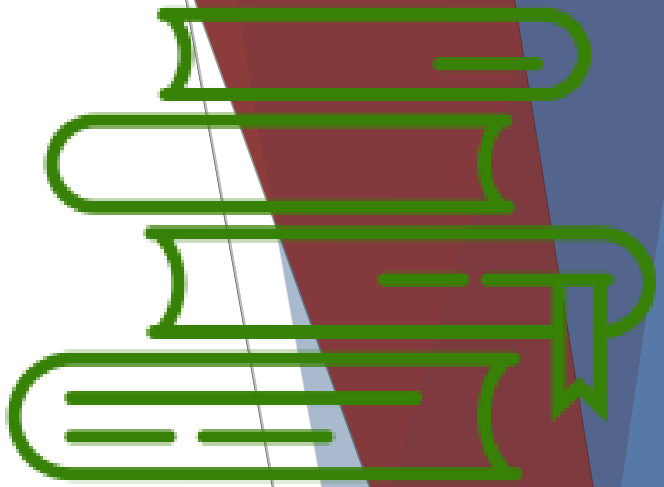
Learning in Nigeria's Schools: Lessons from In and Out of School Children and a Potential Pedagogical Function



Motivation

"if you cannot measure it, you cannot improve it" Peter Ducker

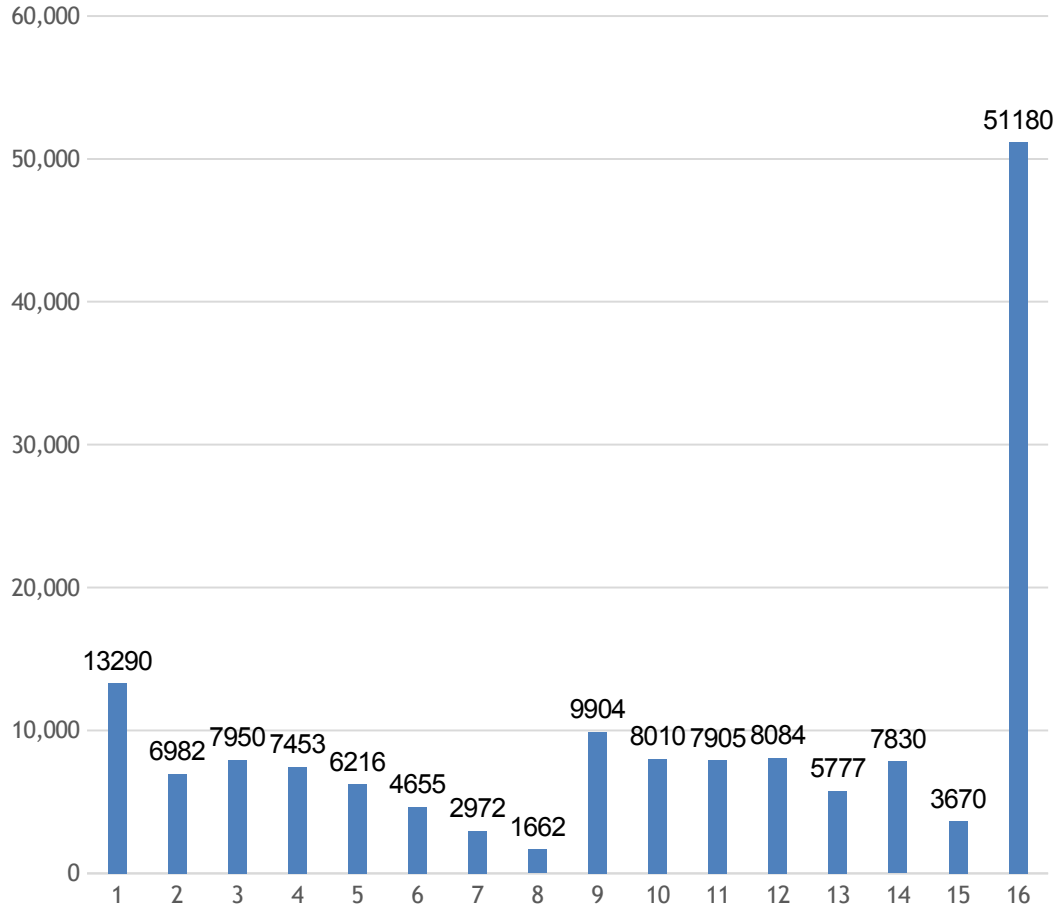
- Like most developing countries, Nigeria is mobilizing national and international efforts to meet the sustainable development goal of inclusive and quality education for all.
- Learning profiles allow for tracking of SDG 4 and assessment of optimal policy response.
- Existing learning profiles in Nigeria are based on Adult Retrospective Surveys using Demographic Health Survey and Multiple Indicator Cluster Survey (see Oye, Pritchett, & Sandefur, 2016).
  - How Current? Based on 15-25years with only primary education.
  - Test mismatch: It tests ability to read a simple sentence about everyday life
  - In-school children are excluded
- Nigerian Education Data Survey is a novel dataset that addresses some of these challenges.

About NEDS Dataset

- National Education Data Survey (NEDS) is the most comprehensive, disaggregated and nationally representative survey on basic education in Nigeria.
- 2015 NEDS is a follow up to the 2013 Demographic and Health Survey (DHS), which is conducted to collect additional data on education from a subset of DHS households.
- The survey has two modules: Parent/Guardian and school age children.
- The same questions were asked of 84832 in-school (pre-primary, primary and junior secondary school) and out-of-school children.

Study Sample

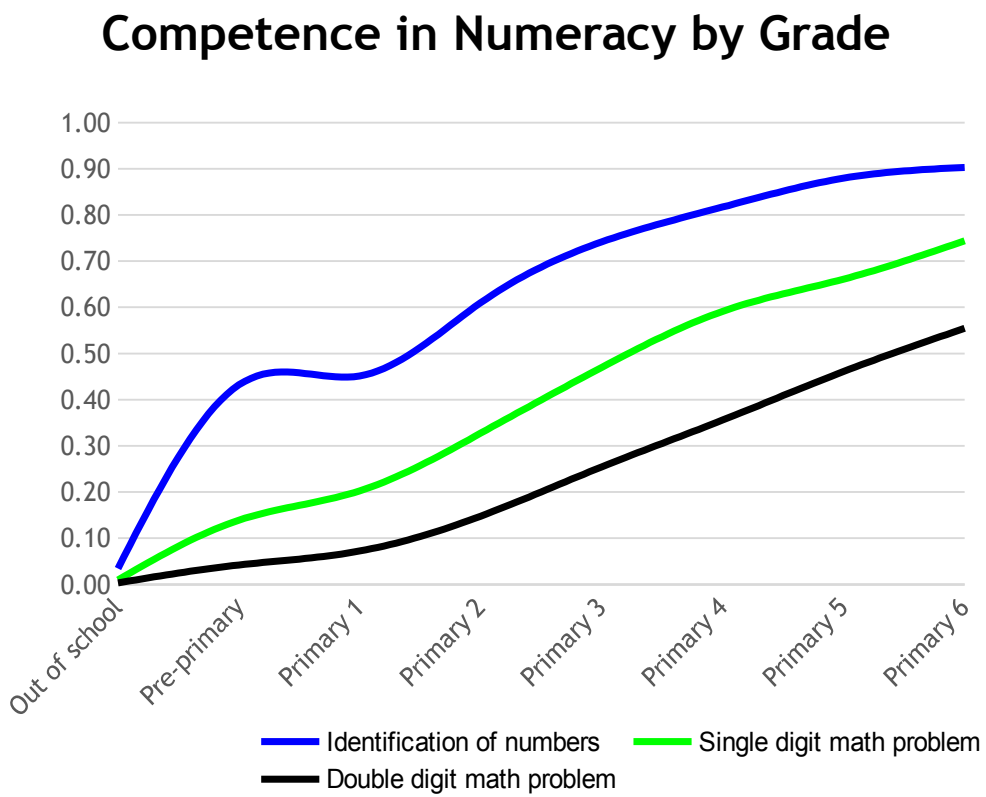
- We use 2015 NEDS to generate a contemporaneous cross-sectional learning profile.
- Focus on pre- and primary school children and out-of-school children from age 5 to 11years (based on official primary school age).
- The analysis covers a total of 51,180 children.

