

Student coding behavior on large programming assignments

Jaime Spacco

Knox College

Galesburg, IL

jspacco@knox.edu

Davide Fossati

Carnegie Mellon University in Qatar

Doha, Qatar

dfossati@cmu.edu

Mentors: **Kelly Rivers** and **John Stamper**, CMU

LearnLab Summer School 2012

Pittsburgh, PA

August 2012

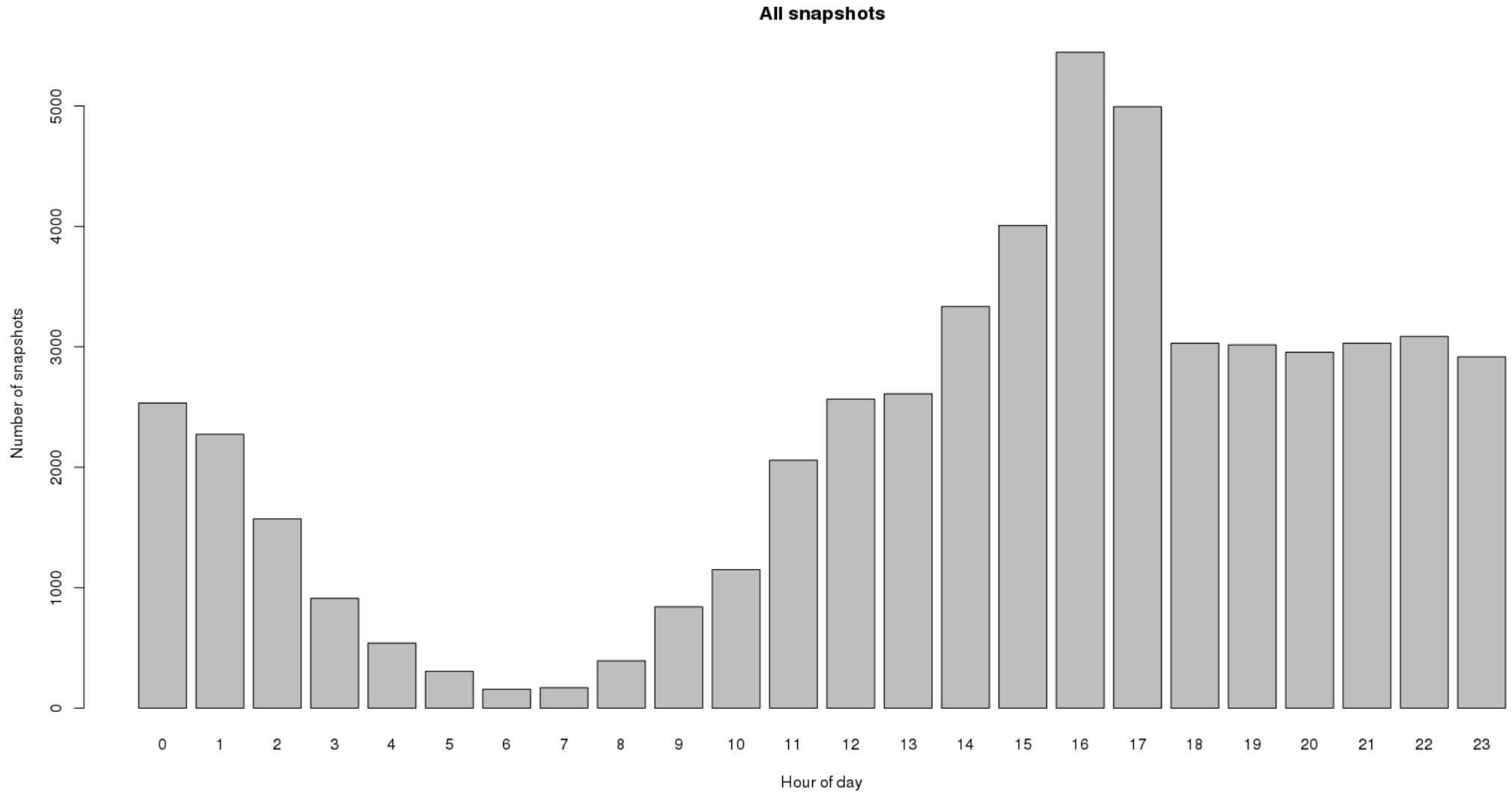
Marmoset dataset

- Collected at University of Maryland in Spring 2006 semester
- CS-2 course taught in Java
- 99 students
- 6 projects
 - JUnit test suite
- 53,895 snapshots after cleanup
 - Captured by instrumented IDE every time students save their files
 - Units tests run against all snapshots

