**Indoor CATS: Does required journaling improve student exam grades?**

**Methods Used:**

Student’s T-test to compare means of two independent groups (pre-journaling and active journaling test scores) to determine whether the population means are significantly different (Also known as the Independent, Two-Sample, Unpaired, etc. t Test).

An Independent Samples t-test compares the means for two groups. Since our “groups” consist of students from multiple semesters, a Paired t-test would not be appropriate (same group at different times) nor would a one sample t-test since a known mean does not exist nor would be valid.

* The t score is a ration between the difference between two groups and the difference with the groups. The greater the t score, the greater the difference between the two groups.
* A p-value is the probability that the results from the data are due to chance alone. The lower the p-value, the greater the probability that your data is valid and not by chance alone. In most cases, a p-value of 5% (0.05) is acceptable for data validity.

Data requirements: Based on the variability that comes with different students in different semesters with modest changes in the instructional material, will use a Two-Sample t Test Assuming Unequal Variances

1. Dependent variable was continuous (grades)
2. Independent variable that was categorical (units tested each & instructors)
3. Cases that have values on both the dependent & independent variables
4. Independent samples/groups with no relationship between subjects in each sample (hmm… we have a number of recycles), subjects cannot be in both groups (again recycles) no group can influence the other group
5. Random sample of data from the population (we used all of the data for each population… this should keep with the spirit of randomness since our students perform all across the board)
6. Normal distribution (appx) of the dependent variable for each group (we do get some skewed semesters, but usually have a fairly normal distribution)
7. Homogeneity of variances (more or less, that is what we see in our data)
8. No outliers

Hypothesis:

The null hypothesis is that there is no difference in the testing outcomes when students journal compared to when they don’t journal.

Ho: 1 = 2 (the two population means are equal) OR Ho: 1 - 2 = 0

The alternative hypothesis is that journaling makes a difference in student testing outcomes (hopefully for the better!)

Ha or H1: 1 ≠ 2 (the two population means are not equal) OR H1: 1 - 2 ≠ 0

Excel Spreadsheet Calculations: Using the Data Analysis Toolkit expressing comparison in the p-value

1. Testing one instructor for each of the first three units journaled by the students, 4 semesters each
2. Testing one instructor for each of the first three units journaled by the students, 2 semesters each
3. Testing total data using combined data

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| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Test** | **Unit 1 pre-Jrnl Ave** | **Unit 1 Jrnl Ave.** | **p-value** | **Unit 2 pre-Jrnl Ave** | **Unit 2 Jrnl Ave.** | **p-value** | **Unit 3 pre-Jrnl Ave** | **Unit 3 Jrnl Ave.** | **p-value** |
| 1. | 53.01  58.94  54.99 | 55.53 | 0.338 | 53.86 | 54.35 | 0.800 | 53.99 | 56.56 | 0.264 |
| 2 | 60.83 | 0.132 | 60.75 | 59.81 | 0.804 | 59.59 | 55.07 | 0.564 |
| 3 | 57.3 | 0.334 | 56.12 | 56.17 | 0.984 | 55.86 | 56.05 | 0.937 |

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|  |  |  | out of 80 pts |  |  |  |  |  |  |
|  | Unit 1 pre-Jrnl Ave | Unit 1 Jrnl Ave. | p-value | Unit 2 pre-Jrnl Ave | Unit 2 Jrnl Ave. | p-value | Unit 3 pre-Jrnl Ave | Unit 3 Jrnl Ave. | p-value |
| Test |  |  |  |  |  |  |  |  |  |
| 1 | 53.01 | 55.53 | 0.338 | 53.86 | 54.35 | 0.8 | 53.99 | 56.56 | 0.264 |
| 2 | 58.94 | 60.83 | 0.132 | 60.75 | 59.81 | 0.804 | 59.59 | 55.07 | 0.564 |
| 3 | 54.99 | 57.3 | 0.334 | 56.12 | 56.17 | 0.984 | 55.86 | 56.05 | 0.937 |
|  | 0.695583 | 0.723583 |  | 0.711375 | 0.709708 |  | 0.706 | 0.698667 |  |
|  | 70% | 72% |  | 71% | 71% |  | 71% | 70% |  |

Conclusions:

* The calculated p-values demonstrate that any difference between testing performance related to journaling is by chance, there is no significant statistical data to support its continued use.
* Statistics do not tell the whole story. Each data point is comprised of a variable group of students with a range of academic talent and interest. For those students who do a great job in their journals and continue journaling after the required three units, they are usually in the top ranks of their sections. Does journaling make the student better or do the better students do a better job of journaling because they are more focused on academics and end-goals?
* Students often state that journaling seems to be specific to EMCC since they did not do this at other community colleges. However, EMCC’s student population tends not to be as well prepared as they might be. It is better to ask students to do something to bring everyone up to the same level of good study habits rather than not because some students are prepared.