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

Quick Assessment of Open ended Activities in R Commander

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- **Open-ended activities are commonly used in teaching STEM disciplines (problems, cases, projects...)**
- **Assessment is commonly done through reports or closed-form questionnaires**
  - Difficult to grade (Time-consuming)
  - Activities are hard to evaluate
  - Assessment does not reflect students' work and/or students' learning difficulties

Open-ended activities

- **Tracing user actions provides powerful information for educational research and for generating useful feedback for users and instructors:**
  - classification of students
  - identification of plagiarism
  - adaptive behaviour detection
  - disengagement detection
- **Approach to an assisted assessment of open-ended activities**

Using traces to capture students' work

- **R Commander**
  - It's a graphical user interface (GUI) widely used for teaching Statistics.
  - 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).
- **R Commander TR**
  - It's a modified version of R Commander that captures users' actions in a *log* file in the working directory

R Commander TR

```
<EVENT application='Rcmdr-20140521' action='EXECUTE' user=
'user_879903' session='20150410093206.769' number='3' time=
'20150410094141.474' type='active'><PARAM name='Command' value=
'pbinom(c(0),%20size=9,%20prob=0.3294556,%20lower.tail=FALSE)' />
</EVENT>
<EVENT application='Rcmdr-20140521' action='EXECUTE' user=
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'0.972593860817254' /></EVENT>
<EVENT application='Rcmdr-20140521' action='EXECUTE' user=
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'0.3294556*9' /></EVENT>
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'2.9651004' /></EVENT>
```

Traces

- **Dashboard**
  - We have created a web platform that allows the visualization and analysis of the collected traces

- **Both the traced version of R Commander and the dashboard are available at**
  - http://asistembe2.iqs.edu/rcmdrtr/

RCmdrTR dashboard

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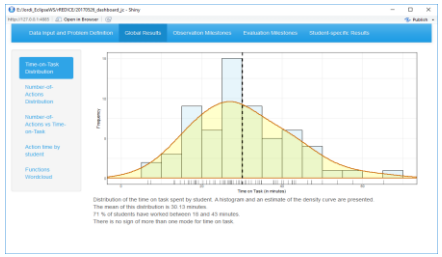
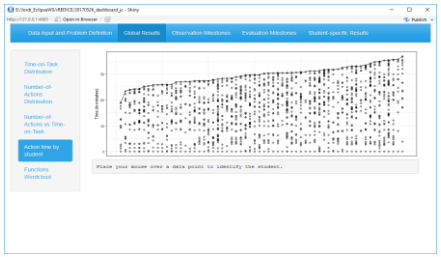

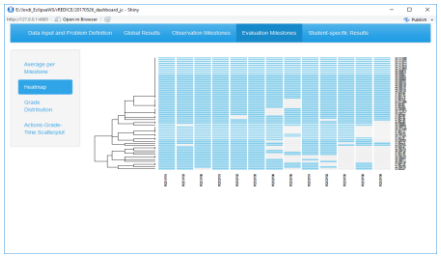
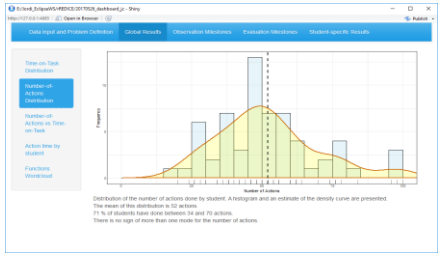
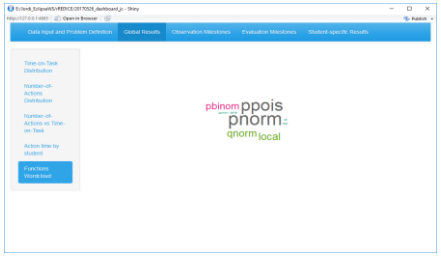