One student's work history viewed with Marmoset

[illegible]

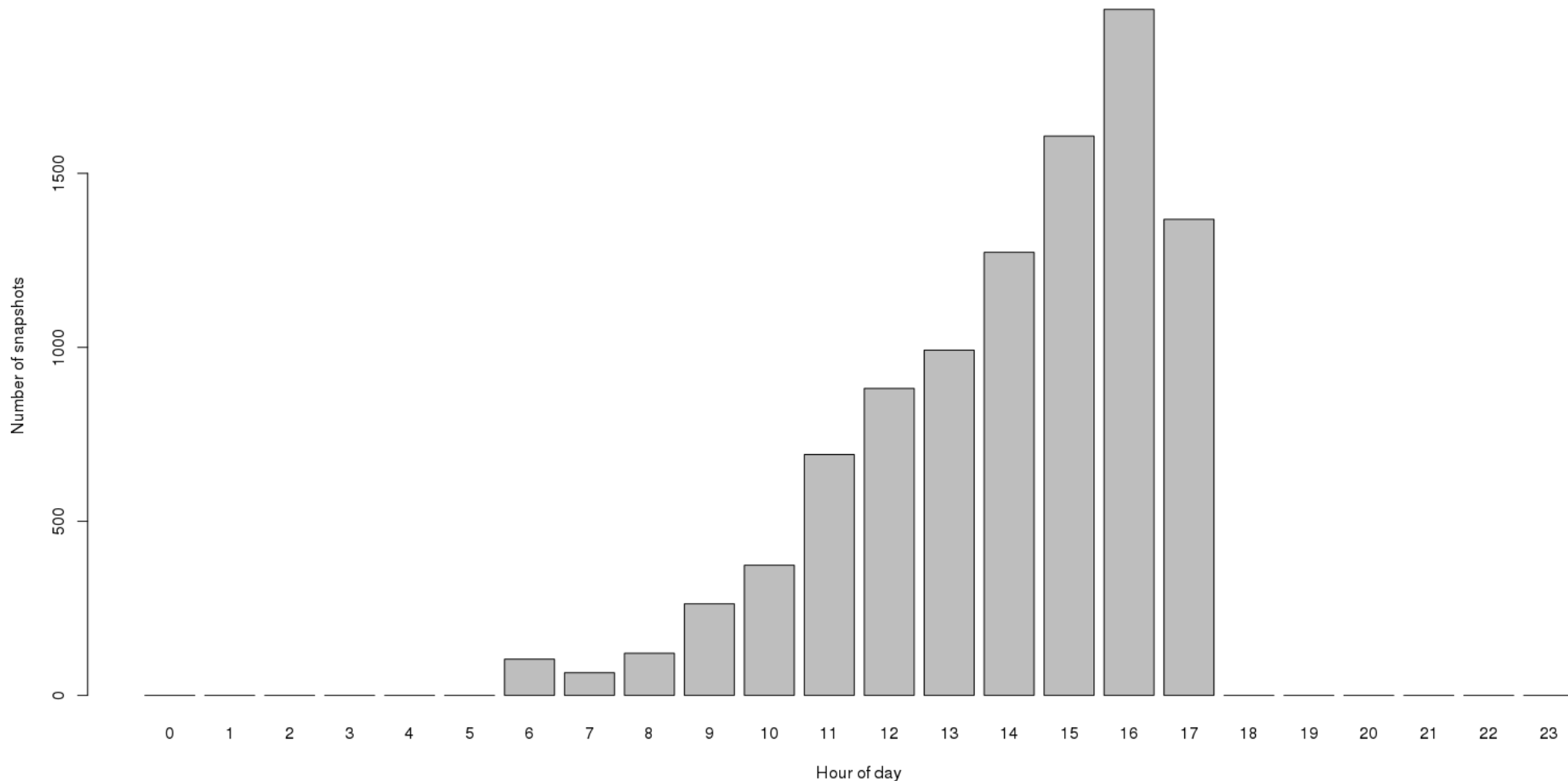
When do students work the most?



