**About Dataset**

Assume you are the new superintendent of School District which has a Junior High School that consists of approximately 500 students in grades 7-8. Students are randomly assigned to grade-level, subject-specific classroom teachers. The school is diverse socioeconomically with several students qualifying for free or reduced-price meals. The ethnic composition of the school is relatively diverse consisting primarily of African-American, Hispanic, Asian, and Caucasian students.

There are three teachers who teach 8th-grade math at the school, each doing their own thing when it comes to teaching math. Ms. Ruger, a young African-American lady who is certified to teach science and math, has been teaching for a total of 5 years and has taught math for the past 3 years. Ms. Smith, a Caucasian lady in her 40s who is certified to teach Spanish and math, has taught Spanish for 12 years but has taught math for the past 3 years. Ms. Wesson, an older Caucasian lady and the sister of the school board president, has been teaching PE for 24 years and has been assigned to teach math for the past 3 years. Each teacher was allowed to use their preferred teaching method and to select their own textbook three years ago. All three use different textbooks.

Ms. Wesson’s approach to teaching math would be broadly defined as the traditional method. The traditional math teacher adheres to a top-down approach in which knowledge originates from the teacher and is disseminated to the students. The teacher is recognized by the students (and often by the teacher herself) as the authority on the subject matter. Traditional math teachers tend to thrive on structure and order, resulting in quiet, calm learning environments. There is research that indicates certain behavioral issues are minimized in a traditional classroom resulting in effective, direct instruction.

Ms. Ruger and Ms. Smith’s approach to teaching math would be more broadly defined as the standards-based method. The standards-based math teacher adheres to a literal interpretation of well-written standards. The teacher facilitates the learning in a constructivist environment in which students develop, explore, conjecture and test their conjectures within the confines of the standard. The teacher believes there is research that a majority of children learn more and deeper mathematics and are better problem solvers when in the standards-based classroom.

During a meeting with the math department it was suggested that the three 8th-grade math teachers should be using the same teaching method and the same textbook. Ms. Wesson, being quite vocal, feels strongly that her approach is the better of the two because of the ethnic composition and sociological background of the students. She further believes and proposes that the students should be grouped among the three teachers according to the students’ ethnicity. She suggests that Ms. Ruger who is African-American teach the majority of the African-American students and that she, Ms. Wesson, would primarily teach the Caucasian and Asian students. Ms. Smith, who speaks fluent Spanish, would teach the majority of the Hispanic students. She also proposes that students be grouped within each teacher’s class by their ability with the high-ability students in a group by themselves and the lower-ability students in a group by themselves because she believes, based on a “gut” feeling, that the students will perform better if they are segregated into groups within the classroom. To support her argument she provides a copy of an article she located in the ATU library (see the Ross article entitled “Math and Reading Instruction in Tracked First-Grade Classes”) to each member of the department. She mentions that she has discussed this with her brother, the school board president, and that it will probably be discussed at the next board meeting. She further states that math is math and teachers should be allowed to teach using the style in which they are most comfortable.

Ms. Smith does not agree with Ms. Wesson’s proposal and shares an article that she has read (see the Thompson article about standards-based math). She states that research indicates students in traditional programs may have better procedural skills, but definitely lack in problem-solving creativity. She proposes that all three teachers should be using the standards-based approach to teaching.

Knowing that you have less than 30 days before the next board meeting you know that you need to have a proposal prepared based on school performance data. You have access to the latest student standardized math scores and personal data for the students taught by the 3 teachers (see file named 1\_Research\_Project\_Data). In order to protect confidentially, student names have been replaced by numbers. You try to anticipate and list any question that might be raised about student performance.

The next day you receive a call from the school board president regarding the two teaching methods used by the teachers. The president asks you to prepare a white paper that he can disseminate at the board meeting. The president wants you to present your recommendation at the board meeting for a specific teaching method – standards-based or traditional – based on your analysis of the 8th grade test scores.

<https://www.kaggle.com/datasets/soumyadiptadas/students-math-score-for-different-teaching-style>