

VICTORIAN PIZZA

"PIZZA FOR POINTS" PROJECT SCOPE AND DATA GATHERING PLAN

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SHA571 Course Project – Part One

December 12, 2018

1. Project Background and Description

Victorian Pizza (VP) is a small pizzeria located near the campus of Big Western University (BWU) and is best known for offering quality pizza and drinks to college students and faculty at a fair price. VP management is interested in encouraging increased pizza sales during BWU's basketball season, which compared to football season has been a low sales period each year.

2. Project Scope

VP's advertising team has proposed an incentive program called "Pizza for Points" which will reward customers with discounts on pizzas based on the performance of the BWU men's basketball team. The program will run only during the BWU basketball season, including any postseason activity such as playoff games. The program will be based on how many points the BWU team scores in each game, with order discounts of 50% and 75% depending on the number of points scored. An extra bonus would reward a free 2-topping pizza with additional purchase if BWU wins and their final score exceeds their opponent's score by a fixed percentage.

3. High-Level Requirements

The goal of this project is to determine the following:

- At what point levels should the 50% and 75% discounts be awarded
- At what final score margin should the free 2-topping pizzas be offered

The program should be straightforward and easy to understand, with no need for special coupons or other encumbrances to discourage customers from taking advantage of each offer.

4. Deliverables

The result of this project should determine:

- The break points at which the 50% and 75% discounts would be awarded
- The final score margin at which the free 2-topping pizza would be offered

5. Key Stakeholders/Affected Parties

- VP Management
- VP Advertising
- VP Store employees (for scheduling)

6. Data Requirements

To determine recommendations for when to offer incentives, the following data points are needed:

- Average scoring levels for the BWU men's basketball team (to calculate break points for discounts)
- Average point margins over opponents when BWU wins a game (to calculate the winning percentage)

Each measure is a category in and of itself and constitutes quantitative values that are set following each game.

7. Data Gathering Plan

To obtain the necessary observational data for making these decisions, an authoritative source to obtain accurate scoring data for all BWU men's basketball games won or lost over time will need to be identified. The best source is believed to be the BWU Athletic Department, with an alternative being the sports department of the local newspaper. A research assistant will be assigned to contact each source to determine if the data is available and to collect it into a formatted spreadsheet for analysis.

It is believed a sample size containing 10 years of scores will provide enough data on winning games to determine the scoring levels and point margins with a reasonable level of confidence. However, in an effort to mitigate risks the assistant will be instructed to obtain up to 15 years of data if available for extended analysis.

VICTORIAN PIZZA

"PIZZA FOR POINTS" PROJECT – DATA SUMMARIES AND VISUALIZATIONS

Michael Bernier

SHA571 Course Project – Part Two

December 19, 2018

8. Project Synopsis

Victorian Pizza (VP) is trying to determine how to move forward with an incentive program called "Pizza for Points" which will reward customers with discounts on pizza purchases and free pizzas based on the performance of the Big Western University (BWU) men's basketball team. Customers would receive discounts of 50% or 75% depending on the number of points scored in each game, and they would also be eligible to receive a free 2-topping pizza (with additional purchase) when BWU wins and their final score exceeds their opponent's score by a fixed percentage.

The goal of this project is to determine the following:

- At what point levels should the 50% and 75% discounts be awarded
- At what final score margin should the free 2-topping pizzas be offered

9. Data Requirements

To determine the levels at which the 50% and 75% discounts would be awarded, data on all the BWU men's basketball team game scores first need to be obtained and analyzed. In contrast, determining the scoring margin percentage for the free 2-topping pizzas would require additional refinement of the data to select only those games which BWU has won and the final scores of both teams in each game.

The athletic department of BWU has been contacted and informed of our project, and they have offered to provide as much data as we need, going all the way to the beginning of their basketball program over 75 years ago if we wish; for our purposes, we will ask them for the past 20 years of game results. As a thank-you for their help, we will host a pizza party for their staff.