Students code the most between 4 and 6 pm

How do students work near deadlines?

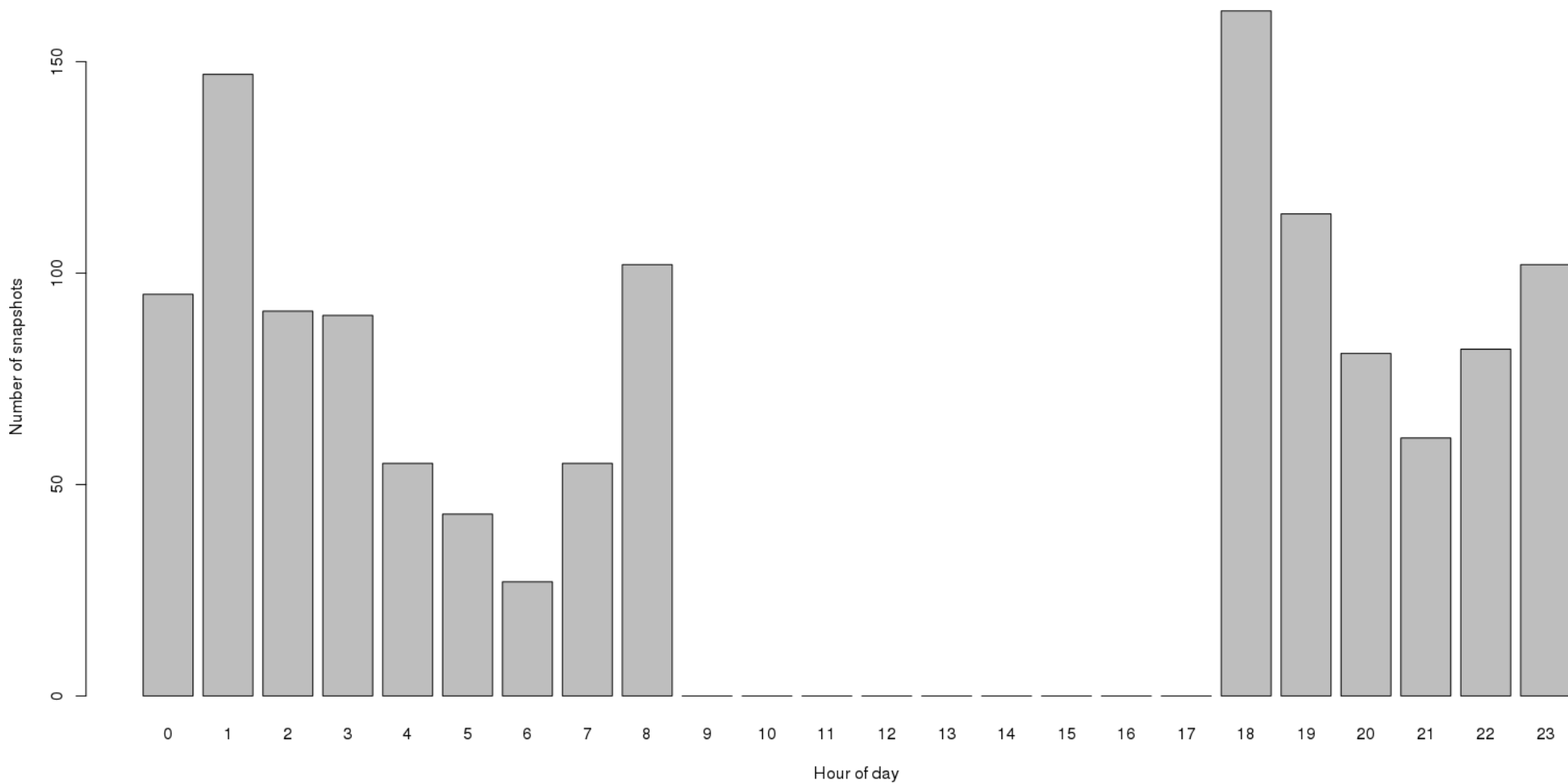
