Efficacy Analysis of Placement Instruments – A Brief Report

4/16/2022

Last Updated: 4/17/2022

1. Data Source and Objectives

This analysis used the combined data from the last analysis (2195 and 2205) and the new data from the fall semester of 2021 (2215). The placement instruments used in 2195, 2205, and 2215 are MPE, ALEKS, and ALEKS respectively.

	Semester		
Course Name	**2195 (MPE)**	**2205(ALEKS)**	**2215(ALEKS)**
MAT-101	214	209	192
MAT-103	258	113	147
MAT-104	32	28	9
MAT-113	373	244	324
MAT-115	9	25	7
MAT-121	431	277	147
MAT-125	114	100	37
MAT-131	178	110	83
MAT-143	125	113	156
MAT-145	10	21	2
MAT-151	39	12	27
MAT-161	73	95	78
MAT-Q20	184	88	45
MAT-Q30	374	316	232

The efficacy of the placement instruments is measured by students' overall performance in their subsequent first math class which is reflected in the distribution of the course grades.

The discrepancy between the overall distributions of students' grades in their first mathematics class reflects the difference in efficacy of the placement instrument that placed them in their classes.

2. Analysis Results

We look at the association between the placement scores and mathematics grades from two different angles.

2.1. MPA and ALEKS Scale Level Comparison

We first examine the distribution of mathematics grades on each scale of the corresponding placement instruments: MPE and ALEKS.

The following graphs show the grade distributions across the semesters at each individual scale of the instruments.

