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Usability Metrics of Web-based Mapping Applications

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Usability Metrics of Web-based Mapping Applications

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Introduction

Web-based mapping applications use web technology to deliver geospatial information and data to users.

These applications are intended for a broader range of users who may have little experience of GIS (Geographic Information Systems).

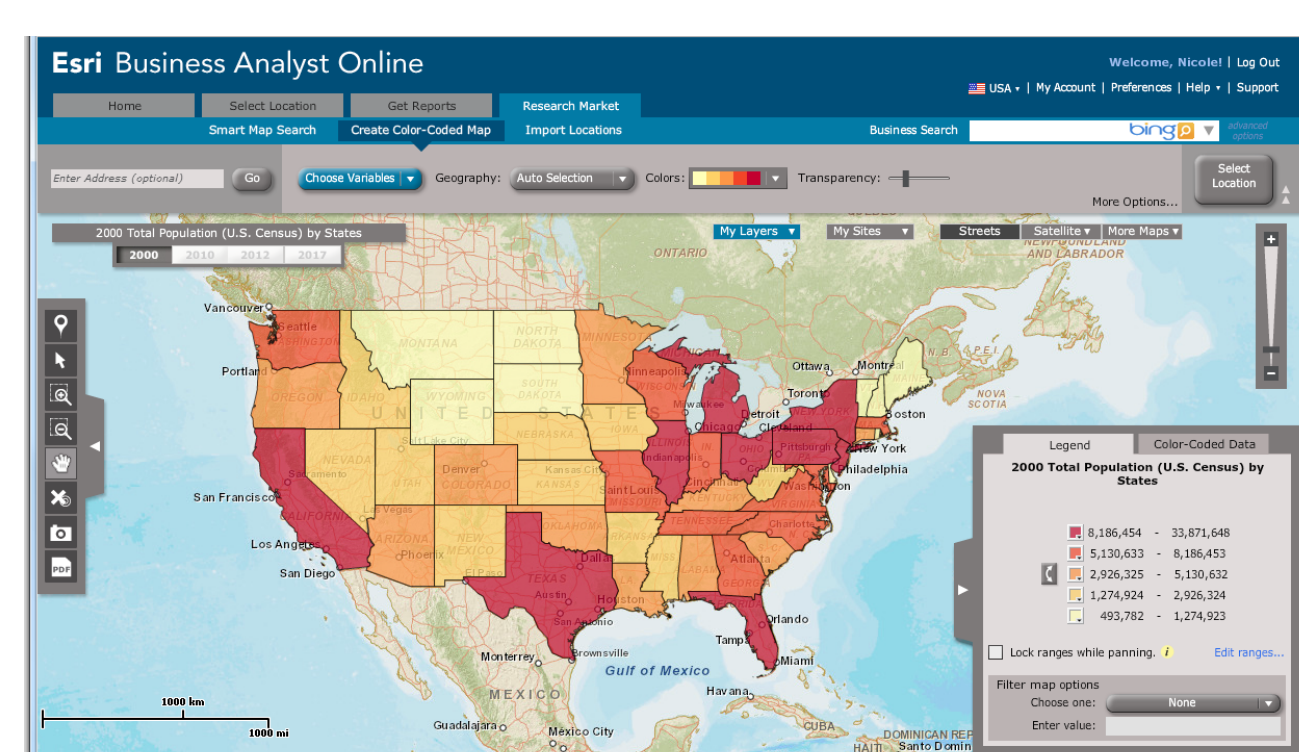
Web GIS bring great opportunities for geospatial information seeking in digital libraries.

Many applications' data representation and interaction paradigm were inspired by systems for expert users, which creates challenges for novice users.

