# MAT 243 Project Two Summary Report

Angel Davila

angel.davila@snhu.edu

Southern New Hampshire University

Note: Replace the bracketed text on page one (the cover page) with your personal information.

## Introduction: Problem Statement

In this experiment, we are going to take a closer look at overall elo and points of a selected team compared to the late 90’s Chicago Bulls team. To do further analysis, we are using the below dataset.

*FiveThirtyEight. (April 26, 2019). FiveThirtyEight NBA Elo dataset. Kaggle. Retrieved from https://www.kaggle.com/fivethirtyeight/fivethirtyeight-nba-elo-dataset/*

We will be performing t-testing to test the hypotheses of the mean of a small sample drawn for elo and points.

## Introduction: Your Team and the Assigned Team

I grew up near Chicago, so I have chosen the Chicago Bulls to do my analysis.

Table 1. Information on the Teams

|  | **Name of Team** | **Years Picked** |
| --- | --- | --- |
| 1. Yours | Chicago Bulls | 2013 - 2015 |
| 2. Assigned | Chicago Bulls | Chicago Bulls |

## Hypothesis Test for the Population Mean (I)

*Suppose a relative skill level of 1340 represents a critically low skill level in the league. The management of your team has hypothesized that the average relative skill level of your team is greater than 1340. You tested this claim using a 5% level of significance. For this test, you assumed that the population standard deviation for relative skill level is unknown. Explain the steps you took to test this problem and interpret your results.*

* Null Hypothesis – the population average, skill level is 1340
  + µ = 1340
* Alternative Hypothesis – the population average, skill level of the team is greater than 1340
  + µ > 1340
* Level of significance is 0.05
* The test statistic is 56.22 and the P-value is 0.0000

Table 2: Hypothesis Test for the Population Mean (I)

| **Statistic** | **Value** |
| --- | --- |
| Test Statistic | 56.22 |
| P-value | 0.0000 |

* *There is enough evidence to say that the relative skill level of the team is greater than 1340*

## Hypothesis Test for the Population Mean (II)

*Your team’s coach has hypothesized that average number of points scored by your team in the team’s years is less than 106 points. For this test, you assumed that the population standard deviation for points scored is unknown. You tested the claim using a 1% level of significance. Explain the steps you took to test this problem and interpret your results.*

* Null Hypothesis – the population average, points scored, is 106
  + µ = 106
* Alternative Hypothesis – the population average, points scored of the team is greater than 106
  + µ > 106
* Level of significance is 0.01
* The test statistic is -19.05 and the P-value is 2.9028

Table 3: Hypothesis Test for the Population Mean (II)

| **Statistic** | **Value** |
| --- | --- |
| Test Statistic | -19.05 |
| P-value | 2.9028 |

* The conclusion is to reject the null hypothesis. There is not enough evidence to support that the team was scoring more or equal to 106 points per game.

## Hypothesis Test for the Population Proportion

*Suppose the management claims that the proportion of games that your team wins when scoring 102 or more points is 0.90. You tested this claim using a 5% level of significance. Explain the steps you took to test this problem and interpret your results.*

* Null Hypothesis – the proportion of games that the team wins when scoring 102 or more points is 0.90
  + P = 0.90
* Alternative Hypothesis – the population average, points scored of the team is greater than 106
  + P ≠ 0.90
* Level of significance is 0.05
* The test statistic is -2355.06 and the P-value is 0.0000

Table 4: Hypothesis Test for the Population Proportion

| **Statistic** | **Value** |
| --- | --- |
| Test Statistic | -2355.06 |
| P-value | 0.0000 |

* *We can reject the null hypothesis in this example. The teams wins when scoring 102 or more points is not 0.90*

## Hypothesis Test for the Difference Between Two Population Means

*You were asked to compare your team’s skill level (from its years) with the assigned team’s skill level (from the assigned time frame). You tested the claim that the skill level of your team is the same as the skill level of the assigned team, using a 1% level of significance.*

* Null Hypothesis – the proportion of games that the team wins when scoring 102 or more points is 0.90
  + µ1 = µ2
* Alternative Hypothesis – the population average, points scored of the team is greater than 106
  + µ1 ≠ µ2
* Level of significance is 0.01
* The test statistic is 47.79 and the P-value is 0.0000

Table 5: Hypothesis Test for the Difference Between Two Population Means

| **Statistic** | **Value** |
| --- | --- |
| Test Statistic | 47.79 |
| P-value | 0.0000 |

* *There is no sufficient evidence at 1% significance to conclude that skill level of my team is the same as the level of the assigned team.*

## Conclusion

Using t Tests, we can determine closely how my team generally compares to the assigned team. After analysis, my team does not have the ability to perform as the assigned team back in the late 90’s, when checking elo and points.