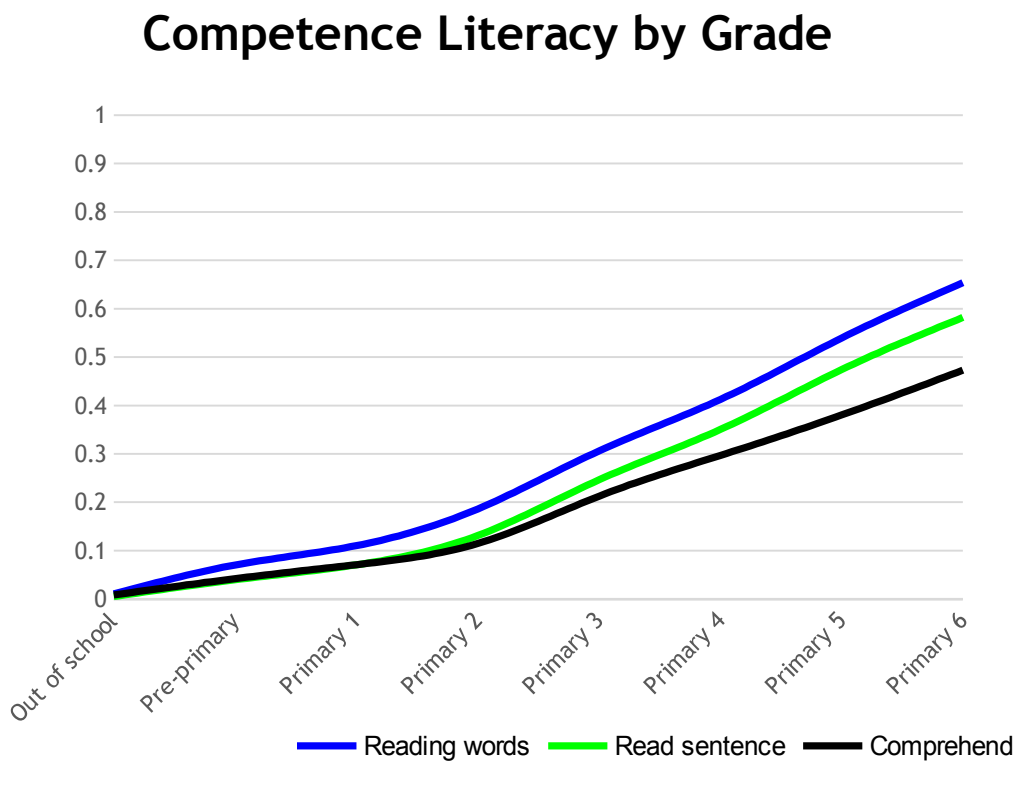


Breakdown of Numeracy and Literacy Assessment

Numeracy assessment	Literacy Assessment	Expected Grade to attain mastery	Expected Age to attain mastery
▪ Identification of numbers ▪ Addition of numbers which sum to less than 10. E.g. 2+3	▪ Ability to read words ▪ Ability to read complete sentences	▪ Nursery & Primary 1	▪ 6 years
▪ Addition or subtraction of double-digit problem. E.g. 17+13	▪ Basic comprehension E.g. Answer True/False to one of the three sentences shown	▪ Primary 2	▪ 7 years

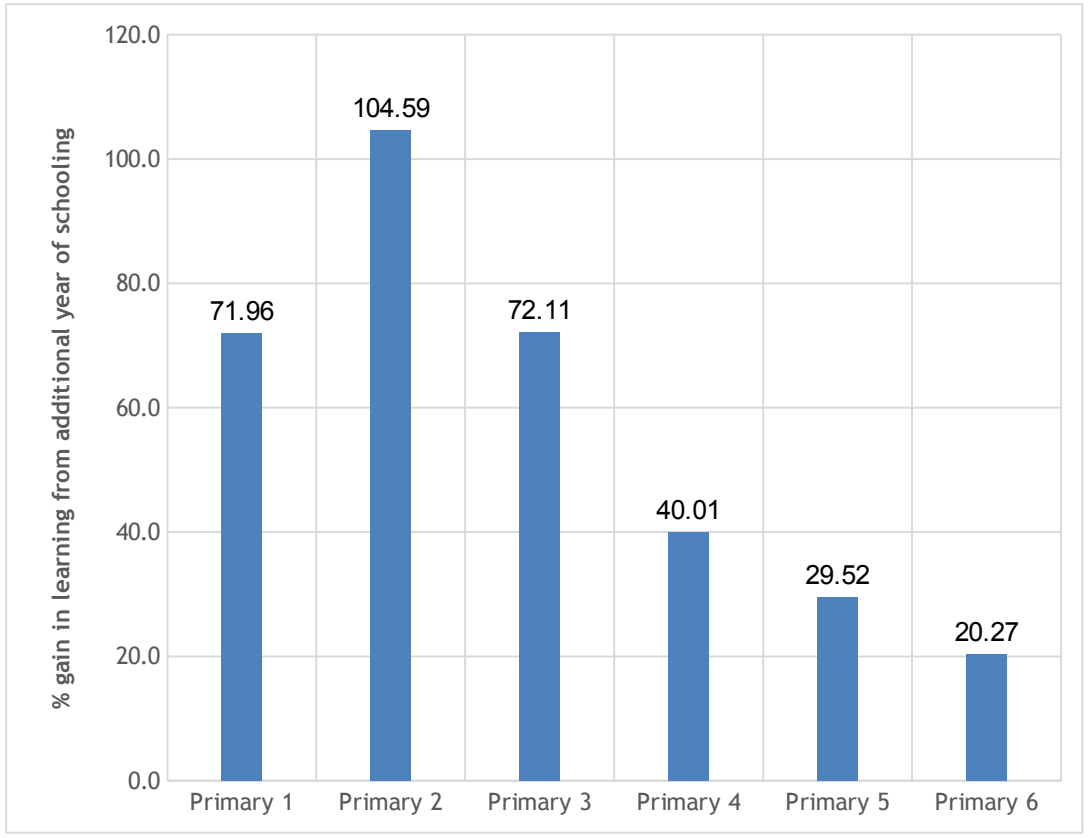
Learning profile: Learning profile by Grade



