

Trial Runs; Simulation Methodology

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The student assignment process, both in reality and in our simulation, has successive phases: (1) the lottery (2) the after-lottery assignments. (In reality there are two successive lotteries, but the second is very small so we have neglected to simulate it.) In some trials we apply different assignment methods to the two phases.

In every trial the lottery is run on applicants divided into three classifications, just as currently. In the current system the three classifications are racial. In the trial systems the three classifications are socio-economic categories. Socio-economic classification is via a map, *not* via personal data. The socio-economic maps herein are the latest in an evolutionary process of experiment aimed at deriving a most effective map from census and population data. The "weights" for combining data and the thresholds that divide three gradations of data are subjects of our experiments.

As in the current system, in the lottery sets aside fraction of seats at each school for each respective group. The seats not filled by the lottery gradually filled in the after-lottery phase.

To test the performance of each proposed scheme we run a trial lottery and an after-lottery simulation on four years of actual assignment data. The simulation outcome populations are compared to the historically recorded populations of each school. A page of pie charts shows the outcome tally by racial group. Another page of pies shows the outcome tally by socio-economic classification.

In each trial herein we ran the lottery using a strictly socio-economic classification. The methods used for the after-lottery phase varied.

Explanation of Illustrations 1-14

- Density Maps 1-3 are population density maps.
 - Socio-Economic Tally 4 is a tally of BUSD Schools by socio-economic factors income, education level, and a combination. It is apparent that the schools strongly diverge with regard to these factors. This is not surprising since there is no control of the school populations on these factors but the amount of divergence is unexpected.
 - Assignment Trials The remainder 5-14 illustrate alternate student assignment schemes. Some variations do not consider race at all. One scheme takes consideration of race to make a small correction at one point on yearly assignment calendar. In none of the schemes is race a strong factor.
1. **Density, Socio-Economic Factor, Household Income** (from Census 2000)
 2. **Density, Socio-Economic Factor, Educational Level** (A weighted average computed from Census 2000)
 3. **Density, Race, Percent non-white** Computed from the BUSD K-5 student population, average of several years data.
 4. **Pie Charts, BUSD K-5, Tally by Socio-Economic Factors**, recent BUSD K-5 *actual* population.
- Socio-Economic Map 090203
5. **Socio-Economic Classification Map 090203, Income & Education**. This map divides BUSD K-5 population into three groups of roughly 25% 50% 25%.

6. **Socio-Economic Map 090203, Simulation Outcome: Race.** Result of applying socio-economic map (090203) to lottery and after-lottery tallied by racial categories..
7. **Socio-Economic Map 090203, Simulation Outcome: Socio-Economic.** Result of applying socio-economic map (090203) to lottery and after-lottery tallied by socio-economic classifications.

Another Socio-Economic Map, 101203

8. **Socio-Economic + Race Classification Map 101203, Unadjusted.** Three data sources was accomplished by simple algebra using weights and thresholds. No human "correction" applied.
9. **Socio-Economic + Race Classification Map 101203.** Same as (8), but with the "outliers" – isolated pieces – re-classified by hand to avoid a checkerboard arrangement. This map divides the K-5 population roughly 55% 25% 20%. That is, the "lower" socio-economic group is much larger than the others. This is a first-trial for such a division; all previously tested maps had divided 25-50-25 or 33-33-33. This division proportion probably has a much larger effect on the scheme's performance than does the addition of a consideration of race.
10. **Socio-Economic + Race Map 101203, Simulation Outcome: Race** The socio-economic map (9) applied to lottery and to after-lottery.
11. **Socio-Economic + Race Map 101203, Simulation Outcome: Socio-Economic.** Socio-economic map (9) applied to lottery and to after-lottery.
12. **Socio-Economic + Race Map 101203 w / "small race correction," Outcome: Race** Socio-economic map (9) is applied to the lottery. Then, a small race-specific correction is applied to the outcome of the lottery. A very small number (1,4,6,2 for 2000,2001,2002,2003 respectively) of white students are relocated from the school to which the lottery assigned them to schools urgently short of white students. Socio-ec map (9) is then applied to the after-lottery as in the trial above. The rationale for this experiment is that schools which fail to attract "enough" white students in the lottery typically attract no more in the after-lottery, and wind up racially unbalanced.
13. **Socio-Economic + Race Map 101203 w /"small race correction," Outcome: Socio-Economic.** The outcome, tallied by socio-economic classifications.
14. **Socio-Economic + Race Map 101203, "share latecomers disregard their choices", Outcome: Race.** Socio-economic map (9) is applied to the lottery. The after-lottery uses the assignment method "share latecomers disregard choice." According to this method all students who "turn up" after the lottery are assigned, first-come-first-served, without regard to socio-economic factors or to racial factors or *to their school preferences*. Students are simply assigned to the school most in need of students on the date on which they appear for consideration. This method is based on the long-standing observation that fewer than 20% of the after-lottery students are white. So a method that distributes them evenly tends to help racial balance over all schools.