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ASISTEMBE
Analytics, Simulations and Inquiry
in STEM and Business Education
Research Group

# How students learn Statistics: from tracing student's activity in R Commander to the visualization of their work through a Shiny app

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R Commander (Fox 2005) is the most well-known GUI for teaching and learning statistics as it is used all over the world in many Statistics courses. R Commander allows the use of R without compromising the learning process as command line interface to R can be an obstacle to many students (Fox 2005). We have tweaked R Commander so that an activity log of the students' work is obtained. This version of R Commander is used in class to trace the students' work in a planned activity. In order to analyze the work done by students, the instructor may design some milestones. These milestones can be understood as steps in the solving process that identify important achievements of the activity resolution.

The shiny (Chang et al. 2017) app we are presenting provides a user-friendly interface to quickly visually the work done by students and identify those who may require special attention from the instructor. This information consists of the most common functions used to solve the activity, each student's list of actions and when they occurred and charts displaying the amount of time spent working, the amount of actions done and how they are related.

If a set of milestones is specified, the instructor will also obtain information about the proportion of students who reached each milestone, how do different students' performances cluster and a chart displaying the relationship between student's workload, the time spent and a grade estimate.

## R COMMANDER    STUDENTS' LOGS    SHINY INTERFACE
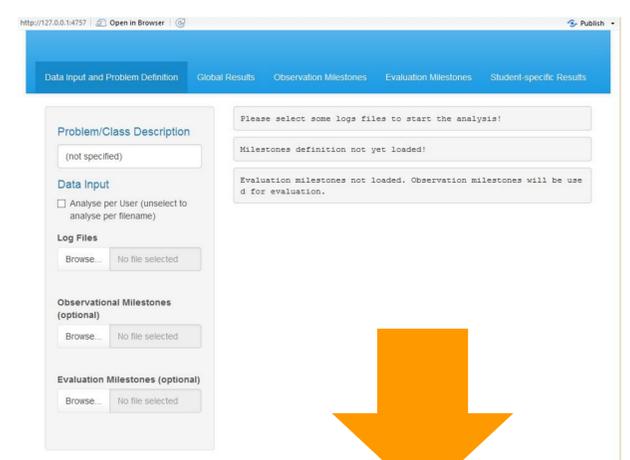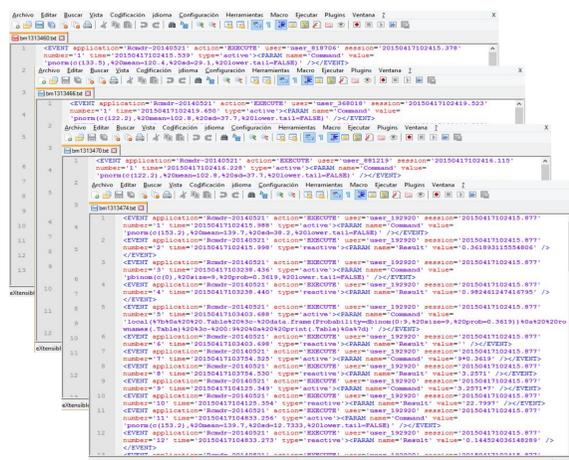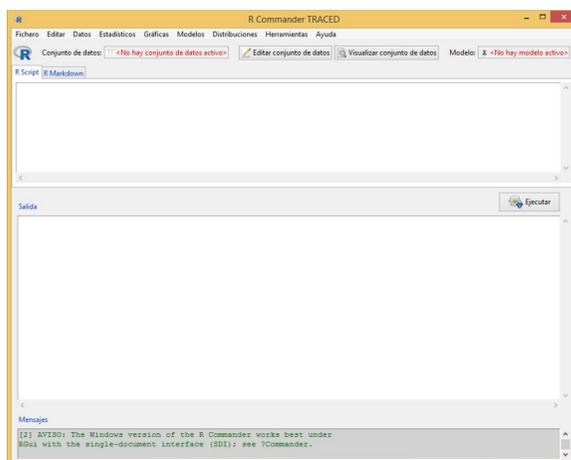