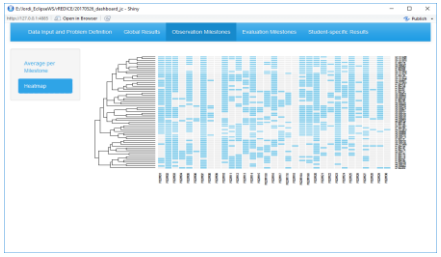
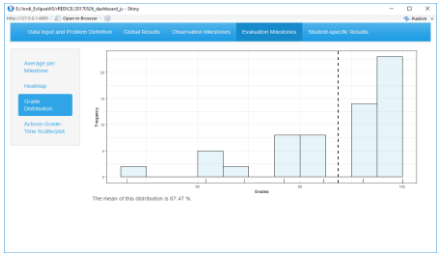
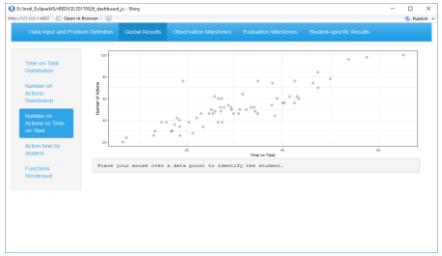
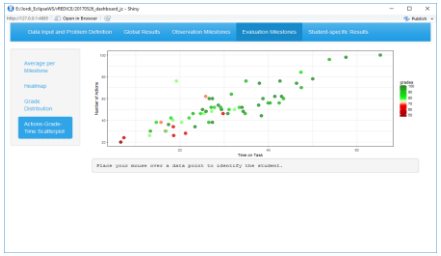
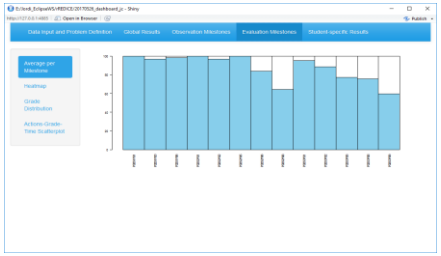
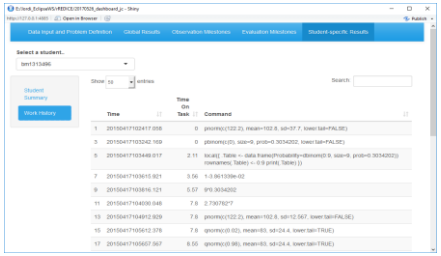

http://asistembe2.iqs.edu/rcmdrtr/

RCmdrTR dashboard

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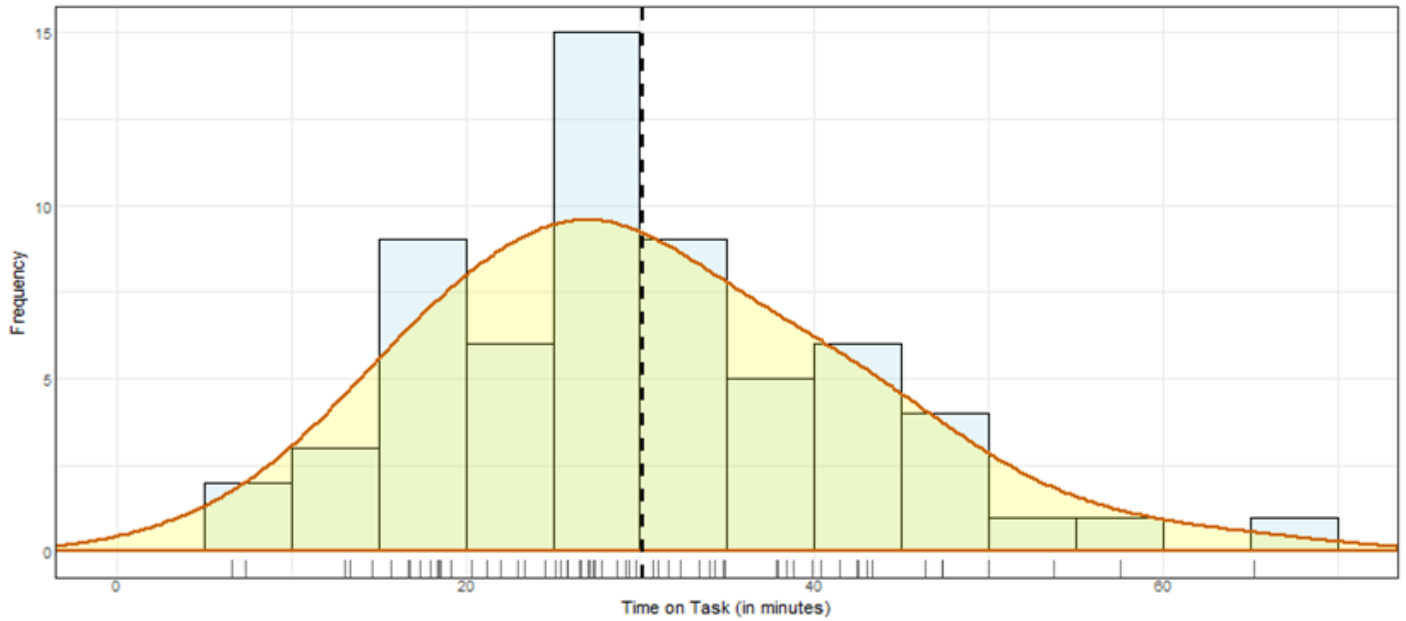
- Time-on-Task Distribution
- Number-of-Actions Distribution
- Number-of-Actions vs Time-on-Task
- Action time by student
- Functions Wordcloud