Snapshots 12 hours before the deadline



Students work the most 2 hours before the deadline

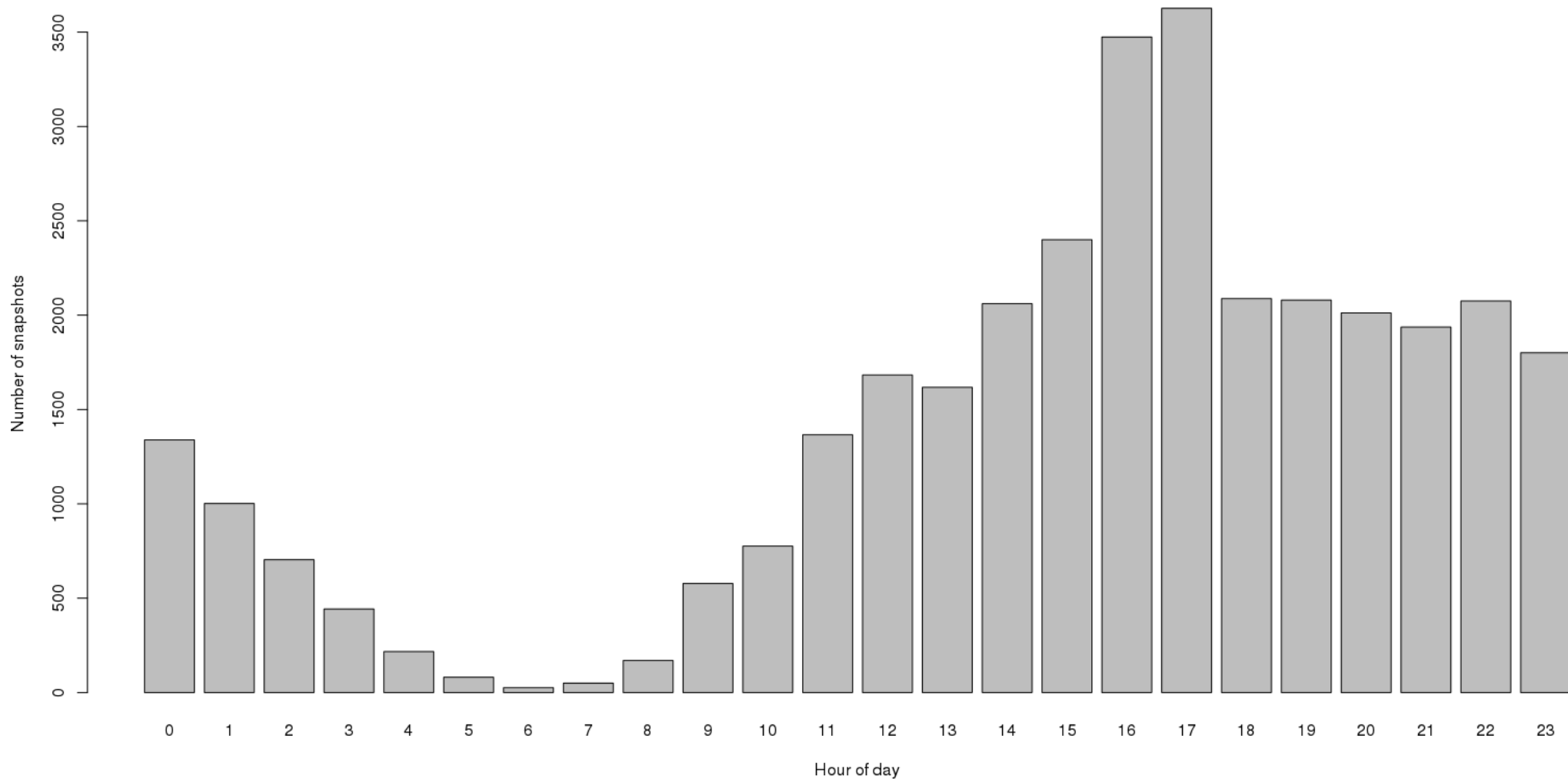
What about late deadlines?