10. Summarizations

We need to analyze the scoring data two different ways:

- To help us determine the levels for each discount
- To help us determine the winning margin percentage for offering free pizzas

To determine the discount levels, the scores from all BWU games (won or lost) would be used. The following statistical values will be calculated:

- Mean
- Median
- Standard Deviation
- Quartiles

Our initial projections prior to actual analysis are as follows:

- 50% discount – BWU's score is equal to or greater than their historical average (mean) score
- 75% discount – BWU's score is equal to or greater than one standard deviation above the historical average (mean) score

To determine the winning percentage margins, the scores from all BWU winning games would be used. After calculating the winning margin for each game in both raw value and percentage, the same statistical values (mean, median, standard deviation, and quartiles) as the discount levels will be calculated.

We do not have any initial projections for the outcome of these calculations.

The final recommendations for discount levels and winning percentage margins will be determined following a review of the both these initial summaries and the visualizations outlined below.

11. Visualizations

For both the discount levels and winning percentage margins, the following visualizations will be generated:

- Histograms using total scores ranked low to high and winning percentage margins ranked low to high to plot range, mean, median, and standard deviation
- Box and whisker plots by total scores and by winning percentage margins to show scoring/percentage spreads and inter-quartile ranges
- Scatter plots by total score and by winning percentage margins to better understand the impact of outliers

12. Bias, Outliers, and Other Concerns

It is well understood that sports scoring can vary widely from game to game and season to season due to changes in personnel, player health and training, and other variables. By using data covering an extremely long period (20 years), it is hoped that the impacts of these variables will be muted to a large extent. There is still a concern for significant data point outliers at both ends of the scale (representing very good or very poor individual game performances); these will need to be examined to determine what effects they may have on the overall results and what adjustments (if any) should be made to take these into account.

VICTORIAN PIZZA

"PIZZA FOR POINTS" PROJECT

DATA AND DECISIONS

Michael Bernier

SHA571 Course Project – Part Three

December 23, 2018

13. Project Synopsis

Victorian Pizza (VP) is trying to determine how to move forward with an incentive program called "Pizza for Points" which will reward customers with discounts on pizza purchases and free pizzas based on the performance of the Big Western University (BWU) men's basketball team. Customers would receive discounts of 50% or 75% depending on the number of points scored in each game, and they would also be eligible to receive a free 2-topping pizza (with additional purchase) when BWU wins and their final score exceeds their opponent's score by a fixed percentage.

The goal of this project was to determine the following:

- At what point levels should the 50% and 75% discounts be awarded
- At what final score margin should the free 2-topping pizzas be offered

Data covering a 20-year period of basketball scores was obtained for analysis. The analysis was performed in two different ways to meet the needs of the project:

- To help us determine the levels for each discount
- To help us determine the winning margin percentage for offering free pizzas

Prior to the beginning of the analysis, the following projections regarding the outcomes were made:

- 50% discount – BWU's score is equal to or greater than their historical average (mean) score
- 75% discount – BWU's score is equal to or greater than one standard deviation above the historical average (mean) score
- No projections for the scoring at which free pizzas would be offered

In each case, the following values were to be calculated:

- Mean
- Median
- Standard Deviation
- Quartiles

A number of different visualizations were also planned including histograms, box and whisker plots, and scatter plots. These would be combined into a data dashboard where all the results could be viewed and final determinations made.

Finally, there was concern regarding bias, and steps were devised to mitigate the possibility of bias and to address the issue of outliers if found in the data.

14. Results of Analysis

As originally proposed, 20 years of BWU men's basketball scores were obtained and analyzed (Note: the data used in this report is real – I pulled it from an actual NCAA Division I men's team located at a large midwestern university). The "box score" initial statistics are as follows:

50%/75% Discounts

- Mean Points per Game: 73
- Median Points per Game: 72
- Standard Deviation: 14

Free 2-Topping Pizza

- Mean Winning Margin in Points: 17
- Median Winning Margin in Points: 14
- Standard Deviation: 12.6

A sample dashboard showing the histogram results for the 50%/75% calculations is attached. It includes the "box score" figures listed above.