Distribution of the time on task spent by student. A histogram and an estimate of the density curve are presented.
The mean of this distribution is 30.13 minutes.
71 % of students have worked between 18 and 43 minutes.
There is no sign of more than one mode for time on task.

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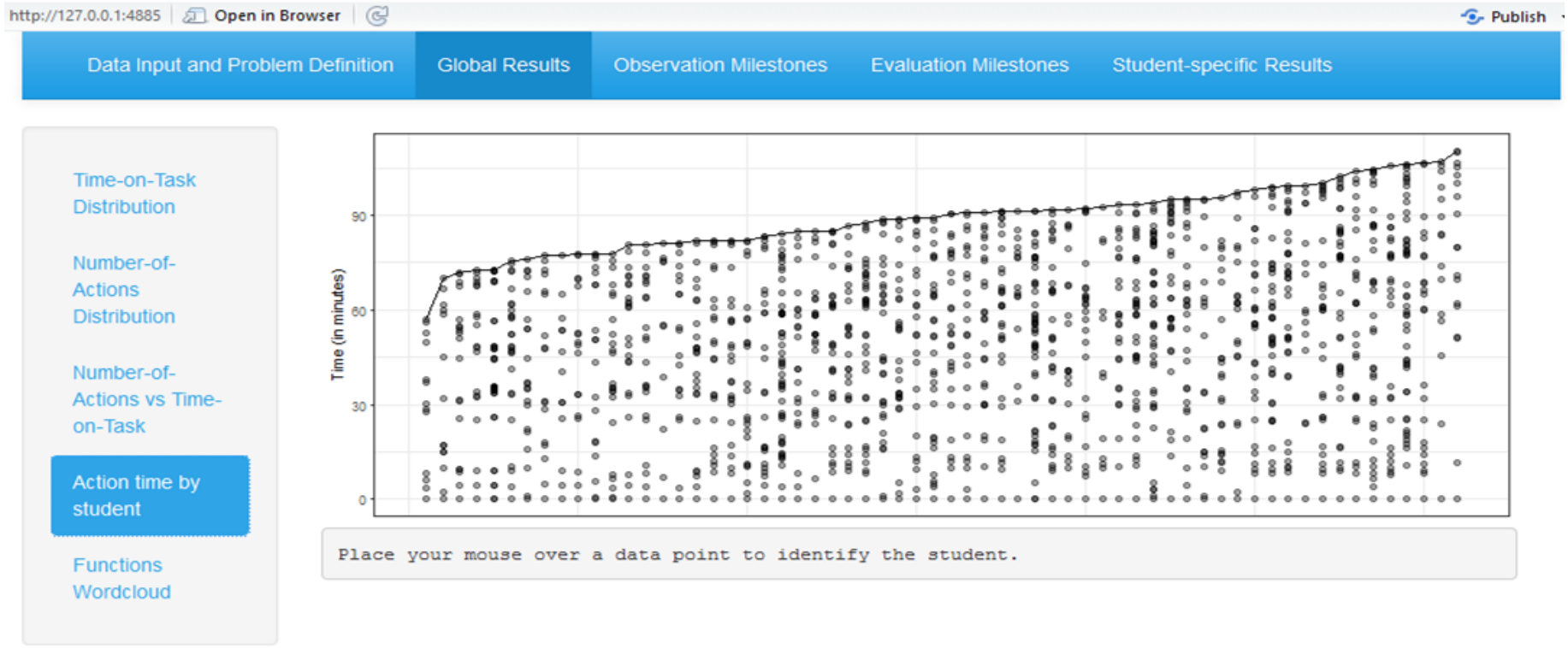