Snapshots after the deadline and before the late deadline



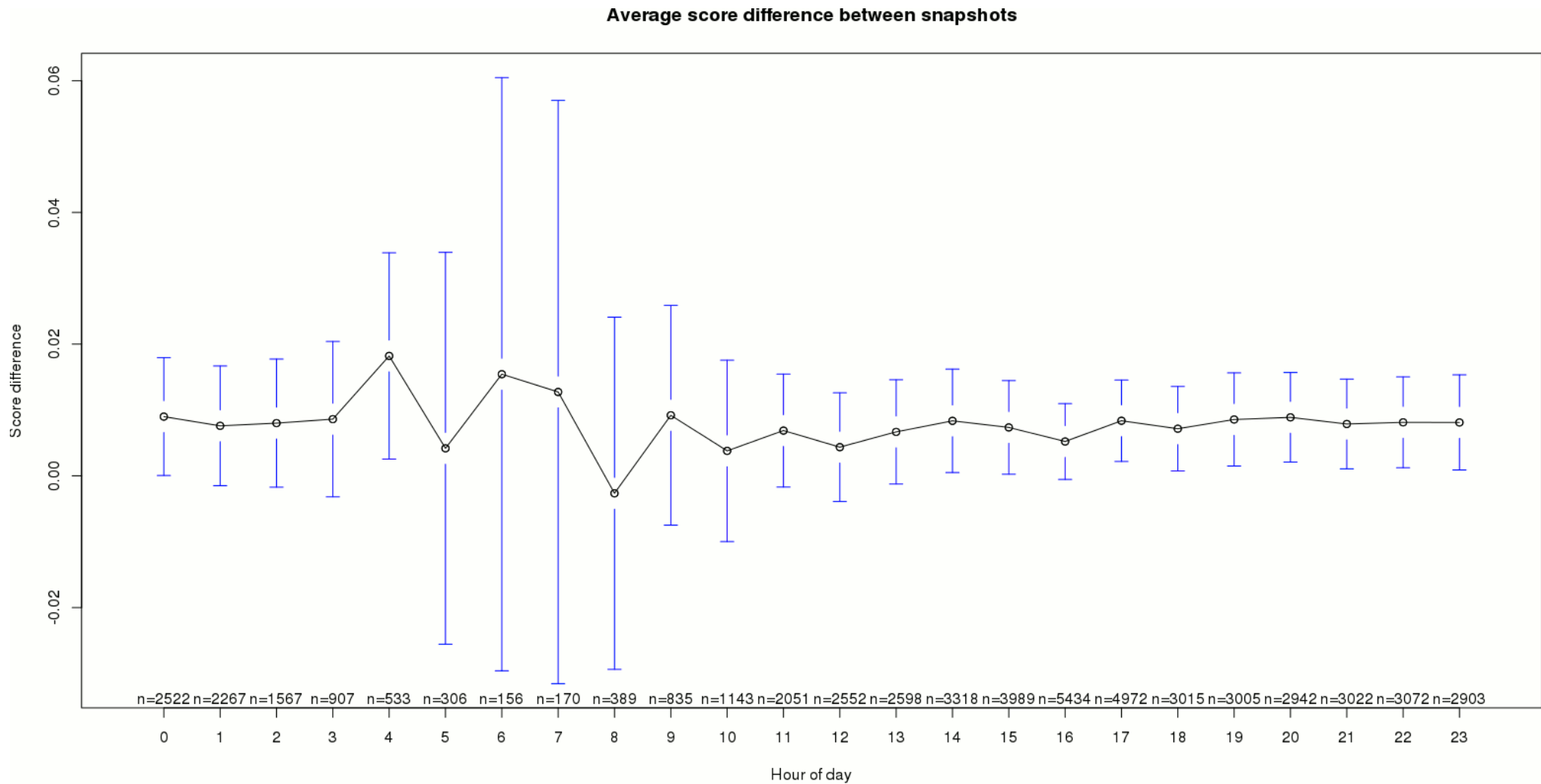
Without the pressure of a deadline?

