

### **Slide 1: Introduction (Ferc)**

**Script:** Hello, I am, Fercine Carpio, and my groupmates are Meliza Jean Antonio, Alliyah Frann Carino, Jeraldine De Asas, Myka Rosal, Maxenne Andrea Sevillano, Larrasophia Sison, and Leejan Tamayo. We are going to talking about the role of probability in basketball strategy. We'll be looking at how chance and strategy interact to influence the outcome of games, and how we can use probabilistic thinking to better understand and analyze the sport.

### **Slide 2: Abstract (Meliza)**

**Script:** To start, let's take a quick look at the abstract. In essence, we'll delve into how probability theory applies to basketball, examining its role in risk assessment, decision-making, performance analysis, strategy development, and outcome prediction. We'll use real-game data to illustrate these concepts.

### **Slide 3: Background (Frann)**

**Script:** Probability theory helps us analyze random events and their likelihood. In basketball, this means we can analyze events like shooting success, turnovers, and rebounds to understand their impact on the game.

### **Slide 4: Objective (Jed)**

**Script:** Our goal is to show how probability theory applies to basketball, aiding in decision-making, risk assessment, performance analysis, and strategy optimization.

### **Slide 5: Scope (Myka)**

**Script:** Our analysis will cover statistical models, in-game metrics, strategy development, player performance evaluation, and advanced analytical techniques.

### **Slide 6: Concepts (Maxenne)**

**Script:** These key probability concepts are crucial for understanding chance in basketball: combinatorics, conditional probability, total probability, mutually exclusive events, Markov chains, expected value, and binomial/Poisson distributions.

### **Slide 7: Formulas (Larra)**

**Script:** These formulas allow us to calculate probabilities in basketball: combinations, conditional probability, total probability, expected value, binomial distribution, and Poisson distribution.

### **Slide 8: Theorems (Leejan)**

**Script:** In addition to the concepts and formulas we've covered, these theorems provide further insights into probability: Bayes' Theorem, the Law of Large Numbers, and the Central Limit Theorem.

### **Slide 9: Notation (Frann)**

**Script:** This is some common notation used in probability calculations.

### **Slide 10: Concepts Applied (Meliza)**

**Script:** Here's how we can apply probability concepts to basketball: calculating lineups, determining win probability, estimating points per possession, modeling game states, and predicting free throw success.

### **Slide 11: Real-Life Example (Ferc)**

**Script:** We'll analyze Game 6 of the 2016 Western Conference Finals to understand the role of probability and the unpredictable nature of basketball. The Warriors were down 3-2 in the series. With 5 minutes left, the Thunder were up by 7 points and favored to win. Despite the odds, the Warriors, led by Klay Thompson's 11 three-pointers, won the game.

We'll use conditional probability, expected value, binomial distribution, and the law of total probability to analyze this unexpected outcome.

#### **Slide 12: Real-Life Example (Jed)**

**Script:** Using the binomial distribution, we can calculate the probability of Thompson making 11 three-pointers. The result shows how unlikely this was. This case shows that while useful, probability models have limitations. They can't predict everything in a dynamic game like basketball. This game highlights how unpredictable basketball can be. Extraordinary performances and the dynamic nature of the game can defy predictions.

#### **Slide 13: Impact (Myka)**

**Script:** Probability significantly impacts basketball by enhancing decision-making, optimizing strategies, improving performance analysis, and deepening our understanding of the game.

#### **Slide 14: Summary of Findings (Maxenne)**

**Script:** Probability is essential for understanding basketball, but models cannot account for everything. Effective decision-making requires both probabilistic thinking and expert judgment.

#### **Slide 15: Interpretation (Larra)**

**Script:** Our findings highlight the importance of strategic planning, real-time adjustments, understanding event interactions, assessing risks, and evaluating performance using probability distributions.

#### **Slide 16: Challenges (Leejan)**

**Script:** Challenges in applying probability to basketball include modeling complexity, dynamic game conditions, data limitations, the assumption of independence, and over-reliance on historical trends.

#### **Slide 17: Summary (Ferc)**

**Script:** Probability theory is a powerful tool for analyzing basketball, but it has limitations. Understanding these concepts improves decision-making and deepens our understanding of the game.

#### **Slide 18: Implications (Meliza)**

**Script:** Accurate data, balanced player development, and strategic application of probability are crucial for success in basketball.

#### **Slide 19: Future Directions (Leejan)**

**Script:** Future research can explore the impact of external factors, fan support, youth development, and ethical implications of analytics.

#### **Slide 20: References (Larra)**

**Script:** Here is the list of the references used in this presentation.

#### **Slide 21: Thank You (Ferc)**

**Script:** Thank you for watching our presentation.