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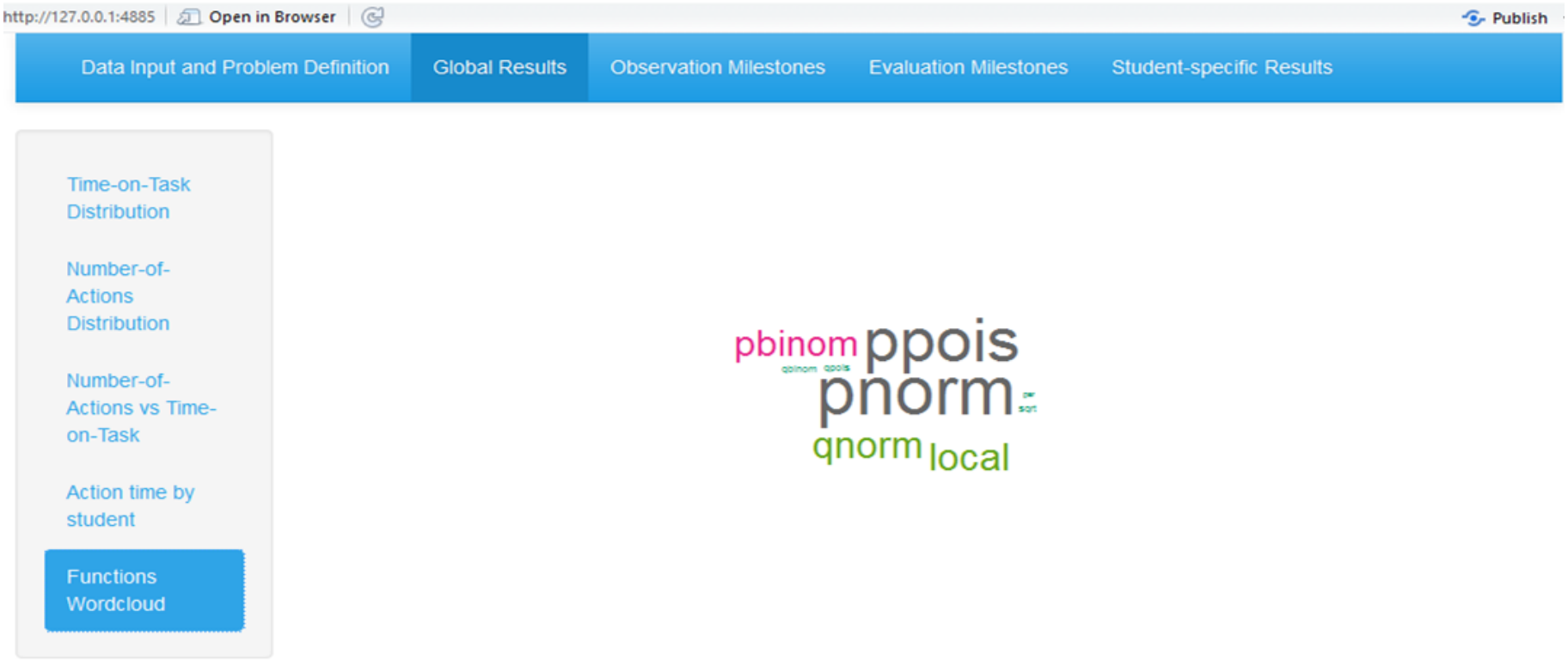

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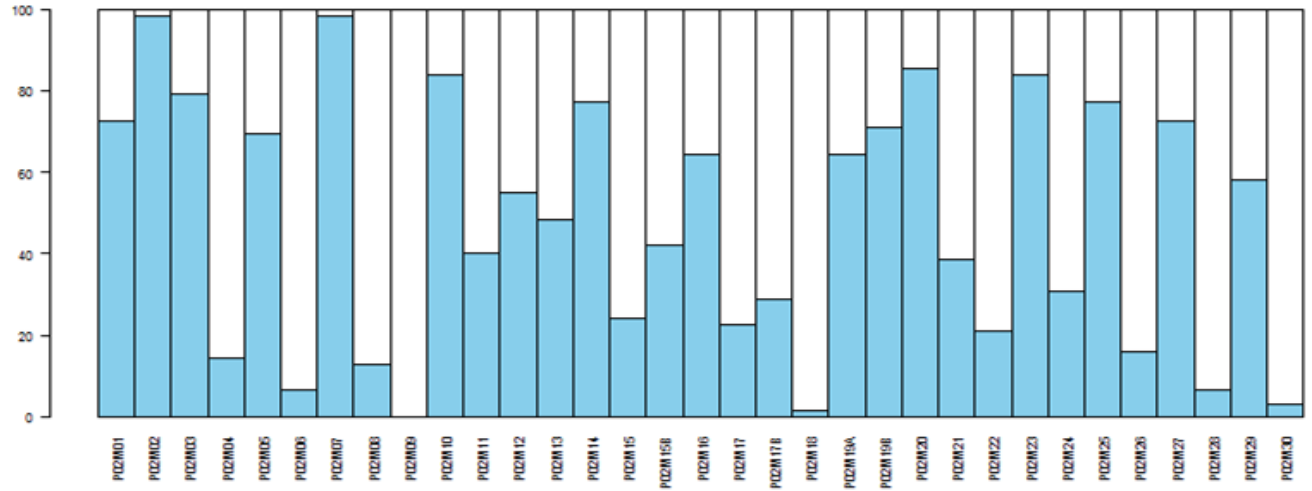
Average per Milestone