Snapshots earlier than 24 hours before the deadline



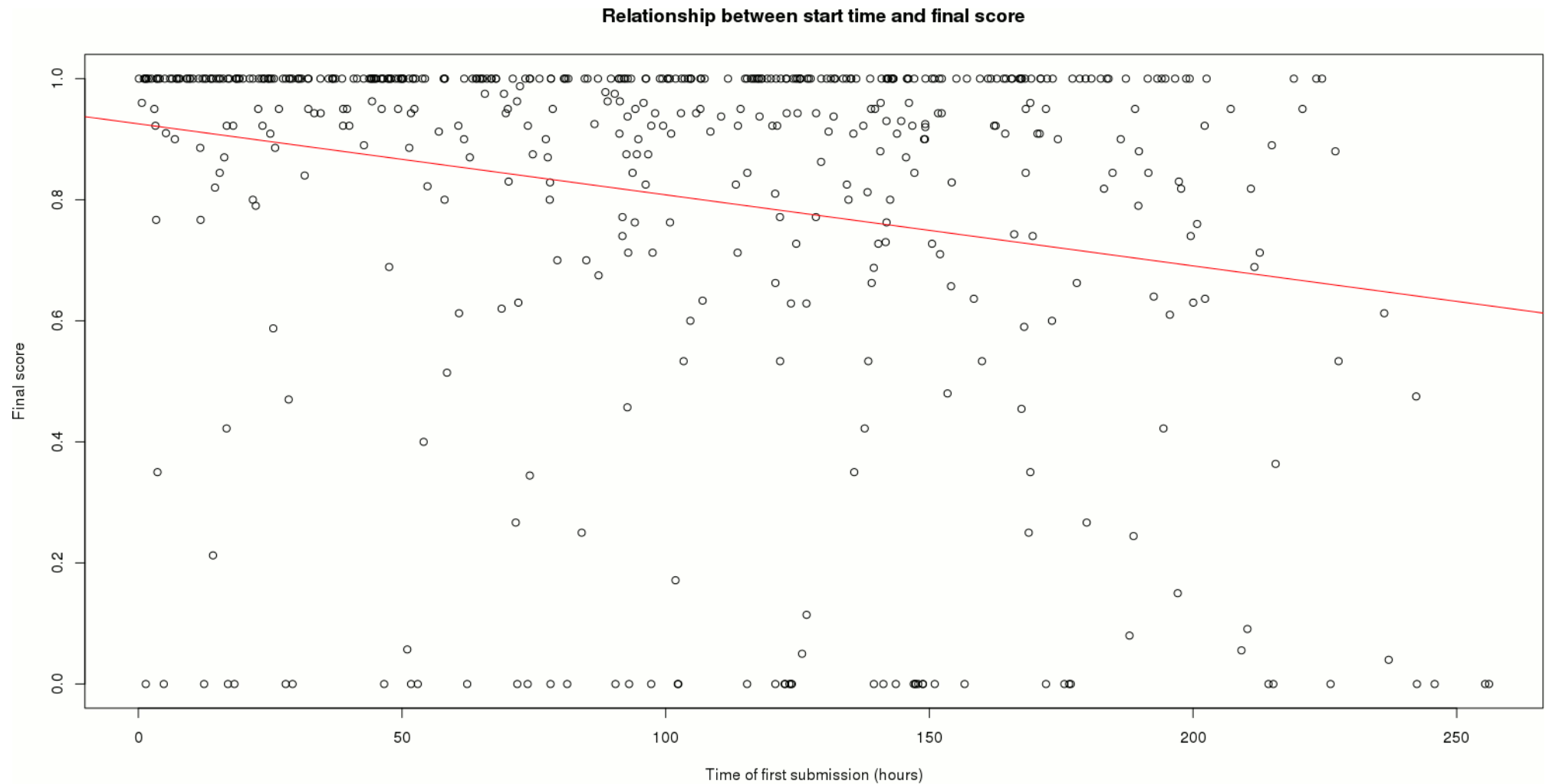
Students still prefer to code between 4 and 6 pm

When do improvements happen?



