Implementing and Developing an Interactive Atlas for the Global Naturalized Alien Flora (GloNAF) Database

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The GloNAF project is a living database that represents the occurrence and identity of naturalized alien vascular plant taxa across the globe [1]. To encourage the accessibility of this dataset, an interactive atlas was created to allow researchers to filter, search, and explore the dataset. Using D3.js, a client-side data visualization library, an interactive atlas was created that visualizes the GloNAF dataset.

A five stage framework was developed to achieve this objective. This framework achieves measurable success through a user-centered design (UCD) philosophy that includes communication with the target user group, iterative prototyping, and a competitive analysis.

RESEARCH OBJECTIVES

1. Develop an interactive atlas for the GloNAF dataset
2. Create a reusable framework for interactive atlas creation
3. Determine if any mapping functionalities are used in all types of atlases; can a minimum standard of necessary functionalities be determined for interactive atlases?

METHODS

A mixed approach to interactive atlas development was created by combining the five stages of UCD for web mapping put forth by Tsou & Curran [2] with Roth, Ross, & MacEachren's three U's for interfaces success [3] (Fig. 1).

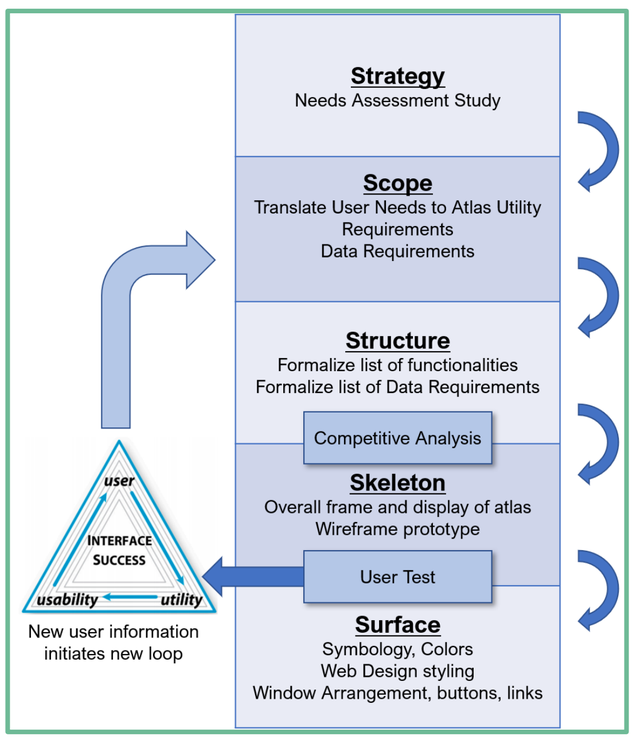

Fig. 1. Interactive Atlas Framework

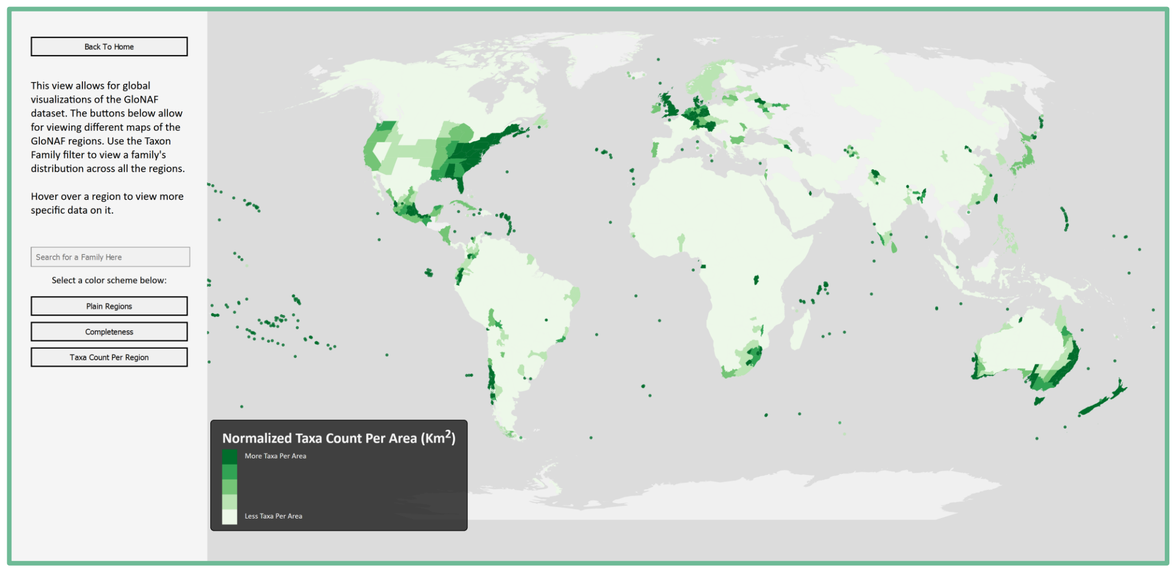

Fig. 2. Invasive Taxa Count per Area

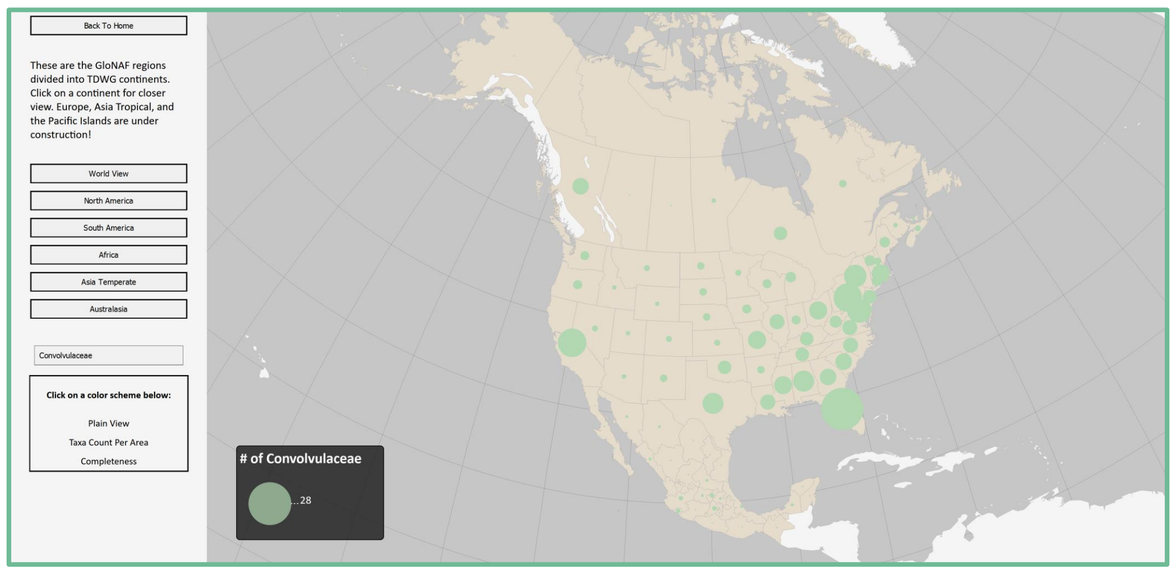

Fig. 3. Convolvulaceae Family Distribution in North America

COMPETITIVE ANALYSIS