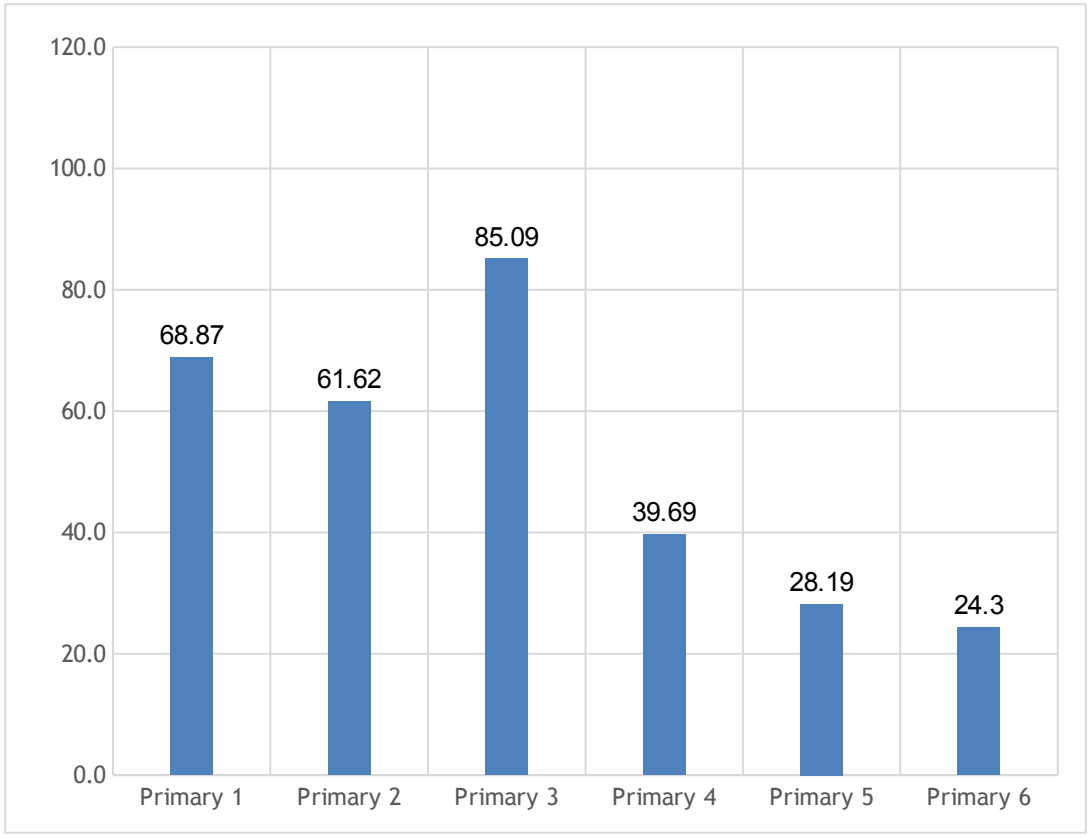


Value addition from Schooling

Double digit math problem

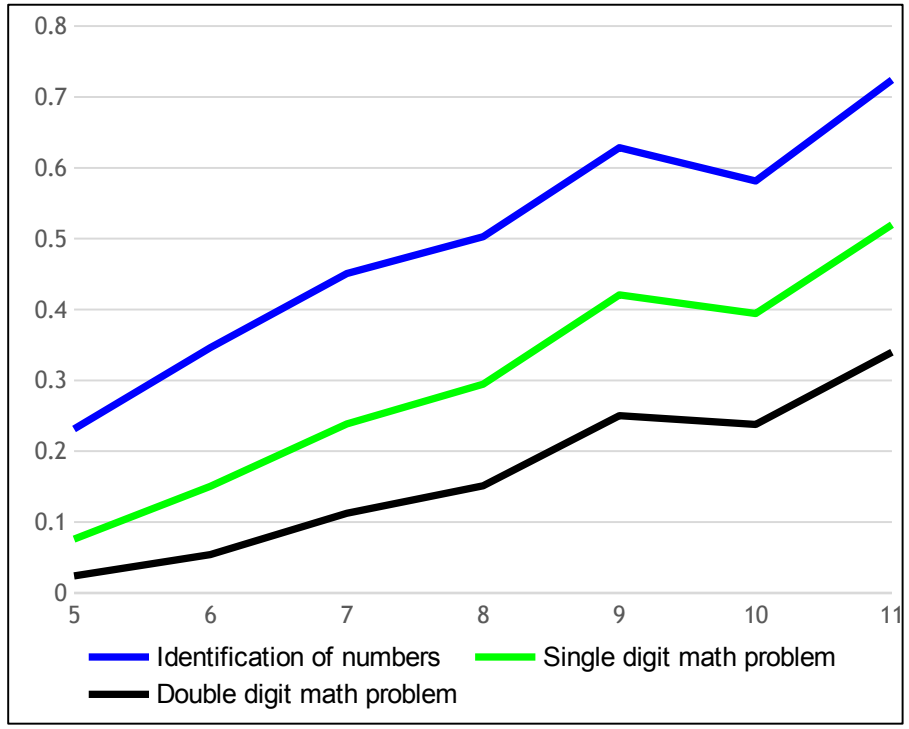


Comprehension

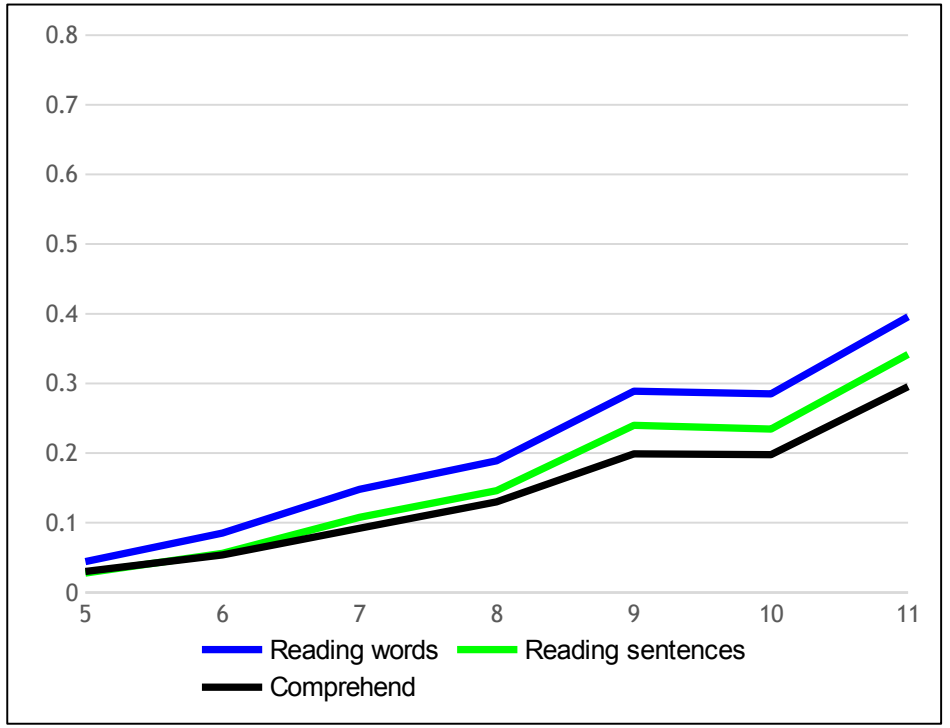


Learning profile by Age (Includes Out of School)