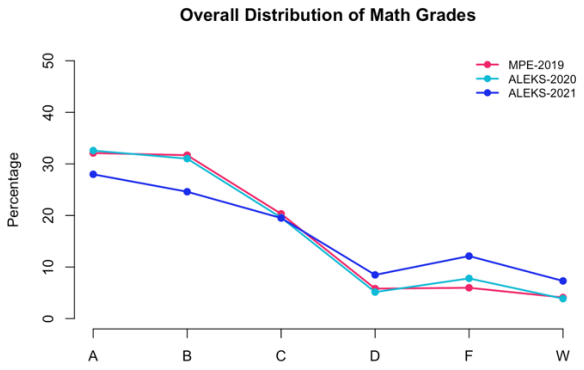

Figure 1

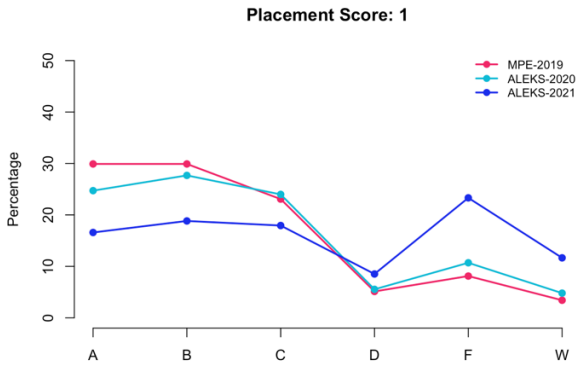

Figure 2

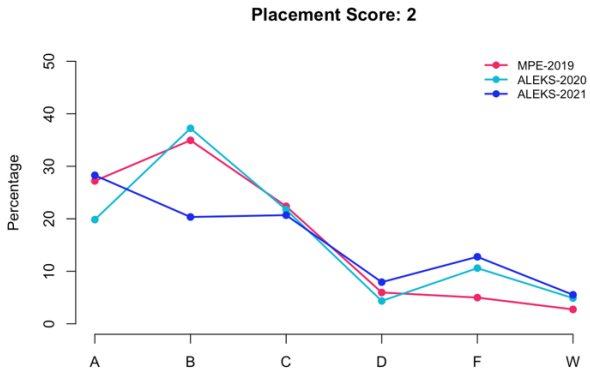

Figure 3

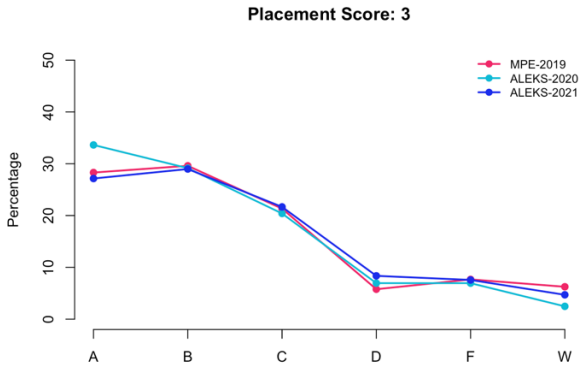

Figure 4

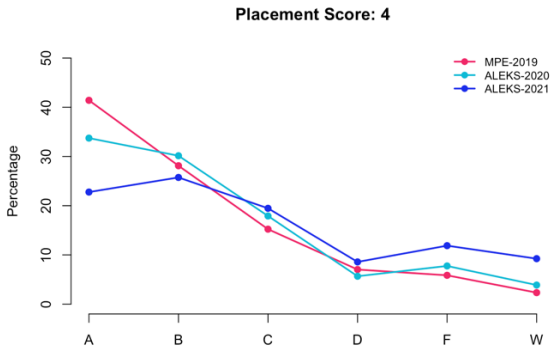

Figure 5

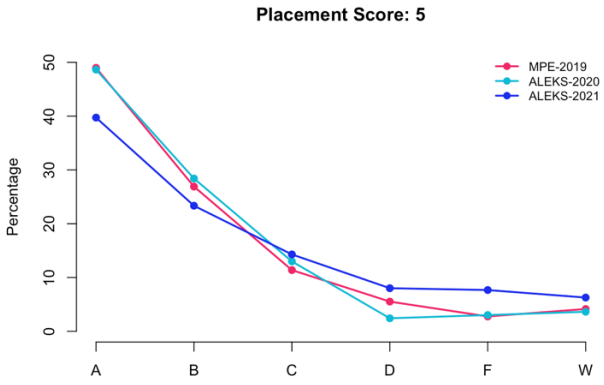

Figure 6

The overall grade distribution (Figure 1) indicates that ALEKS (blue line) placement yields more DFW grades than the MPE (red line). The same pattern is observed across individual scales except for scale = 3 (Figure 4) in which no significant difference was observed.

It seems that ALEKS is more efficacious than MPE.

2.2. Comparisons at Each Individual Course

We only choose the courses with more than 100 students each semester in each course to perform comparisons.