Heatmap



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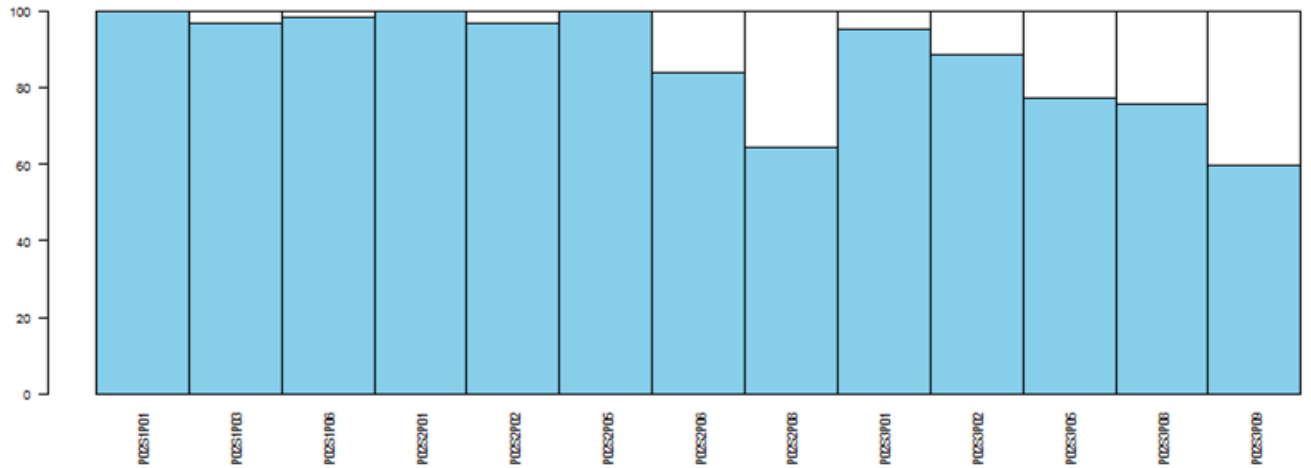
- Average per Milestone
- Heatmap
- Grade Distribution
- Actions-Grade-Time Scatterplot



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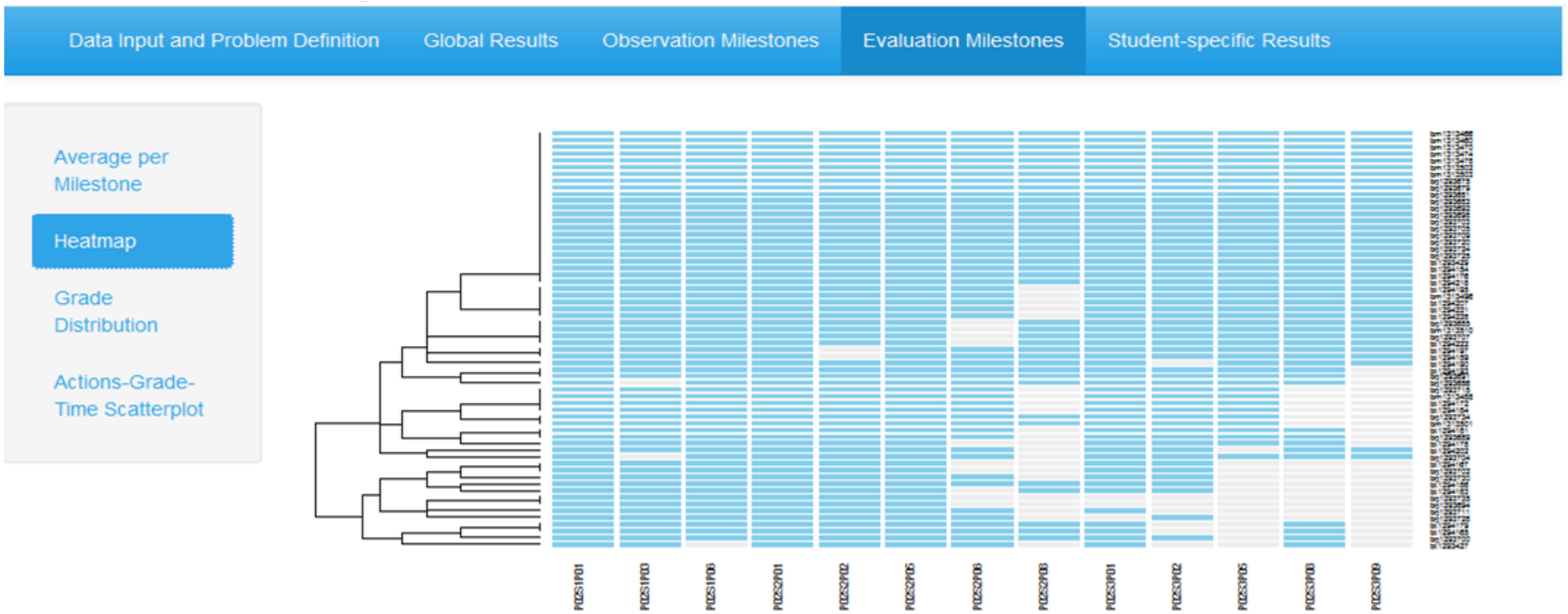

