Usability Assessment of the Missouri Cancer Registry’s Published Interactive Mapping Reports: Round Two

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BACKGROUND

- Health-related data’s users often have trouble understanding and interpreting combined statistical and spatial information.
- This is the second round of a usability study conducted after we modified and simplified our tested maps based on the first round’s results: the initial study was conducted with seven participants who were academic health professionals.
- We assumed that the first round’s results might be tightly connected to the insights of the academic health professionals; for that reason, we conducted this round with health professionals who handle cancer registration, analyze incidence/mortality data, advocate for cancer-related policy changes, etc.

STUDY AIMS

- To explore if the tested maps’ usability improved by modifying the maps according to the first round’s results.
- To evaluate if and to what extent users’ actions may be influenced by a user’s demographic information, experience, education level and work type.

METHODS

- We recruited 13 cancer professionals attending the North American Association of Central Cancer Registries (NACCR) 2016 Annual Conference.
- The study involved 3 phases per participant: a pretest questionnaire, the multi-task usability test and the System Usability Scale (SUS).
- Software was used to record the computer screen during the trial.
- We measured several qualitative and quantitative usability metrics. The study’s data was analyzed using spreadsheet software.

TESTED MAPS

- Area Health Profile Map (https://goo.gl/s2Ht6m)
- Double Map (https://goo.gl/huy9fC)

RESULTS

- **Effectiveness by Participant**
  - Task Completion Rate for All Tasks Per Participant
  - Blue bars indicate participants who finished the task with >70% TCR; Purple bar indicates a participant who finished the trial with <70% TCR.
  - **Effectiveness by Task**
  - Task Completion Rate Per Task for All the Participants
  - Blue indicates tasks involving the Area Health Profile (Tasks 1-6); red indicates tasks involving the Double Map (Tasks 7-10).

- **Efficiency**
  - **Time-based Efficiency by Task**
  - Time Based Efficiency Per Task
  - Orange indicates tasks with 100% ORE per task, blue indicates task with less than 100% ORE per task.

- **Overall Relative Efficiency (ORE) per Task**
  - Overall Relative Efficiency Per Task

- **User Satisfaction**
  - SUS Scores of the Study Subjects
  - Brown color indicates SUS score of ≥68 points, and blue color indicates SUS score of <68 points.

- **Factors that affected participants’ performance**
  - The Compared Factors
  - Education Level vs TCR
  - Work Type vs TCR
  - Previous Experience in GIS Use vs TCR
  - Previous Experience in Healthcare Field vs TCR

- **Correlation between Studied Usability Elements (Effectiveness, Efficiency and Satisfaction)**
  - The Compared Factors
  - TCR vs SUS Score
  - TCR vs TBE
  - Efficiency Per Participant vs SUS Score

- **ROUND 1 PUBLICATION & CONTACT INFORMATION**
  - The results of the first round have been published:
    URL: https://goo.gl/v2R669.
  - For more information about the two rounds of the study, contact us at:
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DISCUSSION

- The trial was conducted effectively despite the diversity in the education, public health and GIS experience of the subjects.
- A PhD holder with cancer and public-health field experience could not achieve the minimally acceptable TCR, while the other lower educated and less experienced subjects could handle the test effectively.
- The easy-ranked tasks were accomplished more effectively than the tasks ranked as complicated. These findings support the previous study’s findings.
- Task #6—a complex task—was conducted successfully in both study rounds, possibly because:
  - It is linked to prior tasks and easier to handle after the subject has solved the preceding tasks.
- As we revealed from the first round, this round of the study found that some subjects took longer to accomplish the tasks effectively than others for even the simply-ranked tasks.
- Repeating and retrying preceding tasks facilitated the completion of some complicated tasks.
- Both rounds have averages and medians of less than 68 points on the SUS scale.
- Second-round subjects, while less educated, had comparable satisfaction results to first-round subjects, who held graduate degrees and had experience in statistical and epidemiological knowledge as well as previous experience in using GIS tools.
- We assumed that when we updated our maps according to the first round’s results, we simplified our tested maps to fit the needs of our potential users of different experience levels.
- By updating the maps, we made the maps more user-friendly and the participants conducted the trial more efficiently.

CONCLUSIONS

- The current study, unlike the previous round, did not detect a statistically significant relationship between the subjects’ performance on the study’s test and having previous experience in using GIS tools.
- Updating the tested maps and tasks made the reports simpler to use, even by users without previous GIS experience.
- The mapping reports should be refined and modified to correct revealed usability concerns and to meet perceptions and requirements of the maps’ potential users.
- The two-round study methodology could be applied on other MCR-ARC atlases and might serve to improve the usability of these maps.
- Including GIS tools’ users should be considered at the initial phases of planning and creating GIS reports.

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*:* The total time in seconds of the whole trial per participant

1, 2, 3 = Notes related to data’s users often have trouble understanding and interpreting combined statistical and spatial information.

1, 2 = Notes related to the diversified education in the second round of the usability study.

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