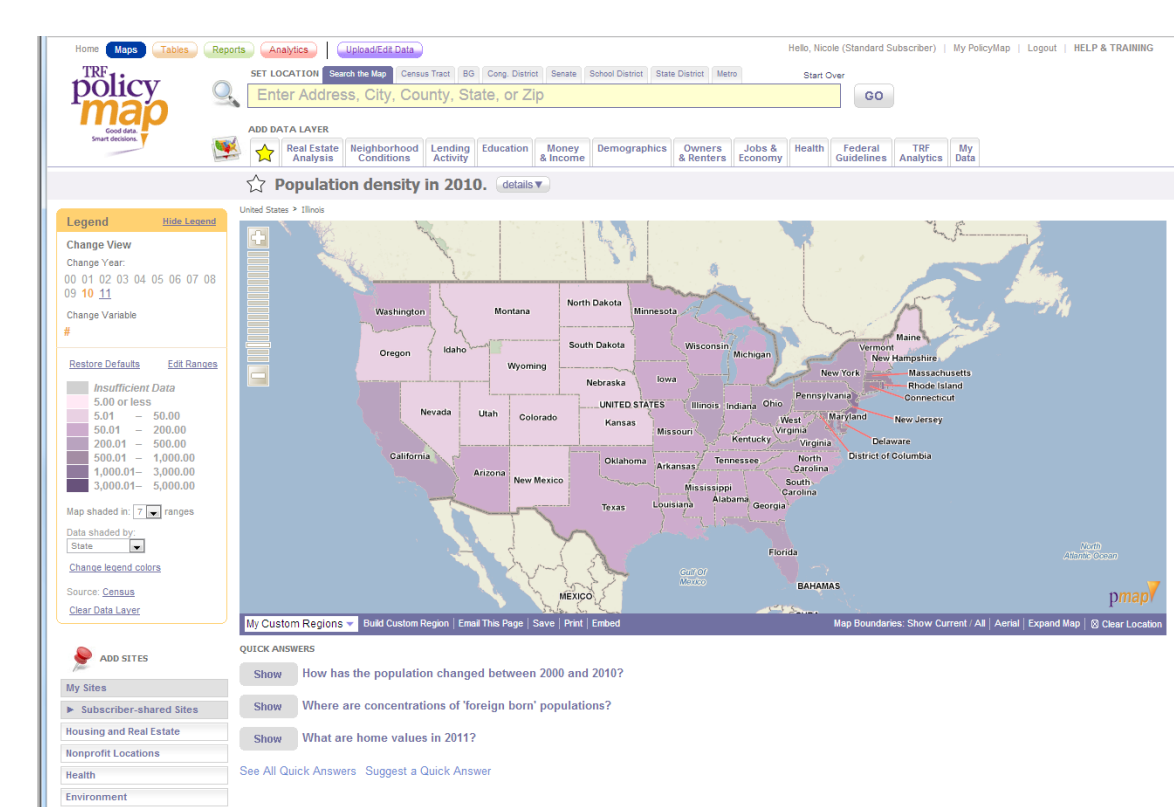
Previous studies assessed individual applications, but did not address the lack of usability metrics and assessment methodology.