Competence in Numeracy by Age Group

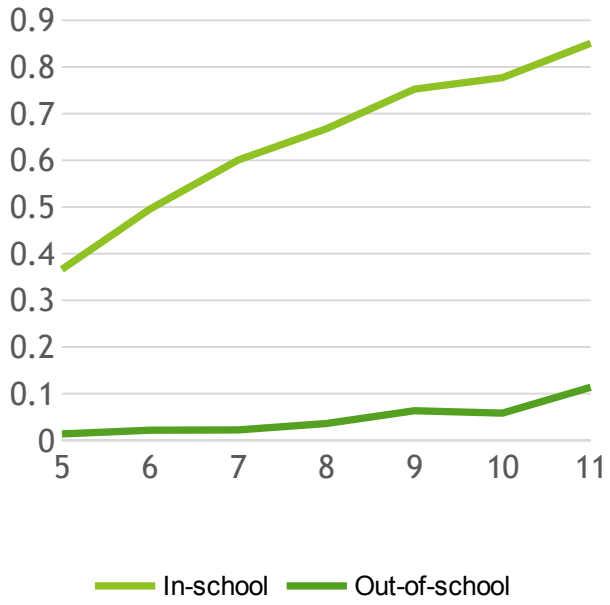


Competence Literacy by Age Group

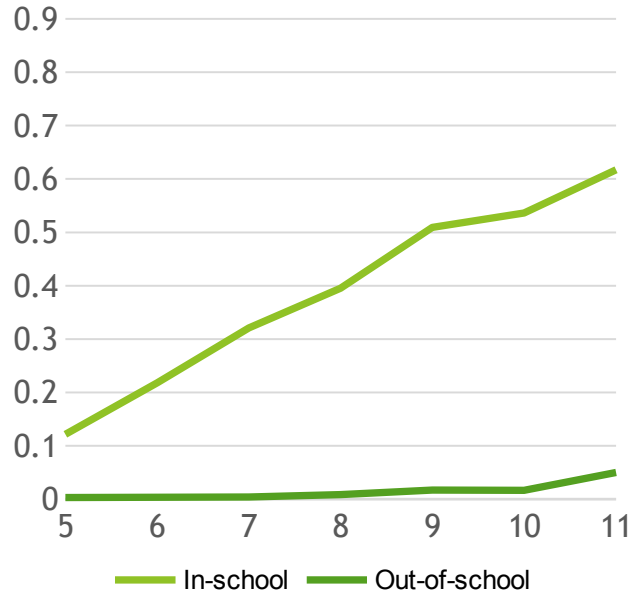


Learning profile for In-school and Out of school Children

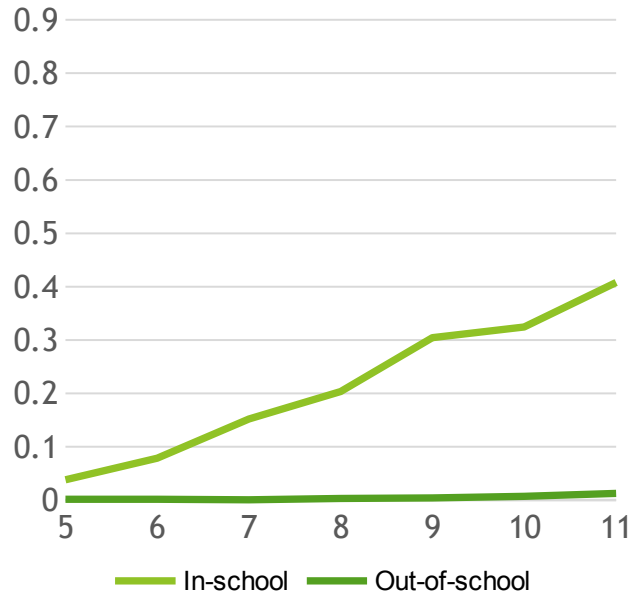
Identification of numbers



Single Digit Math Problem

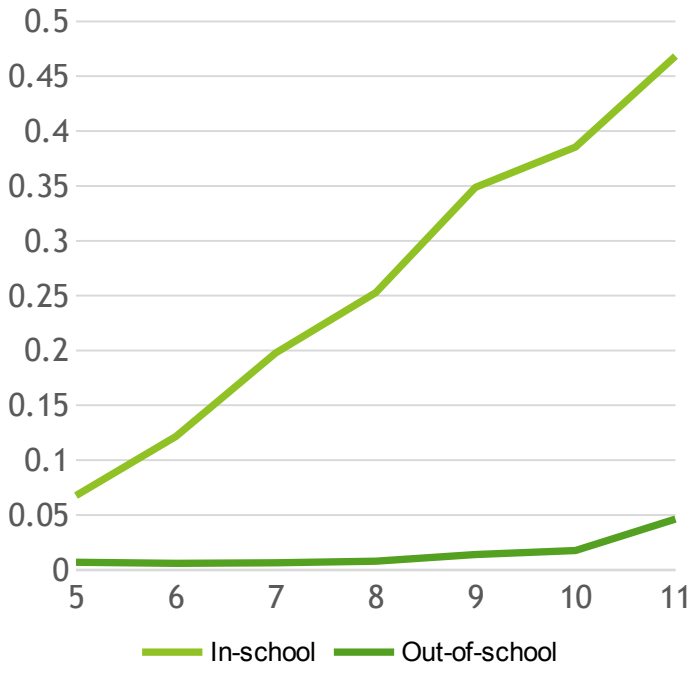


Double Digit Math Problem

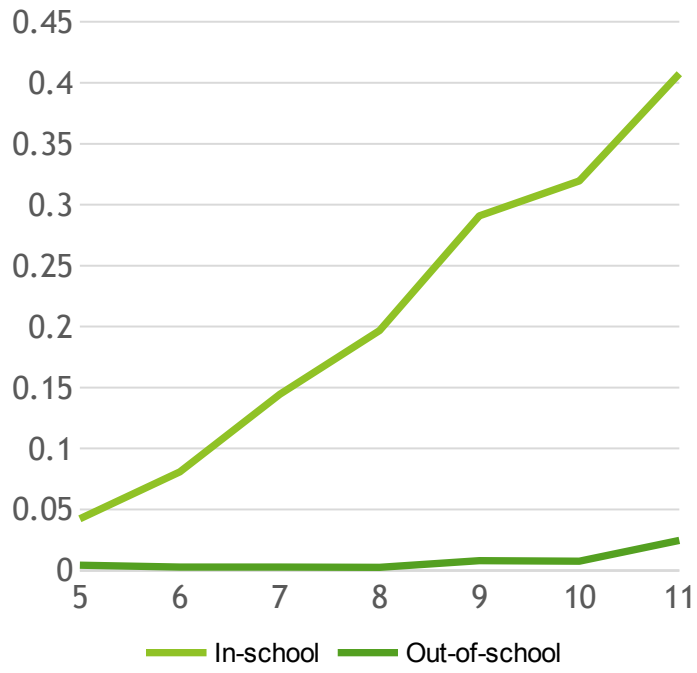


Variation in Learning between in-school and out of school children

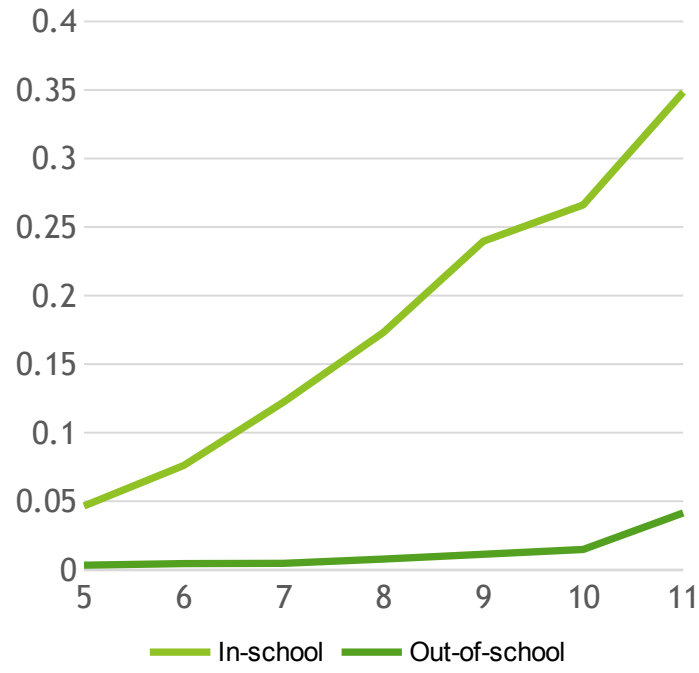
Proficiency in reading Words



Proficiency in reading sentences



Basic Comprehension



Composite Index of learning

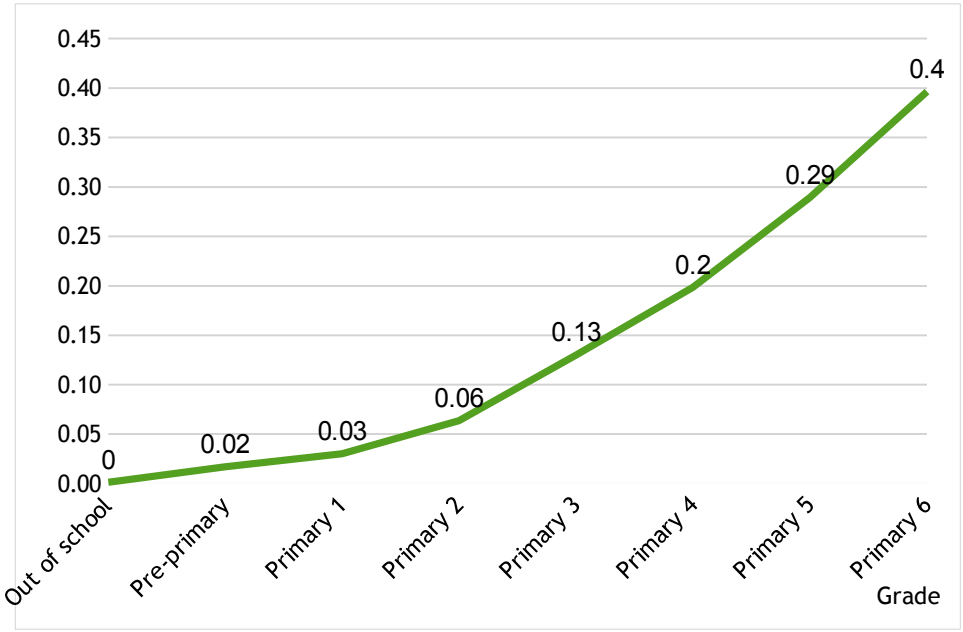
- We develop a composite score by aggregating the students' performance in literacy and numeracy
- For literacy, each child was asked
  i. three questions to test their ability to read and identify words
  ii. three questions to test their ability to read complete sentence