No significant differences in score improvements at different times of the day

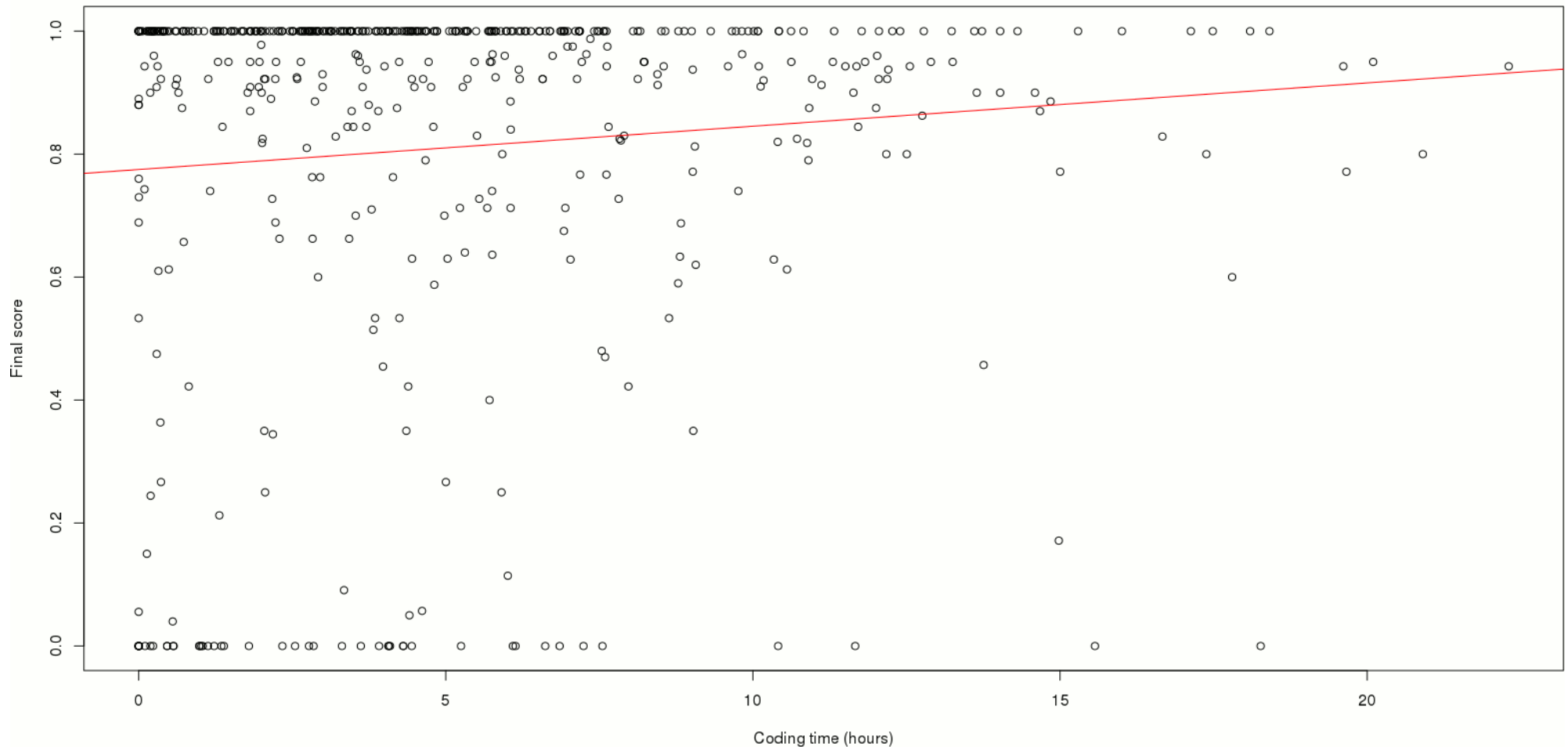
Students who start early get better scores



$b = -0.001173$, $F(1, 522) = 28.72$, $P < 0.001$, $R^2 = 0.05$

Students who code for longer times get better scores, but not much

Relationship between estimated coding time and final score



$b = 0.007046$, $F(1, 507) = 4.824$, $P < 0.05$, **$R^2 = 0.007$**