visualization of information (common for reprocessing descriptions, detail filtering and retrieval in a coordinated deployment) or simply a custom widgets, such as buttons or scroll bars (common to filter, superposition of overlays and sequencing through a series of maps or an animation).

Fewer direct interface styles include menus or selecting one or more items from a list (common for the filter) and modules or encoding characters in an empty text box (joint investigation). The change to the first design or post-WIMP mobiles (windows, icons, menus and pointers) in the cartography has substantially changed the way direct interface styles are designed to support vague tactile interactions (based on the fingers). The command language and natural language styles are indirect and non-graphic styles for the operator's implementation. Shneiderman and Plaisant (2010)[15] provide a complete summary of the relative advantages and disadvantages of interface styles for user interface design.

Figure 2: App Icon

Figure 3: User Interface 1

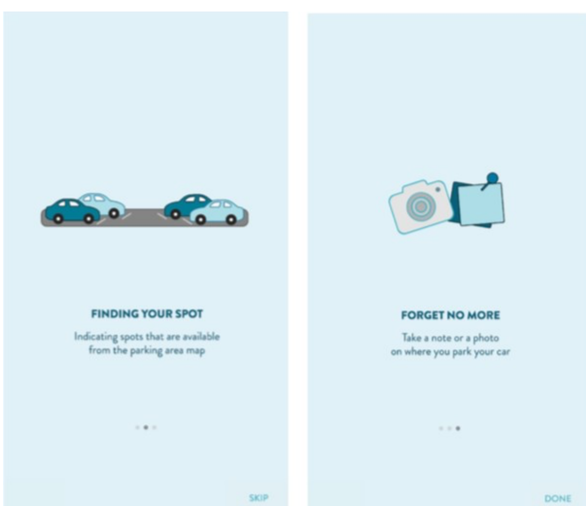

Figure 4: User Interface 2

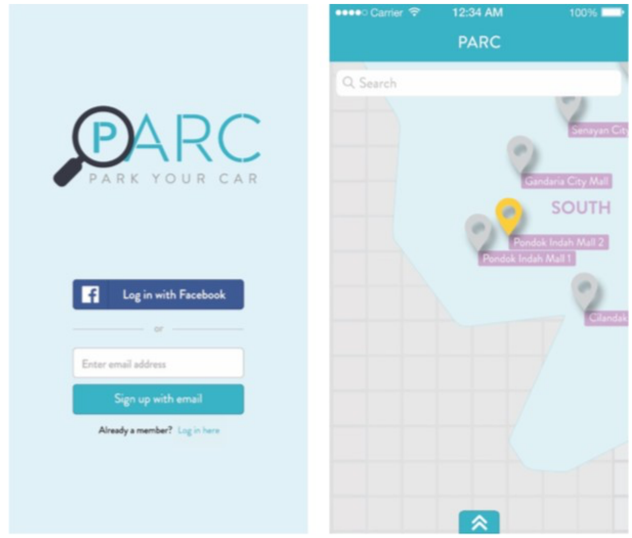

Figure 5: User Interface 3

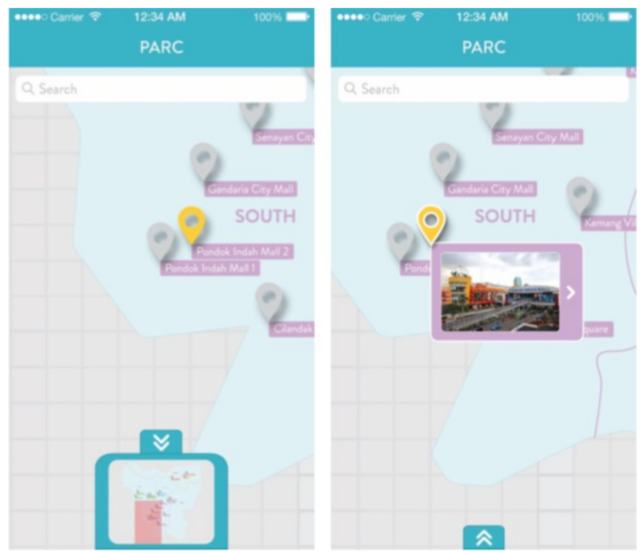

Figure 6: User Interface 4

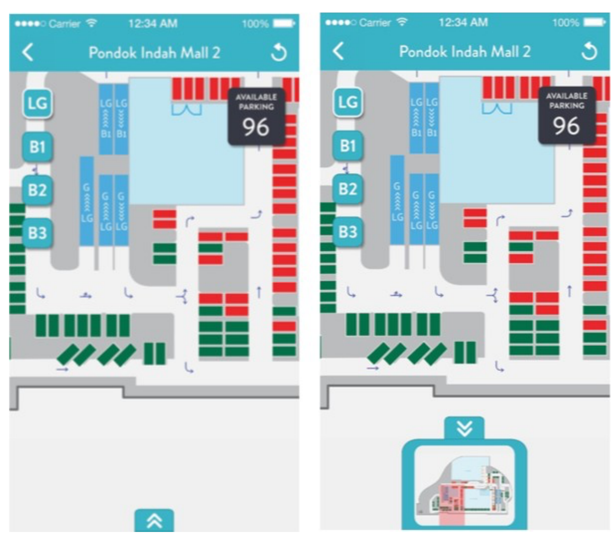

Figure 7: User Interface 5

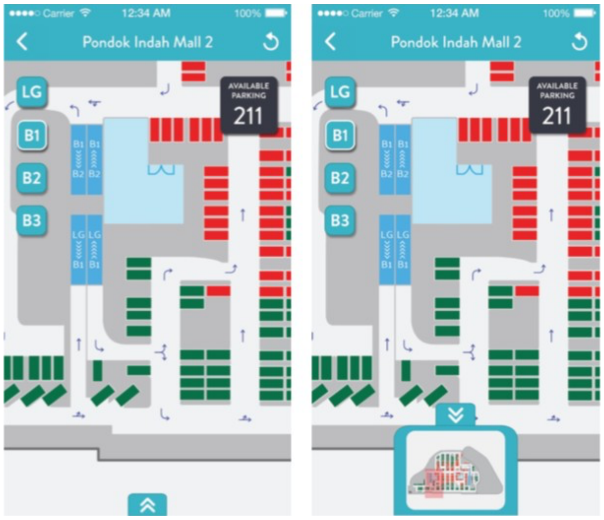

Figure 8: User Interface 6

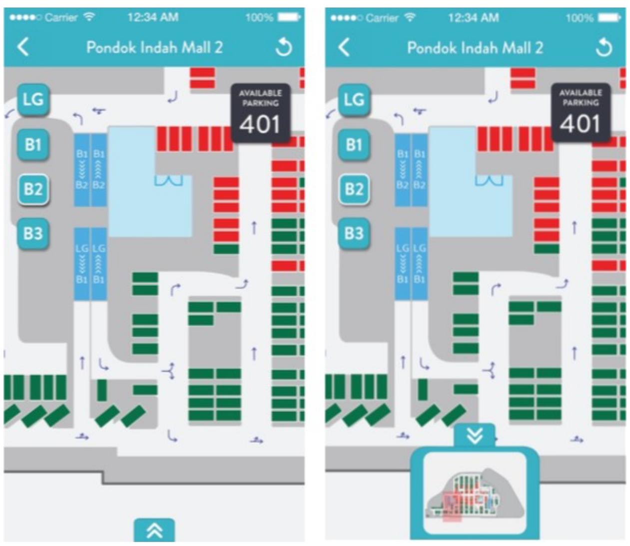

Figure 9: User Interface 7

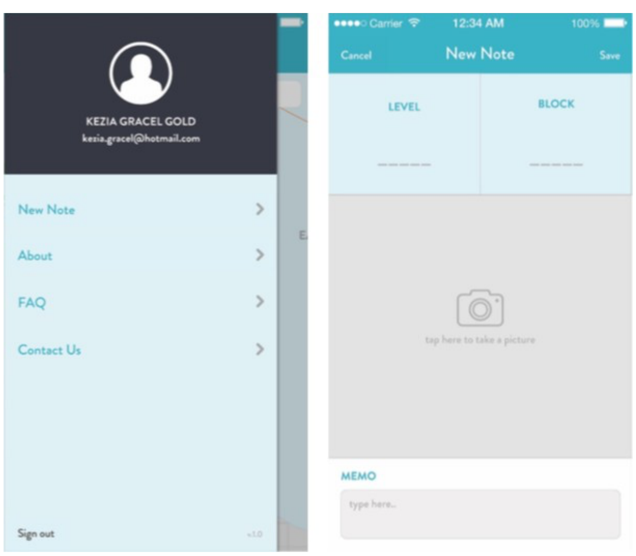

Figure 10: User Interface 8

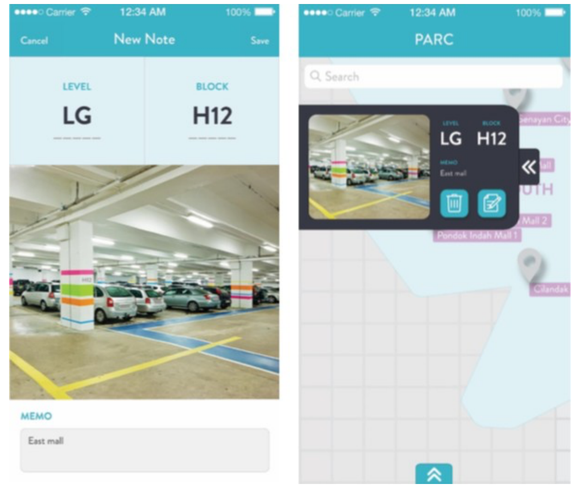

Figure 11: User Interface 9

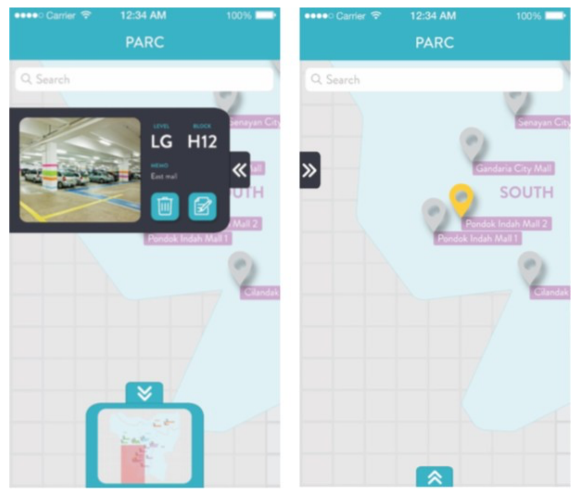

Figure 12: User Interface 10

Figure 13: User Interface 11

IV. Visual Interface design

As with paper or static cartographic design (see Aesthetics and Design), the visual appearance of the user interface design is "more than just the icing on the cake": it sets the tone for the whole user experience, from 'Adjustment of mood and evocation an adequate emotional response through the improvement of usability and subjective satisfaction. The design of the user interface is a highly creative process and the creation of a coherent and unique visual brand is based on the iterative refinement of global design decisions (for example, design and interface reactivity, application navigation, accessibility and feedback). visual), color combinations, typefaces) and local design decisions (for example, visual metaphors for direct manipulation interface widgets, icon-specific text phrases, information about tools and information windows). Nielsen (1994)[16] provides a useful set of usability heuristics to guide the design of visual interfaces.