  iii. a question on the comprehension of one of the sentences in (ii).
- For numeracy, each child was asked
  - (i) two questions on the identification of numbers
  - (ii) two questions on solving of single digit addition problem
  - (iii) two questions on solving of double-digit addition and subtraction problem.

Composite Index of learning

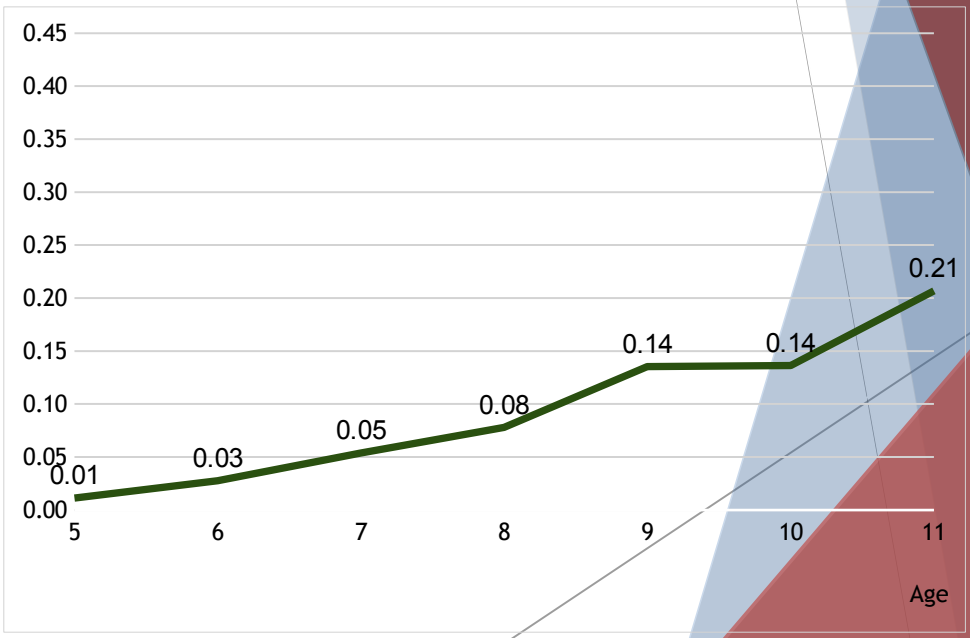
The composite index is a simple sum of all correct answers to the 13 questions asked.

We set a benchmark of 11 correct answers as the pass mark

Pass rate (%) by Grade



Pass rate (%) by Age



Modeling and Simulation

We simulate learning the items on the test using a potential pedagogical function (See Pritchett and Beatty (2012); Kaffenberger and Pritchett)

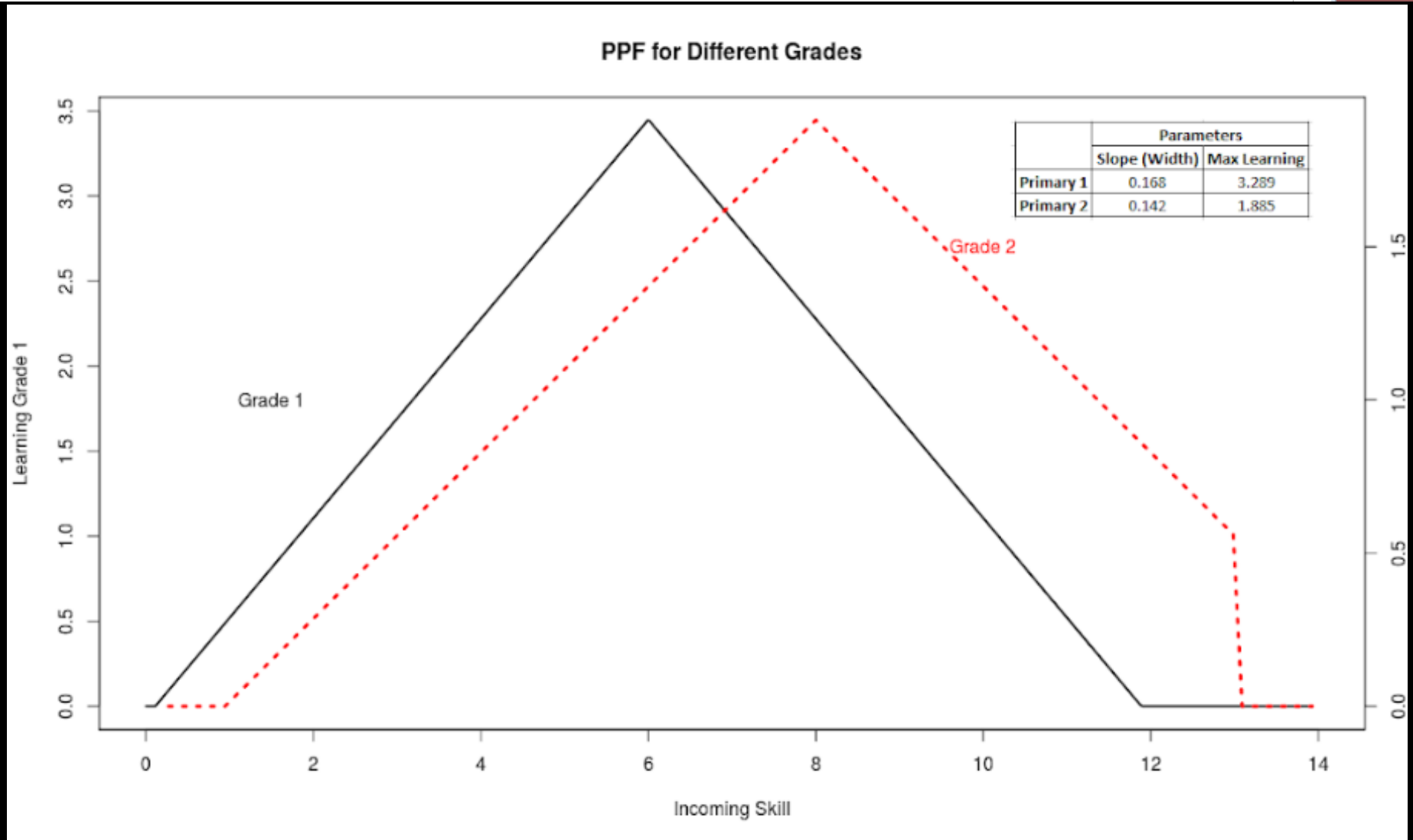
We model learning (L) for pupil, *i*, in grade, *p*, as:

$$L(s_i, h^{(max,p)}, c^p, r^p) = \begin{cases} h^{(max,p)} - [r^p * |(c - s_i)| * h^{(max,p)}] & if\ 0 \leq s_i < 13 \\ 0 & if\ s_i \geq 13 \end{cases}$$