Method

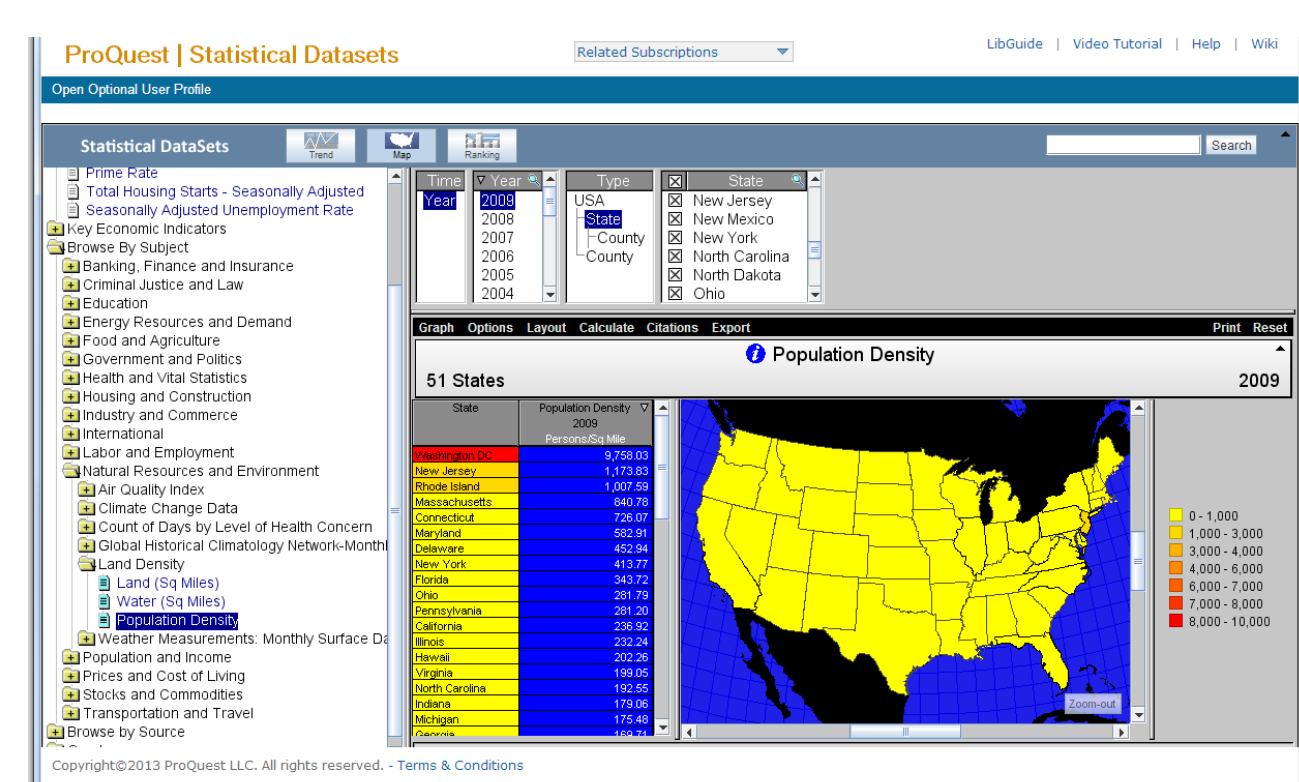
We conducted usability evaluation of six popular web-based