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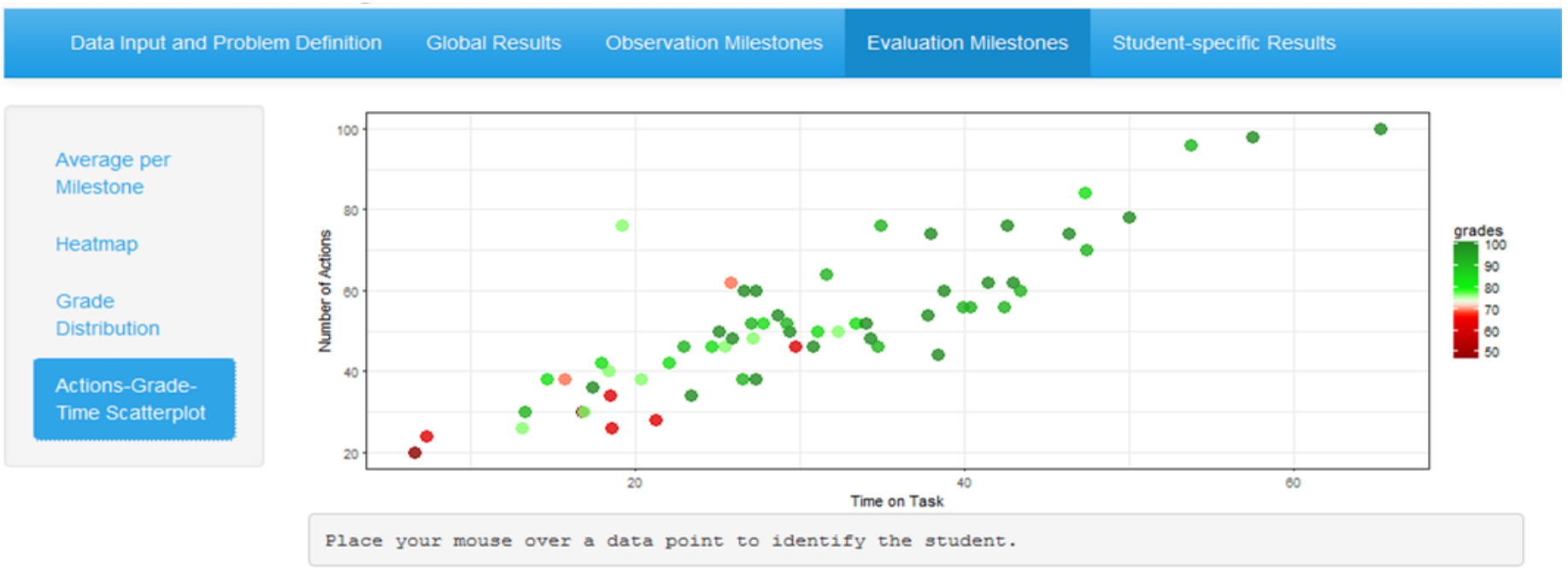

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Acknowledgments

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