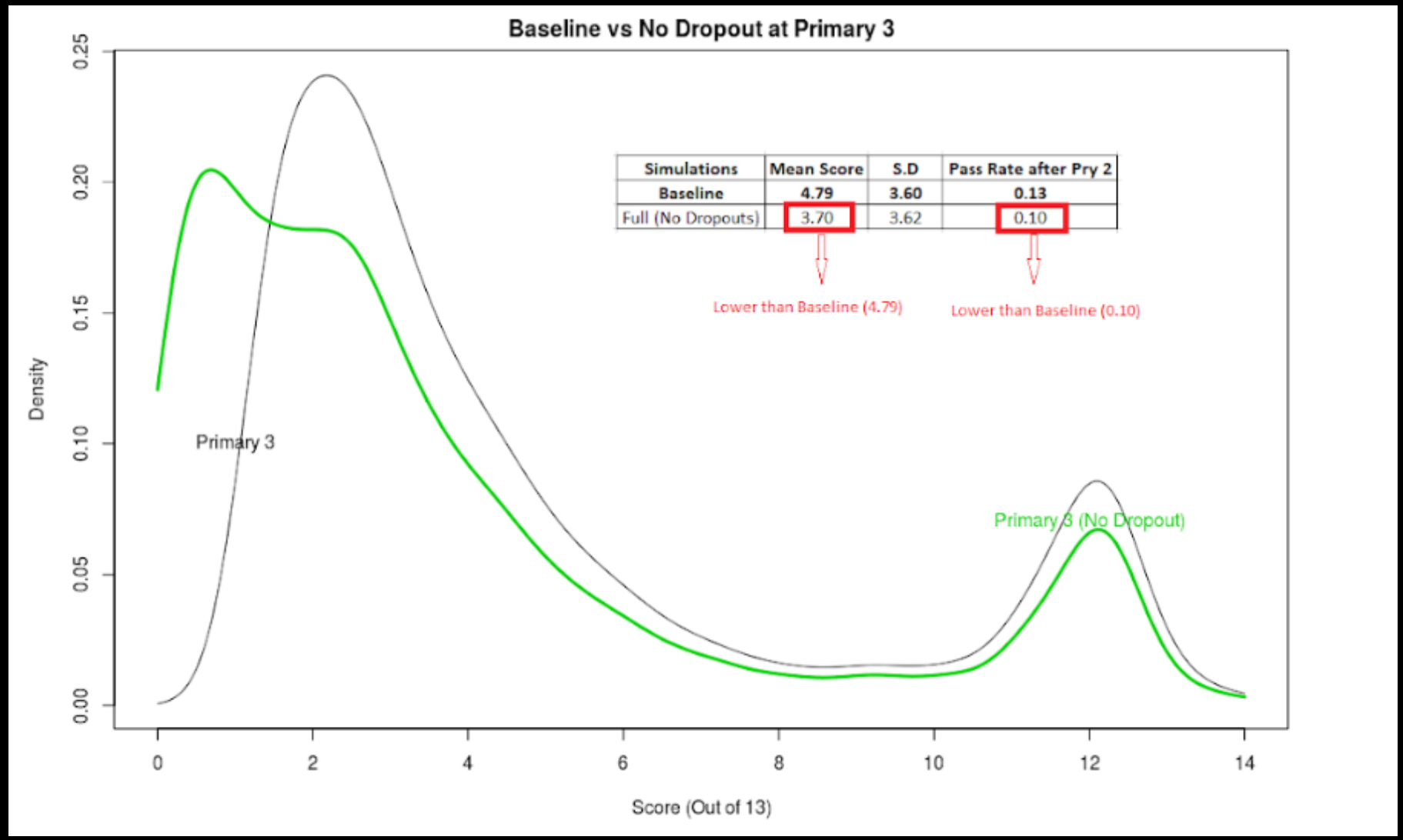
h and *r* are calibrated to match the mean score and standard deviation after each grade