mapping applications:



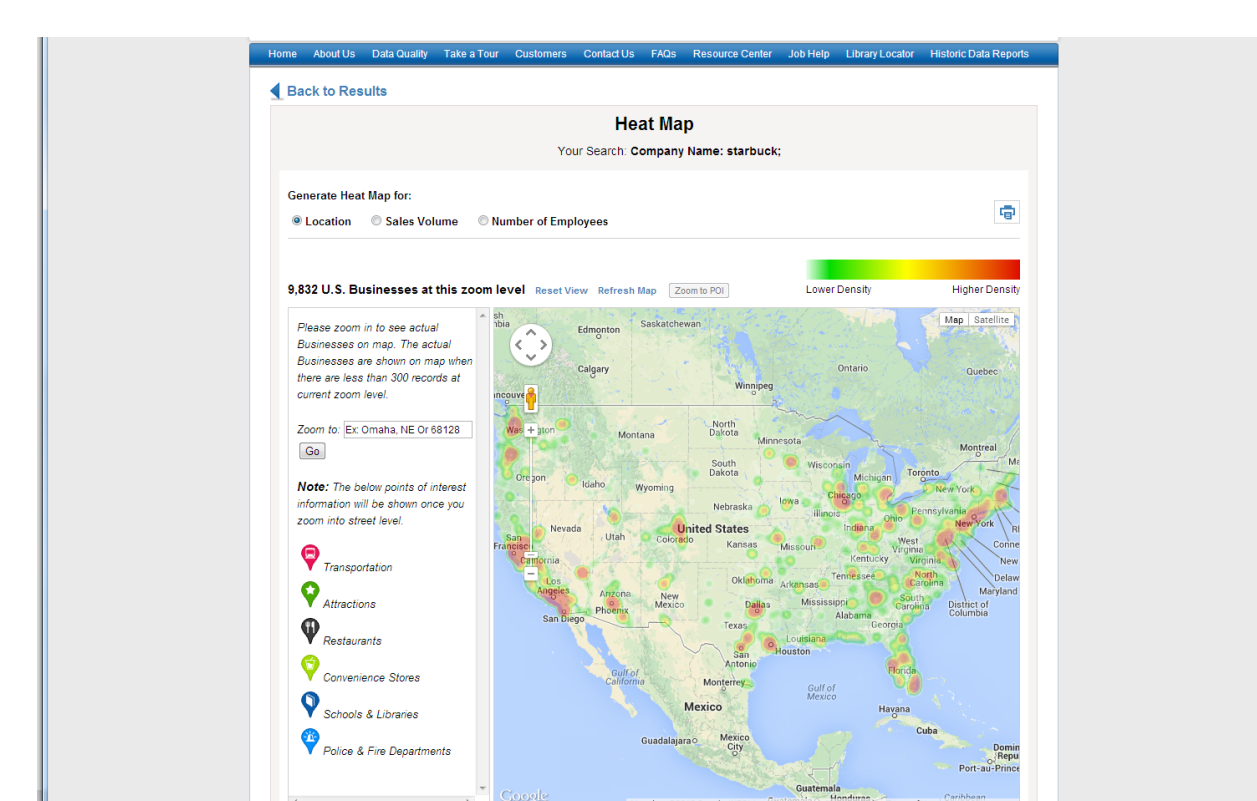
ESRI Business Analyst Online (BAO)