Related geovisualization examples within the same field as the GloNAF were compared. These biodiversity web mapping platforms and online atlases were analyzed to gather information on their specific strengths, weaknesses, technologies used, data representation methods, and interactivity methods.

USER TEST

A user test was conducted to measure the usability and utility of the interactive atlas with the target user group. Participants used the interactive atlas prototype to answer questions about the GloNAF. Participants then answered questions regarding the learnability, ease of use, and their preference of data visualizations used.

RESULTS

The competitive analysis showed diversity regarding technologies used to create the atlases. The results showed diversity in representation styles as well. Most atlases included interactivity methods such as pan, zoom, retrieve, and search. The user test was completed by all but one member of the GloNAF team. Most members were able to answer questions about the atlas correctly and ranked the atlas as "Very Easy" or "Easy" to learn and use. Specific comments regarding surface features, such as web design stylings and color choices, were noted and incorporated into the next iteration of the atlas.

CONCLUSION

The framework developed was successful in creating an atlas that successfully visualized aspects of the GloNAF for the small target user group. Standard necessary functionalities were unable to be defined for all digital atlases, and more research, including a more comprehensive competitive analysis, could lead to more concrete answers regarding this question.

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LINK TO ATLAS

https://sebastian-ch.github.io/glonafAtlas/

REFERENCES

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