Reproducibility review of: Does spatial thinking ability relate to performance when using web-mapping services? A survey with digital natives

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Reviewed paper

Tomai, E., Kokla, M., Charcharos, C., and Kavouras, M.: Does spatial thinking ability relate to performance when using web-mapping services? A survey with digital natives, AGILE GIScience Ser., 4, 13, https://doi.org/10.5194/agile-giss-4-13-2023, 2023

Summary

The authors provided code and data were able to **partially reproduce** the results presented in the figures and tables of the reviewed paper, but some of the tables were not fully reproduced. The paper includes the DASA section. The author provide all the data and code through figshare. Both R and RStudio are required for the reproducibility of the authors work. For the reproducibility of the work, the authors provided R script *survey_2021.R* along with having data in *dataset.7z*.

Reproducibility reviewer notes

1. Code and Data Repository

The authors didn't shared any github repository so it was unable to fork repository. The authors share the data and code through figshare.

2. R Environment Setup

A basic installation of R and RStudio was setup to run the authors code.

3. Installation of Prerequisite Packages

The following packages were needed to run the authors code using following **R** commands through **RStudio Console**:

```
install.packages("tidyverse")
install.packages("DescTools")
install.packages("gdata")
install.packages("stats")
install.packages("psych")
install.packages("rstatix")
install.packages("RColorBrewer")
install.packages("readr")
install.packages("ltm")
```

4. Setup Current Working Directory

I followed the following instruction to setup the current directory for my **R** environment on my local machine:

```
setwd("agile-reproducbility-2023/4590/")
```

5. Results Reprdouction - Figures

Figure 1 shows the use of PCs and smart devices by different group of participants. The figure in the report is generated from the code of the authors. The figure is similar to the one presented by the authors in the manuscript.

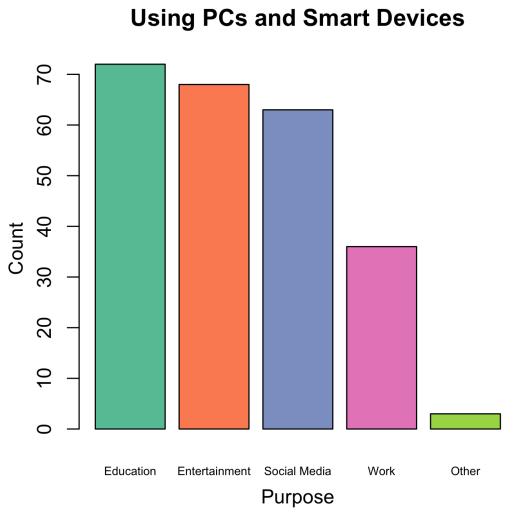

Figure 1: Reasons for using computers and smart devices

Figure 2 visualizes the degree of familiarity of the participants with three web-mapping services i.e., Google Maps, Bing Maps and HERE WeGo respectively. The figure in the report below is generated using authors code which is similar to the authors presented in the manuscript.

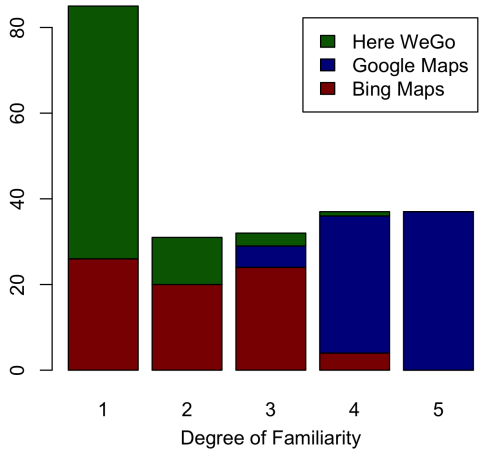

Figure 2: Degree of Familiarity

Figure 3 depicts to compare the accuracy of the participants answering the *Spatial thinking ability test (STAT)* questions. The produced figure from the authors code depicts the same results as mentioned in authors manuscript.

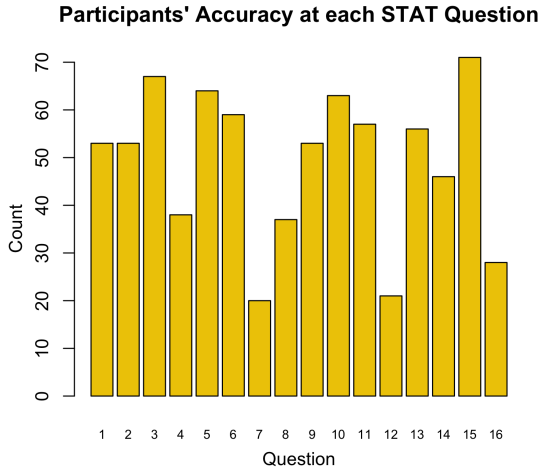

Figure 3: The number of participants who correctly answered each STAT question

Figure 4 shows the STAT score of the sample 74 undergraduate university students using a Boxplot with average score of 11. The produced figure from the authors are similar to the one in the manuscript.