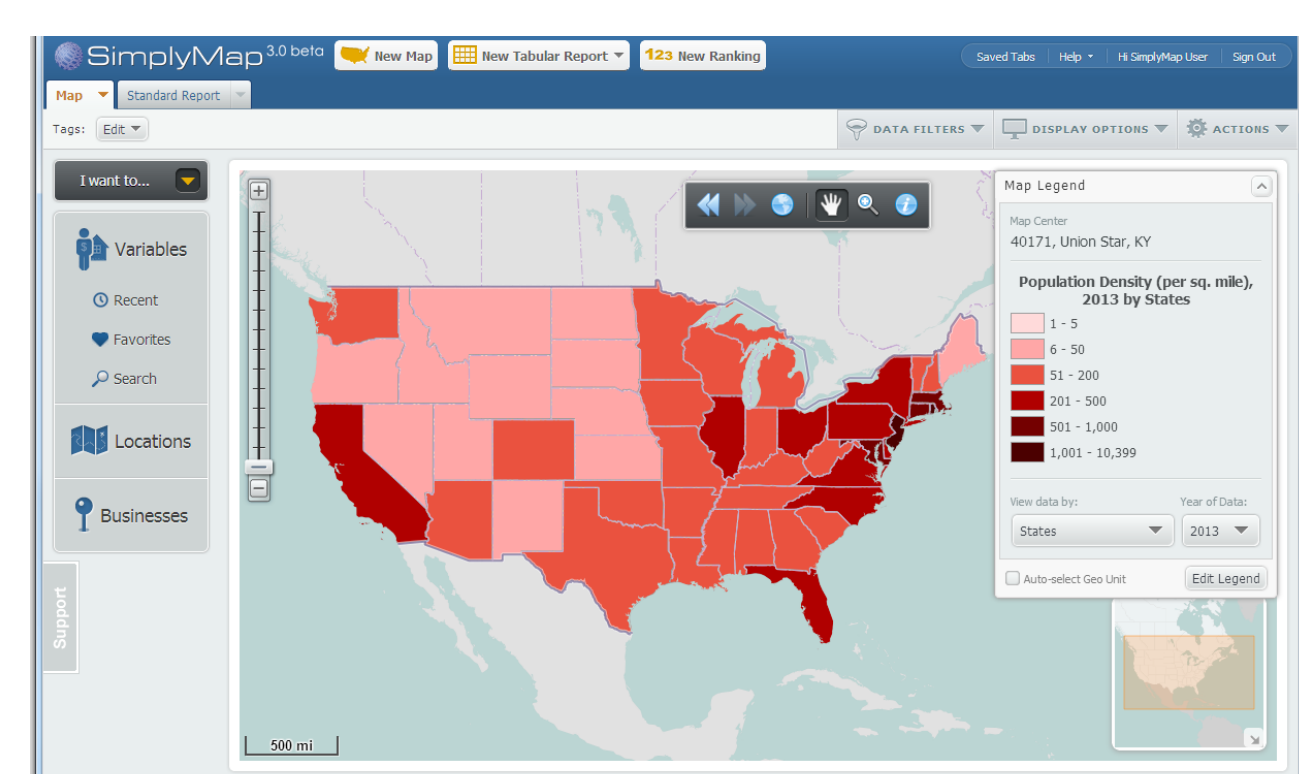
PolicyMap



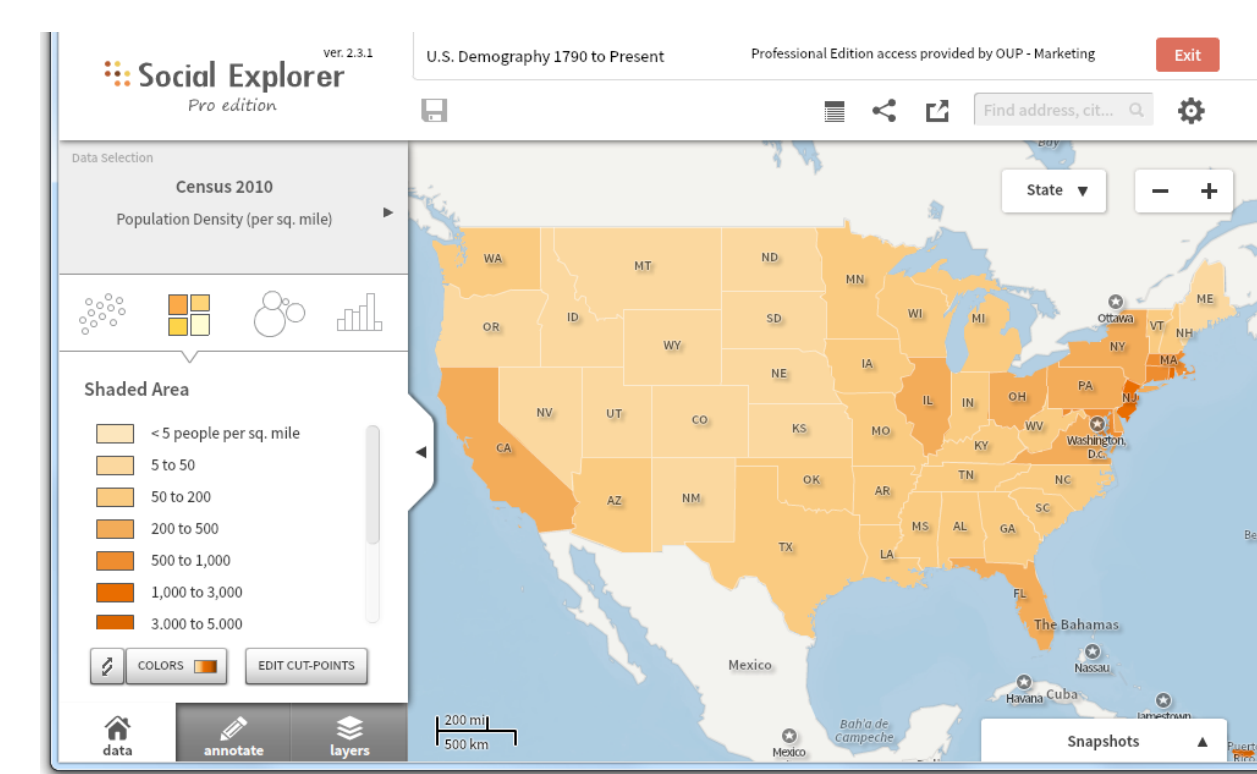
Proquest Statistical Datasets



Reference USA



SimplyMap



Social Explorer

We recruited 18 students at Purdue to perform six tasks:

1. Create a customized map of business information in Indianapolis, IN;

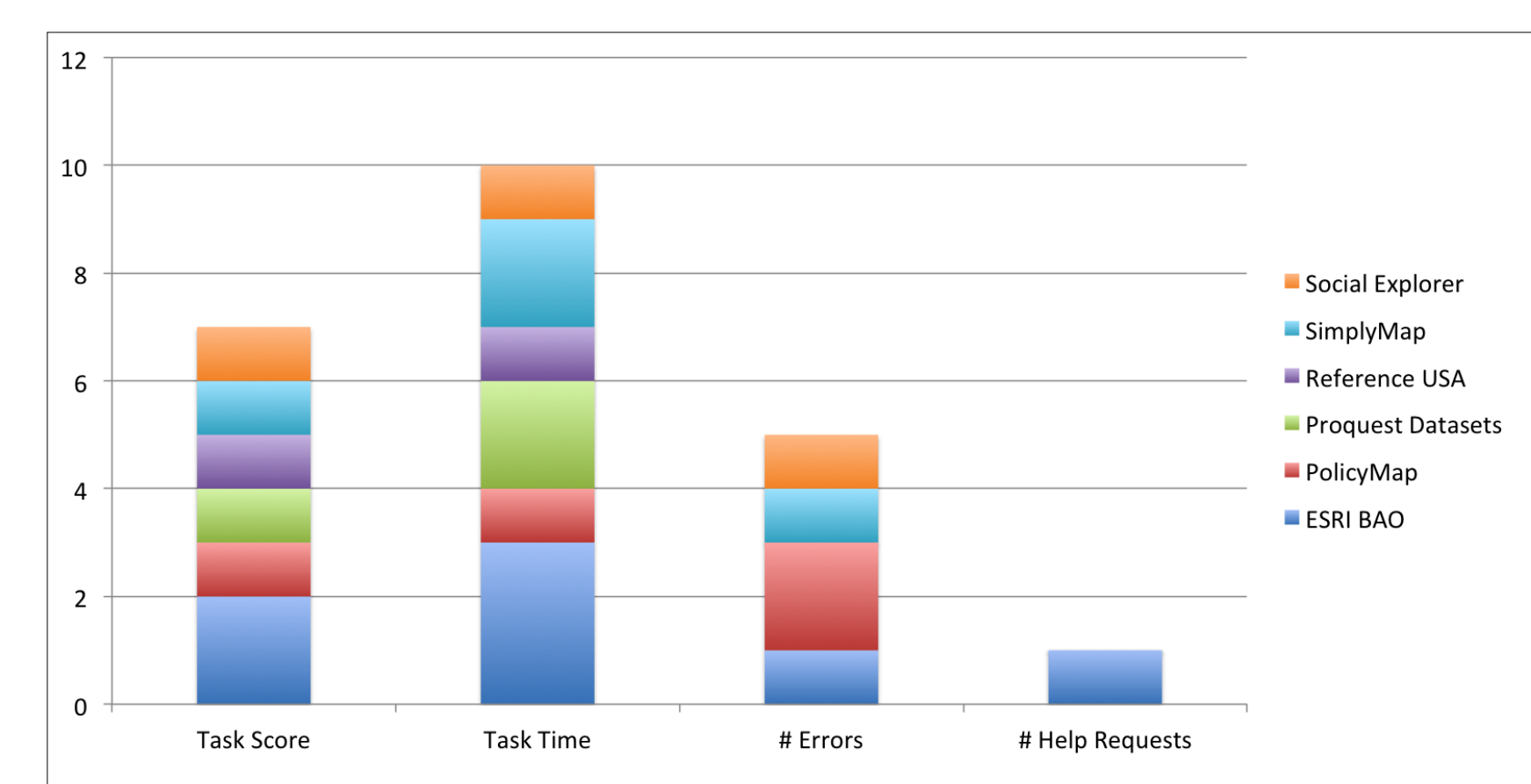
2. Change the map unit to display the information by zip code;
3. Change the colors of information areas on the map;
4. Change the data ranges corresponding to the different colors;
5. Search for another location on the map;
6. Export and save the map.

We collected the following response measures:

1. Score of the successfulness of each task;
2. Time to complete each task;
3. Number of times help or prompts were needed for each task;
4. Number of times errors occurred for each task;
5. Participants' usability ratings of each application, measured by the System Usability Scale (SUS);
6. Participants' comments during the evaluation.

