**Module 4 Pandas Challenge Report**

This challenge produces some key metrics about the students’ academic performance in maths and reading, based on the information given for 15 government and independent schools. Specifically, the key metrics regarding the local government area include the total number of unique schools, total number of students, total budget, the students’ performance measured by average maths score, average reading score, the percentages of students who passed maths, reading, or who passed maths AND reading, respectively. The key metrics shows that the local government area has 15 schools with total 39,170 students, given the total budget of $24,649,428. On average, the students appear to have performed better in maths (average maths score as 70.34 with 86.08% passing rate) than in reading (average reading score as 69.98 with 84.43% passing rate); 72.81% students passed both maths and reading.

The key metrics, in particularly total budget and the above-mentioned metrics for academic performance, are further produced for each school; the metrics for the top 5 and bottom 5 performing schools are thereof produced. As shown in the metrics, similar to the performance trend for the whole population, the students in the highest performing schools appear to have performed better in maths (average maths score as 71.79 or above, and with 91.21% or above passing rate) than in reading (average reading score ranging from 71.25 or above, and with 88.49% or above passing rate). Interestingly, the students in the lowest performing schools appear to have performed similarly in reading (average reading score ranging from 68.87 to 69.57) as in maths (average maths score ranging from 68.84 to 69.17). Also worth noting, 3 out of 5 highest performing schools are independent schools while 4 out of 5 lowest performing schools are government schools.

Further analyses are also conducted to collect the metrics to show these students’ academic performance by year, by school spending per student, by school size (i.e. the total student numbers), and by school type (i.e. independent vis-à-vis government schools). The students’ academic performance, as measured by maths and reading scores, does not appear to be significantly different across academic years, on average. Interesting, it appears that the students in the lower budget schools (per student) appear to have performed better, as shown, the spending ranges per student for the highest performers actually was between $585-630. Not surprisingly, indeed, the smallest the size of the school (as measured by the number of the students), the better the students’ academic performance, as shown in the whole range of metrics for academic performance being the best for the school with the students of 1000 or below. The last but not least, the students in the independent schools perform better than the students in the government schools, consist with the number of the independent schools versus the number of government schools in the highest and lowest performing schools discussed previously.

In conclusion, the most striking observations from the analyses are that (1) in general, independent schools outperformed government schools; (2) the schools of smaller size outperformed the schools of larger size. However, the conclusion drawn are subject to the limitations of the information available, for example, it is unclear if the schools of smaller size also has larger staff-student ratios and where the budgeted money was spend on.