c is the percentile that gains the most from instruction

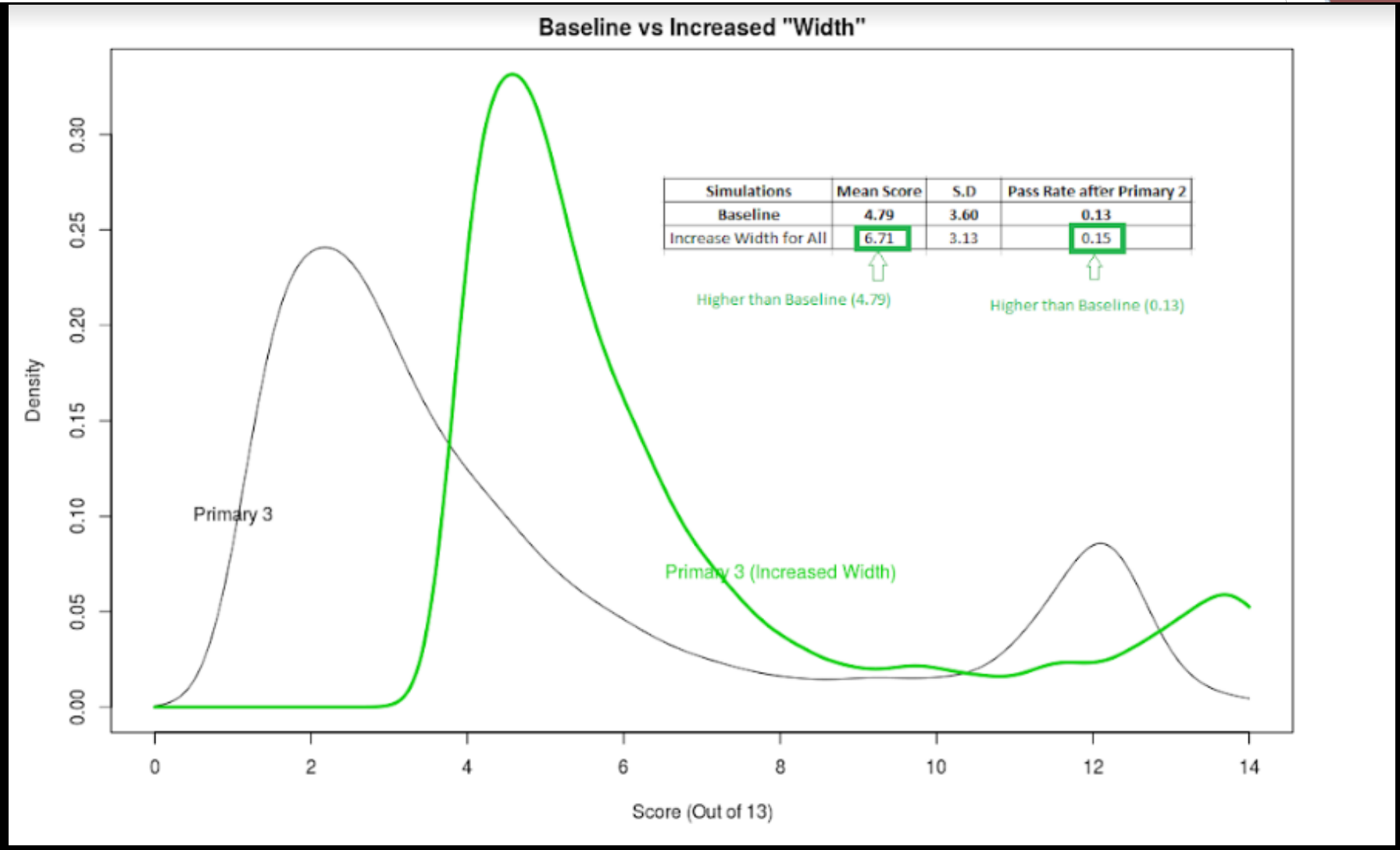
Performance for different grades



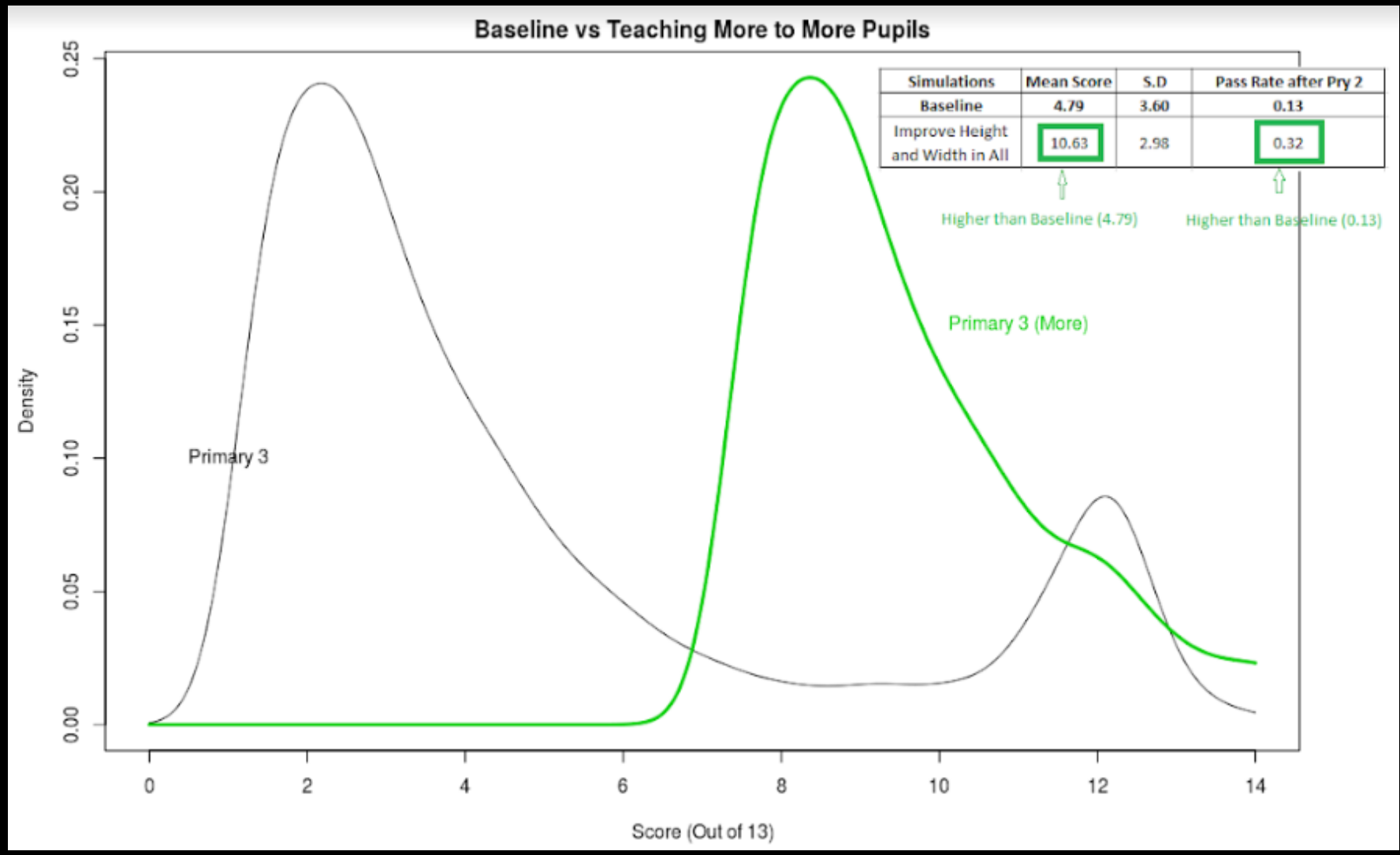
Baseline Result versus Dropout variation