Results

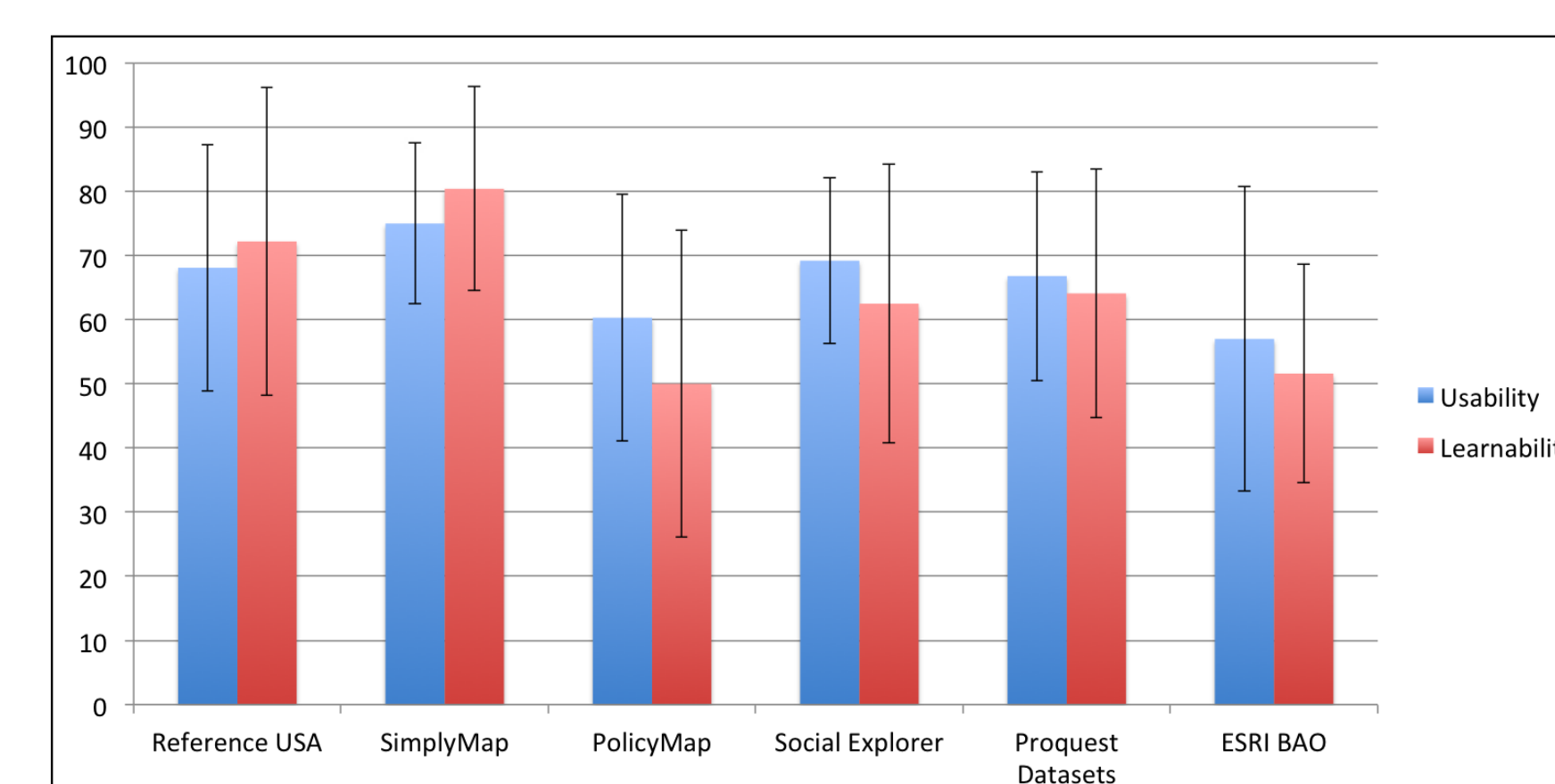
Our evaluation showed that participants encountered the most difficulties and confusions during the first 'creating a customized map' task and the last 'exporting map' task. An important reason is the lack of appropriate guidance on action sequence for new users (i.e., learnability was not well supported). Some applications require time to export maps, thus an effective file-ready notification design is important.



Effectiveness of response measures for revealing usability issues

Metrics developed for revealing violations of usability principles

Learnability	SUS ratings
Flexibility	Task score
	time to task completion
	Participants' comments
Robustness	Task score
	Number of errors
Aesthetics	Participants' comments



System Usability Scale (SUS) ratings for applications