StatLearning: A shiny app for practicing statistical hypothesis testing

Juan Claramunt González, Frank Busing
Institute of Psychology, Leiden University, Leiden, the Netherlands
j.claramunt.gonzalez@fsw.leidenuniv.nl

Universiteit Leiden
The Netherlands

useR! Salzburg 2024

1. Goals of StatLearning

- **Individualized education**: Each student makes his own decisions on how to practice and learn the statistical tests.
- **Unlimited number of exercises**: Students can practice according to their needs.
- **Practice at home**: Use the workgroup time for theoretical questions and improve comprehension.

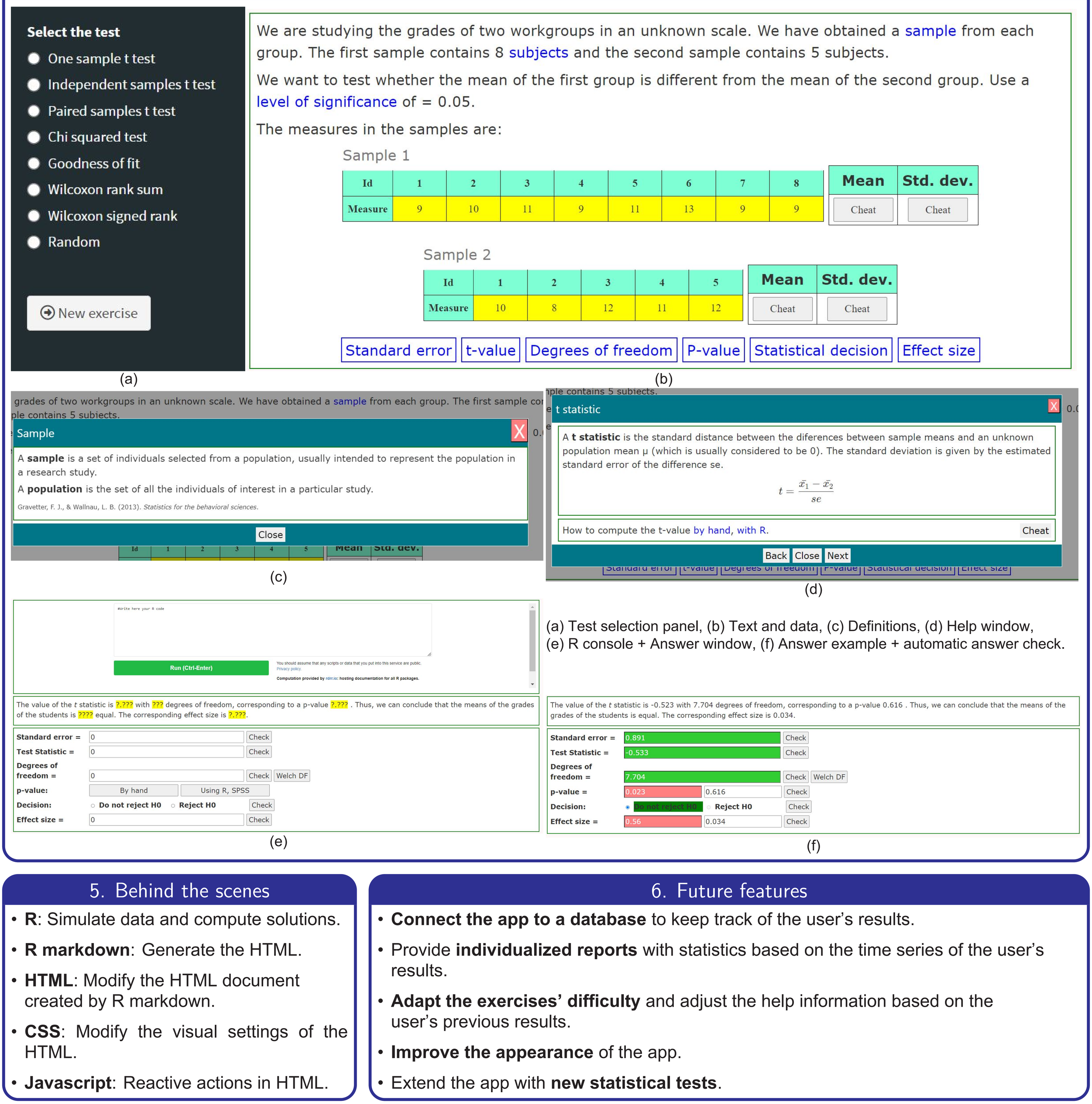
2. Learning preferences

- **Reading**: Prefer reading texts and examples given in papers and books.
- **Listening**: Prefer listening to podcasts or videos of explanations on specific topics.
- **Watching**: Prefer watching videos with explanations and examples on specific matters.
- **Doing**: Prefer doing computations either by hand or coding (using R).

3. Features

- Definitions statistical concepts
- Texts and videos on how to compute the statistics step by step by hand or using R.
- Integrated R box to compute the results.
- "Cheat" button to skip computations.
- Automatic answer check.
- Statistical conclusion written in a text format.

4. The app



(a) Test selection panel, (b) Text and data, (c) Definitions, (d) Help window, (e) R console + Answer window, (f) Answer example + automatic answer check.

5. Behind the scenes

- **R**: Simulate data and compute solutions.
- **R markdown**: Generate the HTML.
- **HTML**: Modify the HTML document created by R markdown.
- **CSS**: Modify the visual settings of the HTML.
- **Javascript**: Reactive actions in HTML.

6. Future features

- **Connect the app to a database** to keep track of the user's results.
- Provide **individualized reports** with statistics based on the time series of the user's results.
- **Adapt the exercises' difficulty** and adjust the help information based on the user's previous results.
- **Improve the appearance** of the app.
- Extend the app with **new statistical tests**.