V. Conclusion and Recommendation

A. Conclusion

In a crowded metropolis city such as Jakarta that has many malls, malls have become one of the favorite destinations for people who are looking to enjoy themselves. The part of enjoyment could overturn quickly when it has become tiresome to find parking spots in malls, and this also leads to wasting time and money for the people. Finding a parking spot is a task people would like to see made easier. There will be no more asking strangers where to park or spending more cash for parking tickets. Sure, it won't be like having your own driver, but it is the next best thing for when you are trying to find a spot in a crowded mall. Observation and survey have been done by the author to come up with the solution to this problem. The results said that malls needed to have more parking spaces which leads to needing more land. With that problem cannot be solved there was an idea of creating a mobile application that can serve multiple benefits for users. The application needs to be functional, therefore, an application with the features of real time information on available parking spots and note to remind users on the location of where they parked should bedeveloped.

B. Recommendation

iOS application is to be developed as well as the continuation of the Android launch. This application has the potential to be developed even more into a GPS supported parking application when the technology allows to do so especially development for precision in underground areas. It may also be integrated with booking system from other applications to provide users with more features. When this application comes to live, it is recommended to approach other mall groups for example, Agung Sedayu Group, Agung Podomoro Group, and Lippo Group to be cooperated with as supporting institutions to develop this project.

References

[1] Garrett, J. J. (2010). The elements of user experience: user-centered design for the web and beyond. Pearson Education.

[2]] Haklay, M. M. (Ed.). (2010). Interacting with geospatial technologies. John Wiley & Sons.

[3] Roth, R. E. (2013b). An empirically-derived taxonomy of interaction primitives for interactive cartography and geovisualization. IEEE transactions on visualization and computer graphics, 19(12), 2356-2365.

[4] Sundar, S. S., S. Bellur, J., Oh, H., Jia, H., & H. S Kim. (2016). Theoretical importance of contingency in human-computer interaction: effects of message interactivity on user engagement. Communication Research, 43(5), 595-62

[5] Norman, D. A. (2013). The design of everyday things: Revised and expanded edition. Basic books.

[6] MacEachren, A. M., Wachowicz, M., Edsall, R., Haug, D., & Masters, R. (1999). Constructing knowledge from multivariate spatiotemporal data: integrating geographical visualization with knowledge discovery in database methods. International Journal of Geographical Information Science, 13(4), 311-334.

[7] Roth, R. E. (2013a). Interactive maps: What we know and what we need to know. Journal of Spatial Information Science, 2013(6), 59-115.

[8] Fitts, P. M. (1954). The information capacity of the human motor system in controlling the amplitude of movement. Journal of Experimental Psychology. 47(6): 381-391.

[9] MacEachren, A. M. (1994). Visualization in modern cartography: setting the agenda. Visualization in modern cartography, 28(1), 1-12.

[10] Roth, R. E. (2012). Cartographic interaction primitives: Framework and synthesis. The Cartographic Journal, 49(4), 376-395.

[11] Thomas, J. J., & Cook, K. A. (2005). Illuminating the path: the research and development agenda for visual analytics. IEEE Computer Society.

[12] Andrienko, N., Andrienko, G., & Gatalsky, P. (2003). Exploratory spatio-temporal visualization: and analytical review. Journal of Visual Languages & Computing, 14(6), 503-541.

[13] Shneiderman, B. (1996). The eyes have it: A task by data type taxonomy for information visualizations. In Visual Languages, 1996. Proceedings., IEEE Symposium on (pp. 336-343). IEEE.

[14] Howard, D., & MacEachren, A. M. (1996). Interface design for geographic visualization: Tools for representing reliability. Cartography and Geographic Information Systems, 23(2), 59-77.

[15] Shneiderman, B. (2010). Designing the user interface: strategies for effective human-computer interaction. Pearson Education India.

[16] Nielsen, J. (1994, April). Usability inspection methods. In Conference companion on Human factors in computing systems (pp. 413-414). ACM.

[17] Tsou, M.-H. (2011). Revisiting web cartography in the United States: The rise of user-centered design. Cartography and Geographic Information Science, 38(3), 250-257