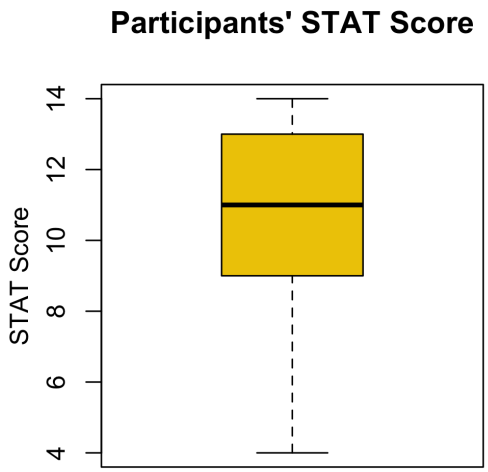

Figure 4: Boxplot of participants' STAT scores

Figure 5 shows the Boxplot of participants score for *Digital Natives Assessment Scale (DNAS)*. The mean score of the DNAS for sample is 105.51±13.98.The produced figure from the authors are similar to the one in the manuscript.

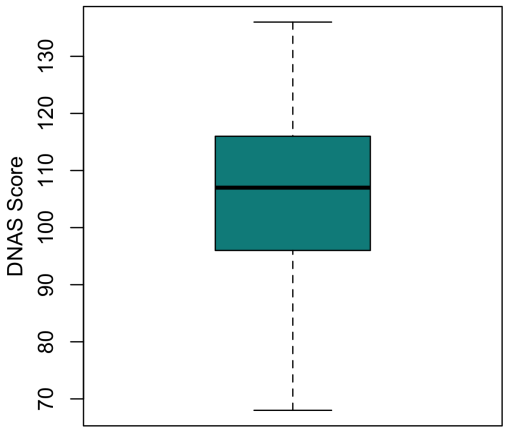

Figure 5: Boxplot of participants' DNAS scores

Initially, there was some patch of code missing to generate Figure 6 and Figure 7. The error in the code was **missing columns in GMHWG CSV** file. The communication with authors provide me the updated code to sort out the issues. The news code generated the Figure 6 but with issues to generate the Figure 7 with **missing columns Sum_GM_Group2** which is sorted in the updated code provided by the authors.

Figure 6 shows the comparison of accuracy of tasks performance of 37 participants using Google Maps and Bing Maps . The produced figure from the authors are similar to the one in the manuscript.

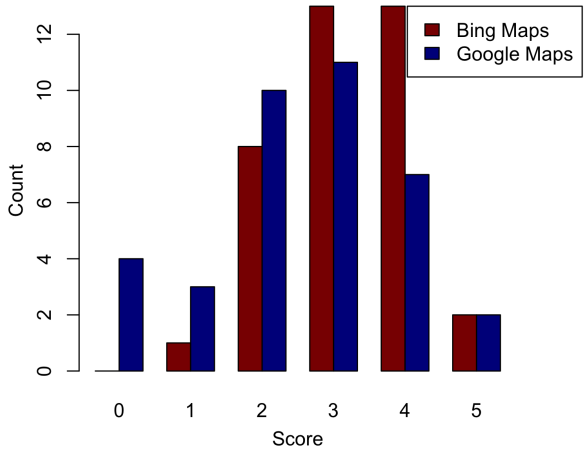

Figure 6: Tasks Scores of 37 Participants using Bing Maps; M=3.19 and Google Maps; M=2.54 (Group 1)

Figure 7 shows the comparison of accuracy of tasks performance of 37 participants using Google Maps and HERE WeGo (HWG) . The produced figure from the authors are similar to the one in the manuscript.

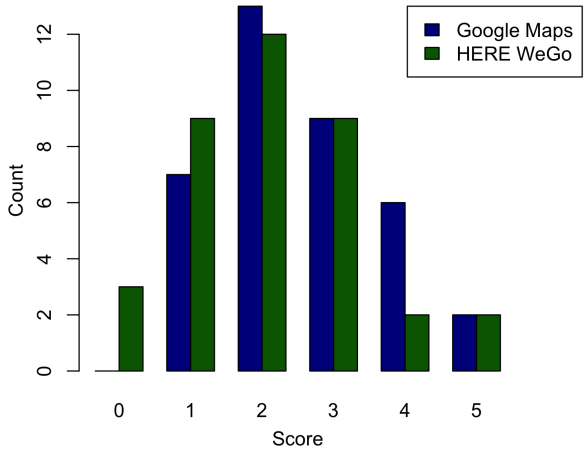

Figure 7: Tasks Scores of 37 Participants using Google Maps; M=2.54 and HERE WeGo; M=2.11 (Group 2)

6. Results Reprdouction - Tables

The authors provides the code to reproduce the tables in the manuscript after communication. However, there was instructions missing to reproduce the tables. It was difficult to follow the different results computed by the authors for different tables. However, I found the values that were mentioned in the Table 5. The values computed in Table 5 is quite similar to the author table mentioned in manuscript. However, I found slightly different the value of **HWG** in Table which is **55.7** in the computation.

The overall comments on the Table reproduction is as follows:

- **Table 5** was reproducible

Comments to the authors

- The **README.txt** should be **README.md**.
- The README.md should contains the instructions that how one could setup the environment and configure the environment to run the code along with access to data.
- It could be better to have github repository for the provided script.
- It could be nice to have a license file whiling sharing the code. _ Please provide some easy way to produce the results of tables. In the current version of the computation, it is quite difficult to follow the results of the computed variables mentioned in the manuscript of the authors.