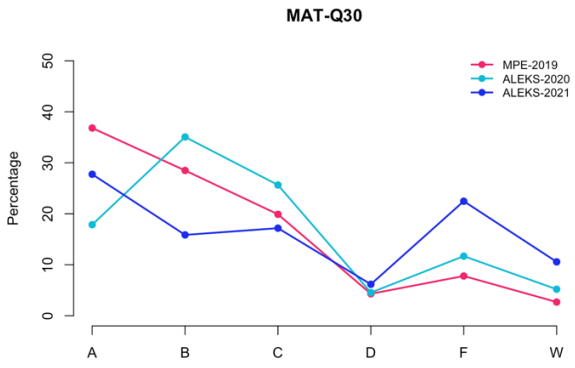

Figure 7

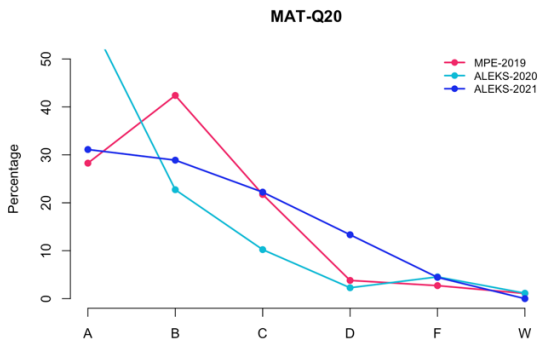

Figure 8

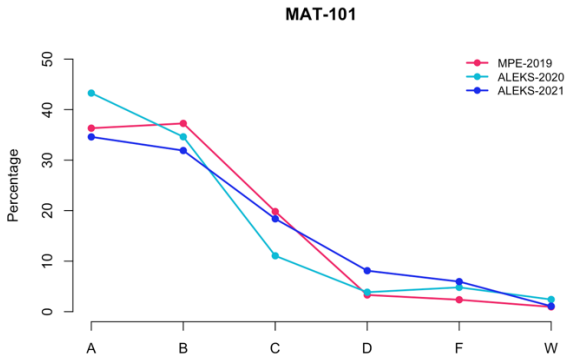

Figure 9

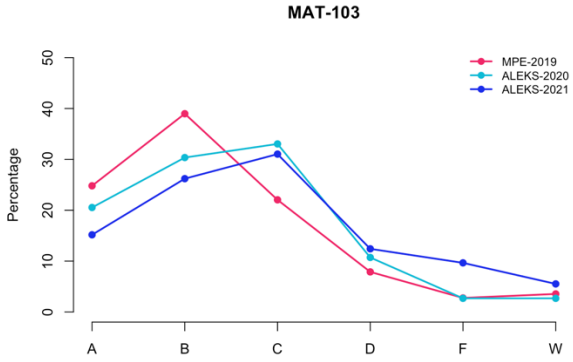

Figure 10

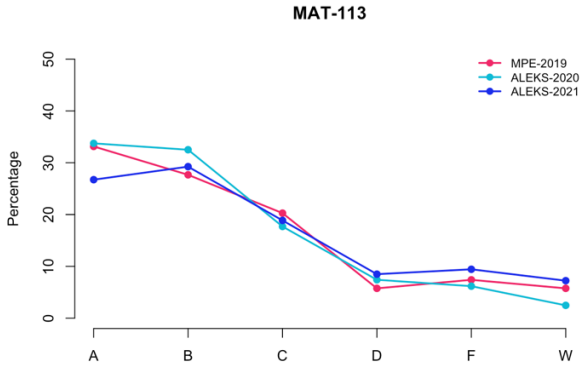

Figure 11

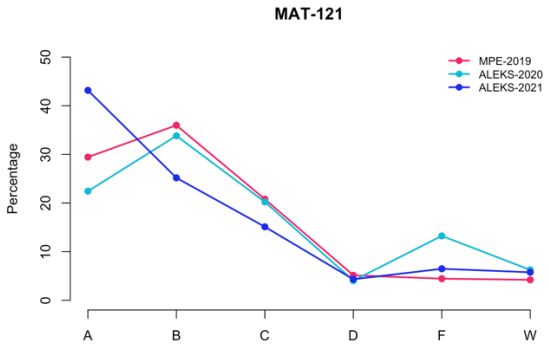

Figure 12

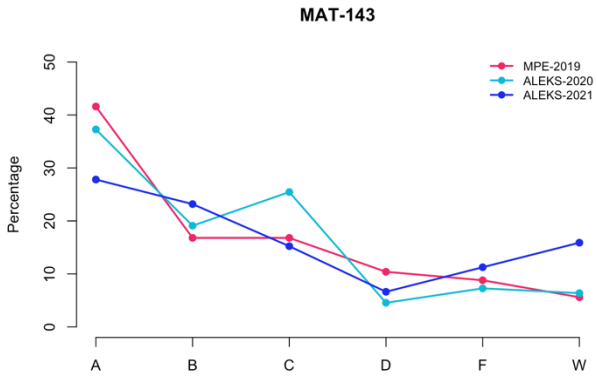

Figure 13

The comparison in each individual course also indicates the same pattern that ALEKS generates more DFW grades and fewer ABC grades.

3. DFW Rate by Course

The following table list the proportions of DFW grades in the individual courses and the overall DFW rate.

	2019	2020	2021
DFW.ALL	0.1588629	0.1681109	0.2791178
DFWQ20	0.0760870	0.0795455	0.1777778
DFWQ30	0.1478495	0.2142857	0.3920705
DFW101	0.0660377	0.1105769	0.1513514
DFW103	0.1417323	0.1607143	0.2758621
DFW113	0.1890411	0.1604938	0.2515723
DFW121	0.1378505	0.2352941	0.1654676
DFW143	0.2480000	0.1818182	0.3377483

4. Conclusions

Based on the above graphical analysis, we observe the following

1. The distribution of math grades of students who took MPE and in-person courses and that of students who took ALEKS and online courses are significantly different.

2. When comparing the same distribution of math grades for students who took MPE and math courses in 2019 and those who took ALEKS and math courses in 2021, we found a significant difference - ALEKS produces a high percentage of DFW grades.