## THE DASHBOARD GENERATES THESE CHARTS TO VISUALIZE STUDENTS' WORK
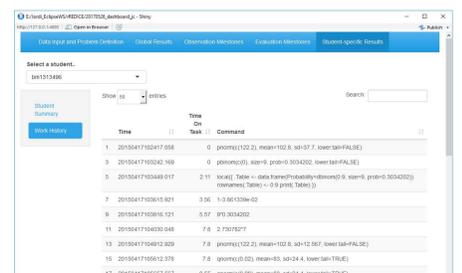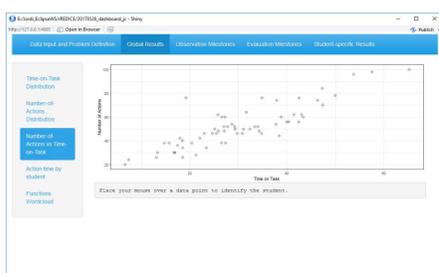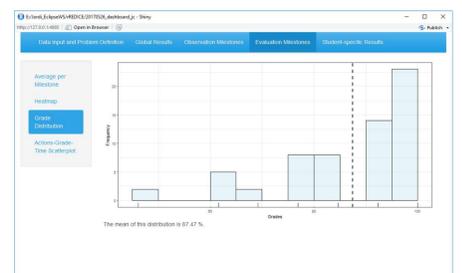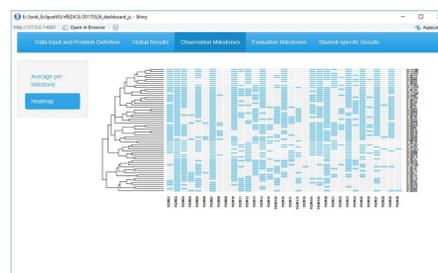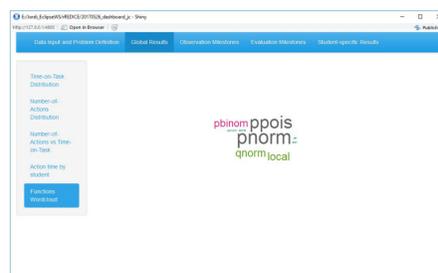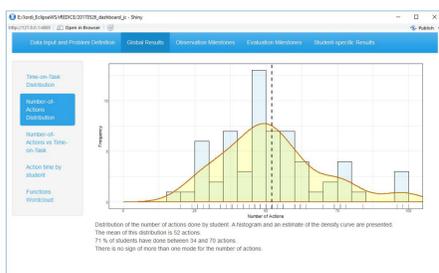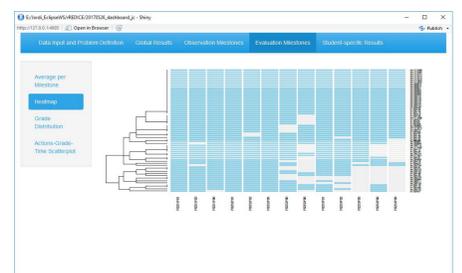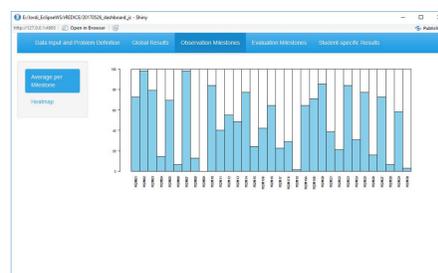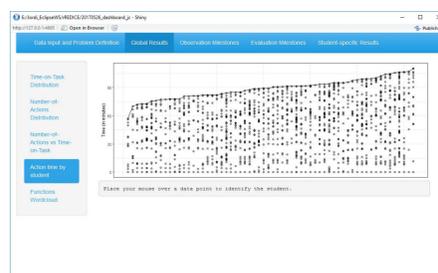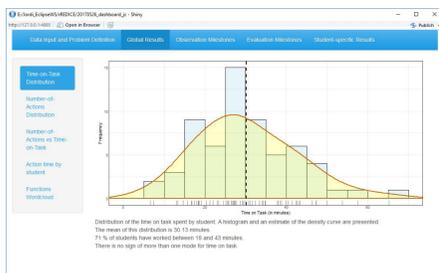


- The combination of R Commander, which allows a suitable setting for a lot of situations in most Statistics undergraduate subjects, and flexibility of regular expressions, makes the presented tool very appropriate for virtually any teaching situation.
- The Shiny application provides a very nice environment for exploring the student's work, detecting special needs and it is specially useful to provide personalized feedback to students. It is known that feedback is a key aspect for improve the learning experience.

## References    Want to see more…

Chang, Winston, Joe Cheng, JJ Allaire, Yihui Xie, and Jonathan McPherson. 2017. *Shiny: Web Application Framework for R*. https://CRAN.R-project.org/package=shiny.

Fox, J. 2005. "The R Commander: A Basic Statistics Graphical User Interface to R." *Journal of Statistical Software* 14 (9). doi:10.18637/jss.v014.i09.