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Assignment 2

Math Course Progression

Data Exploration and Rank Analysis

July 21, 2022

| Are All Colleges and Universities The Same? | |
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| **Introduction** | When high school seniors, tenured professionals looking to advance their career, or anybody in between start applying to colleges and universities, much of that decision is driven by just a few factors. Of these, the obvious and necessary factors tend to be proximity to home, tuition prices, and what programs the institution has to offer, but a factor talked about less openly is school prestige. Whether it is always admitted by employers, school prestige is considered when looking through the resumes and LinkedIn profiles of job candidates for open positions requiring a college degree.  Whether speaking of academics or athletics, the prestige of an institution comes down to its history. Just to name a few examples, Notre Dame is well known for high graduation rates, “Ivy League” schools are known for a rigorous application process and what is believed to be the highest level of academics in the United States, and Gonzaga is known for its basketball program (for the remainder of this paper, we are concerned with academics only). While these are all valid reasons, the main issue comes back to the fact that they are all based on the past and present, but not so much on the future.  With the internet, specifically Google, social media platforms, and remote learning, our society has become more “book smart” than any generation of the human race has ever been before. The divide between the level of knowledge from person to person on average is becoming smaller, and the same is bound to happen between the average college/university, if it hasn’t already.  The latter of that previous sentence is exactly what will be examined: Are the academics between each school truly as different as the narrative around different schools would indicate? To answer this question, we are looking at 5 different institutions. For the privacy of each institution we will call them A, B, C, D, and E. Each of these schools is currently implementing the same exact math course on the same exact dates. Each is ¾ through the current semester of the class and has reported their course progress to this point in the semester.Between the 5 schools, there are 30 total sections of this class, and data have been provided by each school for each section. |
| **Analysis** | Given the semester is ¾ of the way complete and there are 35 lessons to complete in the semester, being “on time” would mean that exactly 27 lessons have been completed. All possibilities for current course progress will be grouped by number of lessons completed, based on 27 being “on time”.  The following criteria will be used:   * “Very Behind” is more than 10 lessons behind * “More Behind” is 6 to 10 lessons behind * “Behind” is 1 to 5 lessons behind * “Middling” is 0 to 5 lessons ahead * ‘Very Ahead” is 6 or more lessons ahead, but not “Completed” * “Completed” means that all 35 lessons have been completed   This translates to the following definitions:   * Very Behind = 0 to 16 lessons completed * More Behind = 17 to 21 lessons completed * Behind = 22 to 26 lessons completed * Middling = 27 to 32 lessons completed * Very Ahead = 33 to 34 lessons completed * Completed = 35 lessons completed   The data have been given in a tabular format with one row of data per section, totalling 30 rows of data. There are also columns for each status discussed above that contain the number of students that fall into each. This will need to be aggregated to get totals per school, since these data will be used to compare at the school level.  Another thing to consider is that there are not only a different number of students in each class section, but also a different number of class sections per school. To normalize results, the number of students in each progression status per school will be converted to the percentage of total students in each progression status per school.  After exploring how schools compare amongst those percentages, a “rank analysis” of sorts will be performed on the results. For “negative” categories (Very Behind, More Behind, Behind), each school will be ranked from smallest percentage of students to largest. For “positive” categories (Middling, Very Ahead, Completed), each school will be ranked from largest percentage of students to smallest. That is, schools will be rewarded for having a large percentage of students in a “positive” category and for having a small percentage of students in a “negative” category. All of the ranks will be added together for each school, and then the rank analysis will be complete. Due to the method of ranking, smaller values will indicate a “better” school. For ties in the rankings, both schools are assigned the next largest number (in this case, the next worse rank). |
| **results** | After cleaning and normalizing results, the following results were found for each progression category.              The rank analysis results can be seen below.    After the Rank Analysis, it is clear that school B is far superior to the other schools for the criteria that have been established. The question that titles this paper, “Are all colleges and universities the same?”, can be interpreted many ways, but the fact that school B is “twice as good” as schools A and D give two great counterexamples that can technically answer the question. |
| **conclusions** | Using the data provided by schools A, B, C, D, and E, it was discovered that there is a significant difference for at least two schools between the progression of the average student in the math class. Each school was looked at to find the percentage of students that are progressing well, and the percentage that are progressing poorly. Schools were then compared based on the criteria of “rewarding” high percentages of students in good progression and low percentages of students in poor progression.  Specifically to answer the question “Are all colleges and universities the same?”, it was found that school B is far outperforming schools A and D. Admittedly, there was no defined criteria for schools being “different from each other”, there is a large enough gap between school B and schools A and D to justify that the former is “different” from the latter schools.  While the human race continues to have ease of access to larger amounts of information every day, it appears that there is still a difference between certain colleges and universities. Thus, it is still a valid statement to conclude that any given school is better or worse than another. School B ought to be proud of itself, while the other schools, specifically A and D, should make sure their students get a large amount of work done during the final quarter of the semester. |