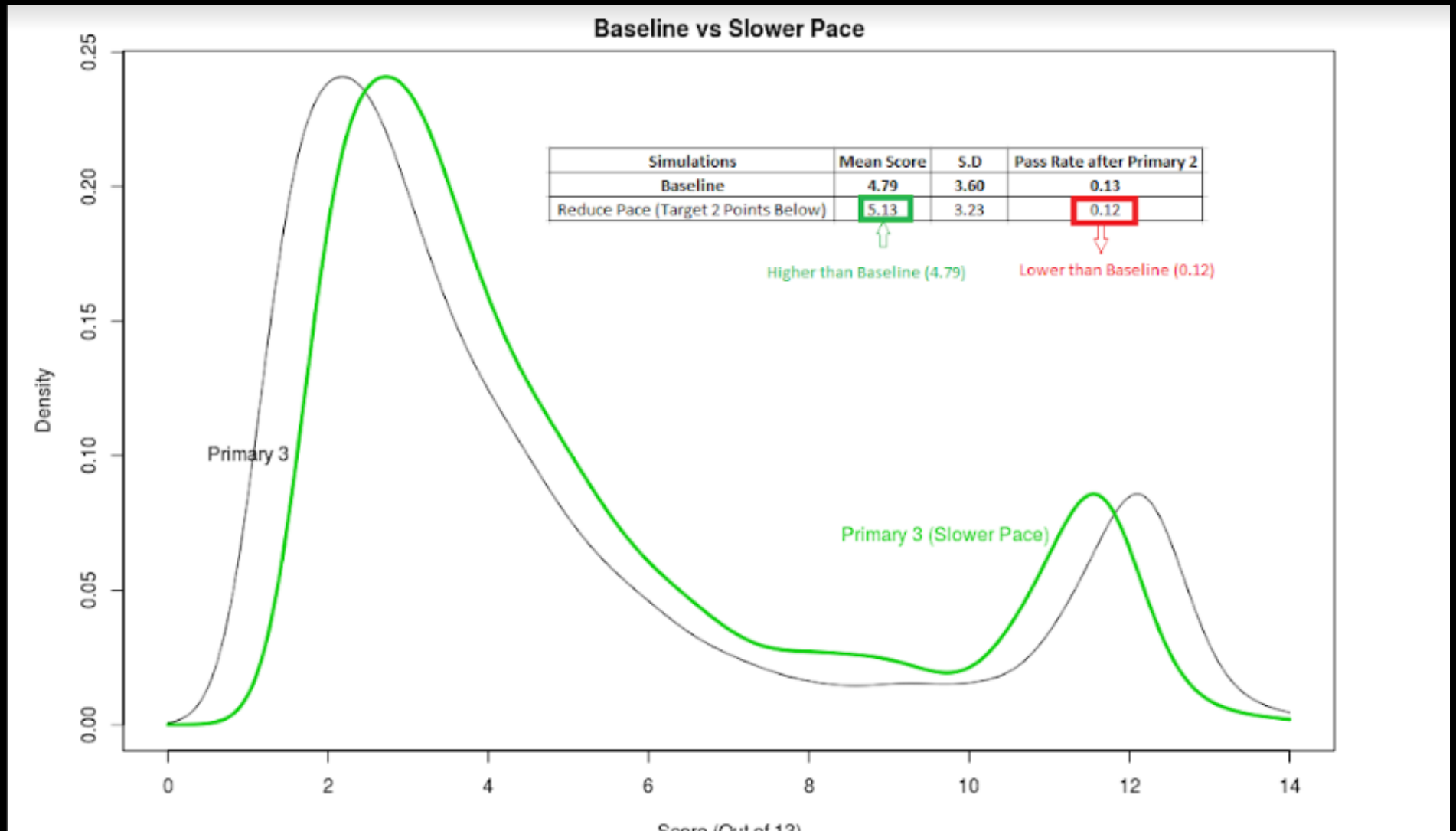
Baseline Result versus Increased Width



Baseline Result vs Improved Teaching

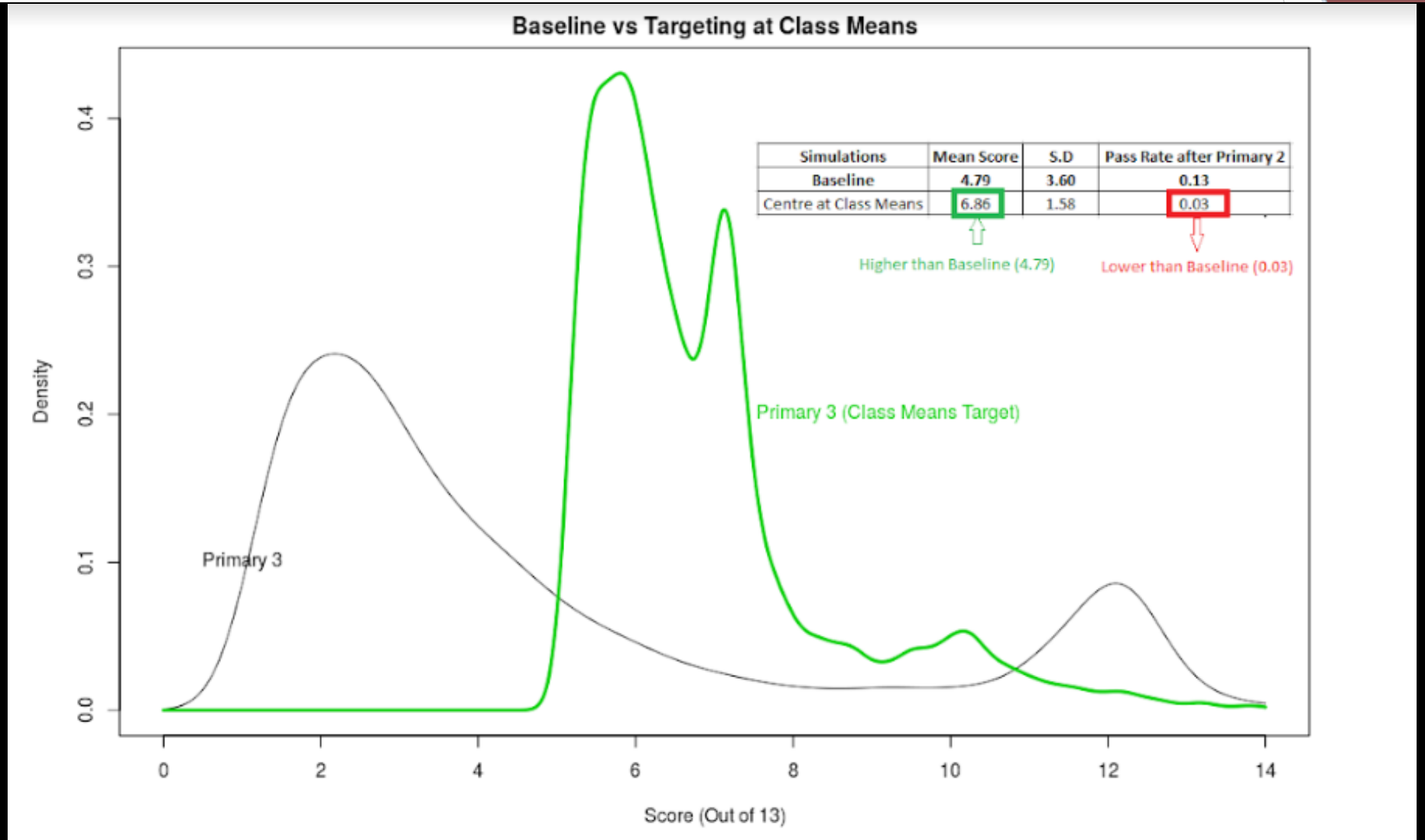


Baseline Result versus Slower Pace

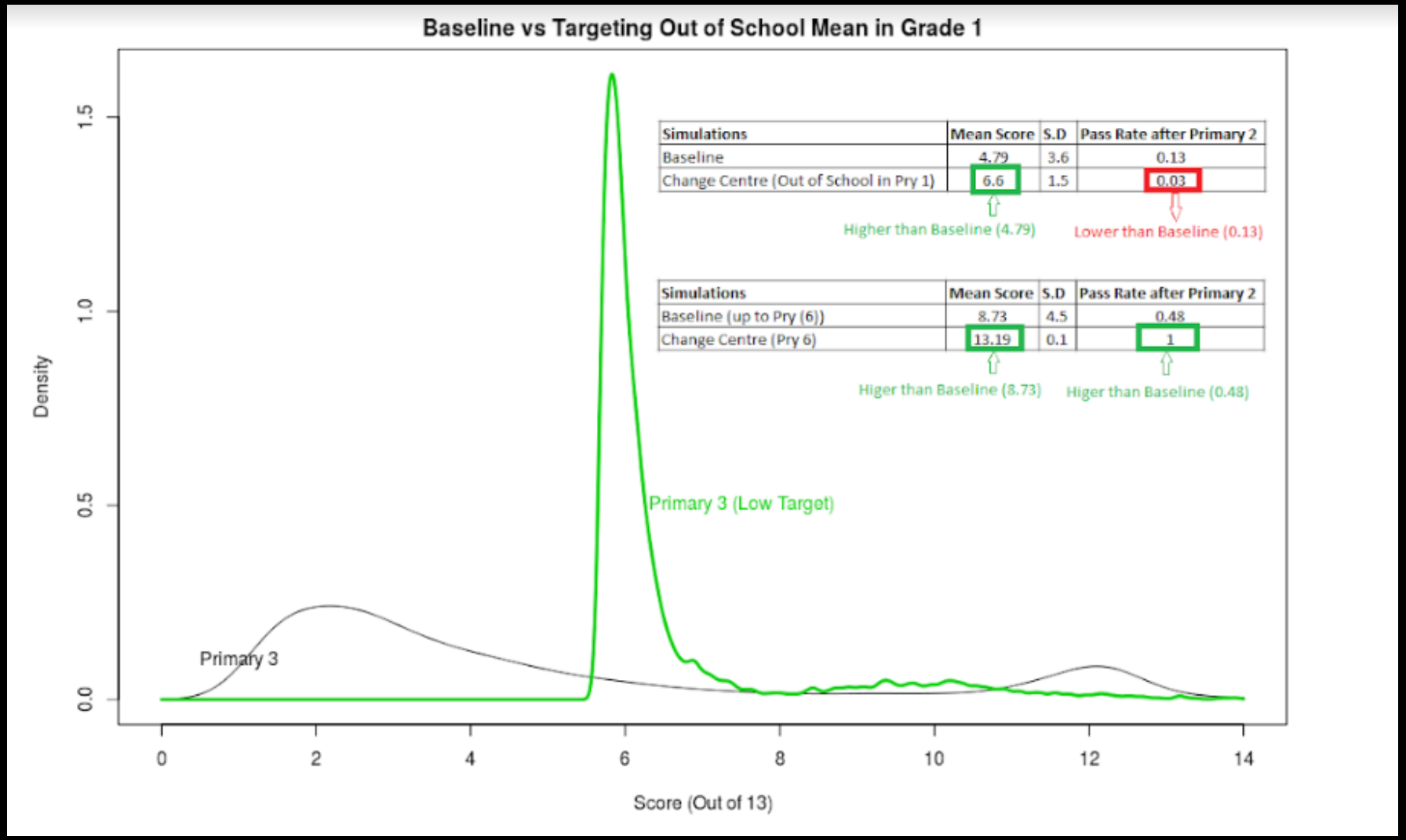


Simulations	Mean Score	S.D	Pass Rate after Primary 2
Baseline	4.79	3.60	0.13
Reduce Pace (Target 2 Points Below)	5.13	3.23	0.12

Baseline Result versus Targeting Class mean



Baseline Result versus Targeting out of school mean



Thank You