In both cases, there was no obvious appearance of bias in the sample, and outliers were minimal, primarily at the upper end of the scoring scale, but were not considered a significant factor affecting the recommendations outlined below.

15. Recommendations

Based on the analysis results the following recommendations are being made:

50%/75% Discounts

With regard to this part of the proposed program, there are well defined points at which these discounts could be offered. Given the mean (73) and median (72) scores are just above an easily recognized value (70), the recommendation is to offer a 50% discount when the BWU men's basketball team scores at least 70 points. Likewise, the standard deviation (14) is also close to an easily recognized value (15); therefore, the recommendation is to offer a 75% discount when the BWU men's basketball team scores at least 85 points (70+15).

Free 2-Topping Pizzas

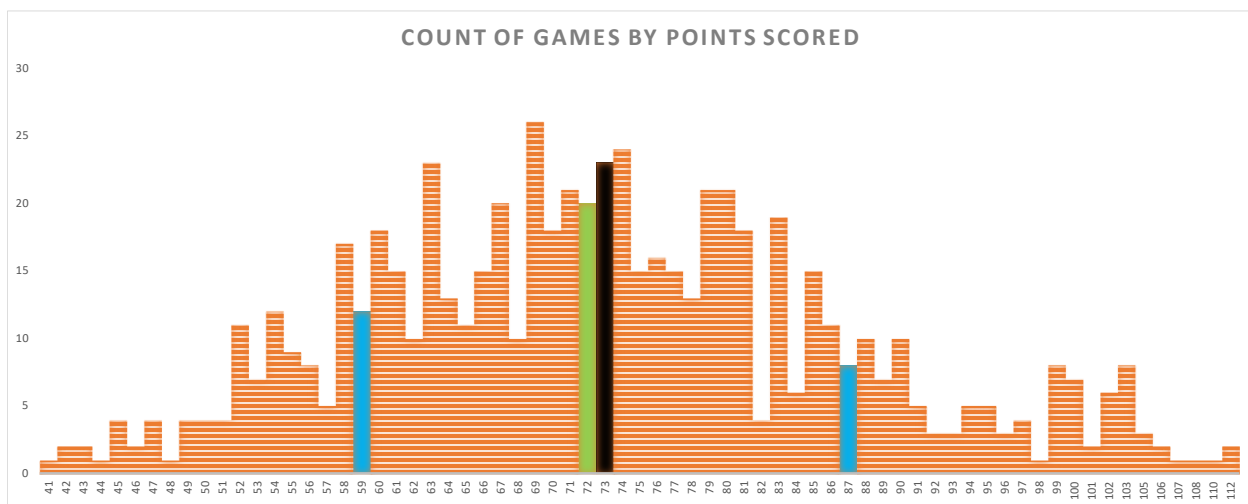
With regard to this part of the proposed program, it became clear as we were reviewing the data that this proposal was not well defined. Using similar techniques as the previous part of the program, it would be possible to define two suggested points for offering a free pizza – either close to the mean winning margin (17, perhaps rounded down to 15 or up to 20) or at approximately one standard deviation (12.6) above the mean (perhaps rounding to 30). It is noted that keeping up with the individual game scores in this

manner could be confusing and potentially counter-productive, particularly if the team scores the minimum number of points to achieve a discount but still loses the game. It is left to management to make that final determination.

16. Summary

To summarize, based on the available scoring data, the following recommendations are presented:

- Offer a 50% discount on purchases when the BWU men's basketball team scores at least 70 points per game (just under their historical average)
- Offer a 75% discount on purchases when the BWU men's basketball team scores at least 85 points per game (approximately one standard deviation over their historical average)
- Offer a free 2-topping pizza either when the BWU men's basketball team wins by at least 15-20 points (the average winning margin) or wins by at least 30 points (approximately one standard deviation over the average)



	Mean	73	Projected 50% Discount	70
	Median	72	Projected 75% Discount	85
	Std Dev	14		