

A man with a beard, wearing a VR headset and a red hoodie, is shown from the chest up. He is gesturing with his hands, with his right hand raised and palm facing forward, and his left hand open and facing towards the viewer. The background is a plain, light-colored wall. A small, horizontal, multi-colored bar (green, orange, and blue) is visible on the left side of the image, partially overlapping the man's arm.

# VR Application in Projectile Motion

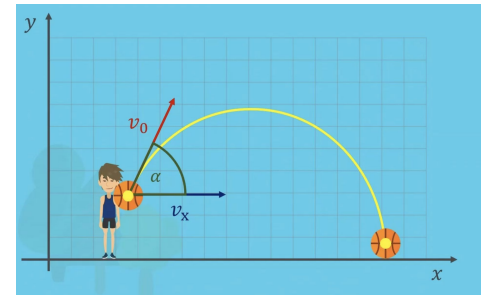
Physics behind projectile & spinning motion

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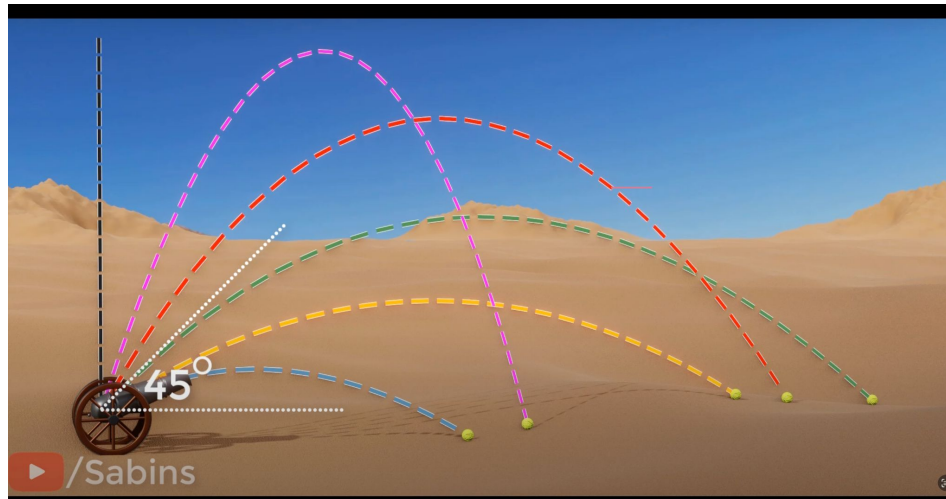
# Educational aspects

# Projectile motion

- Helping students realising the subject, not just the formula
- VR improves the quality of education provided to the students
- Students learn procedures without any risk
- Calculate the maximum height/distance can reached
- Learn how to throw a projectile with the best angle



# Projectile motion video



[https://youtu.be/uEnUG\\_1TYxc?t=162](https://youtu.be/uEnUG_1TYxc?t=162)

# Spinning motion

- Actively learn how to make a ball spin without it falling down
- Understanding balance and the physics behind it
- Interactive aspect (Interacting with the ball)



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# Gamification aspects

# Environment

- Basketball court
- Football field



# Features & Goal of the game

- Get points if you throw the ball into the rim
- Pop up window with hints and small educative video (all physical forces will be shown)
- Guide the user for the optimum throwing angle with color indicators
- The aim of the game is to score as many points as possible. The user creates a high score.





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**Meet with our Personas!**



## Kevin Malone

"I love shooting hoops in my free time."

### DEMOGRAPHICS

Gender: **Male**

Age: **17**

Education: **High School**

Job: **Student**

### TECH

Analytical Thinking: ★ ★ ★ ★ ★

Tech knowledge: ★ ★ ★ ★ ★

Outdoor Activities: ★ ★ ★ ★ ★

VR Experience: ★ ★ ★ ★ ★

## THE SUBJECT

I am a sportive person, but during my high school I had hard times understanding analytical subjects. I feel like I need hands on experience and interactive visualizations to understand analytical concepts.

### GOALS

- ☆ Learning analytical subjects via an entertaining environment.
- ☆ Practicing basketball skills in free time.
- ☆ Turning my passion into academic success.
- ☆ Passing highschool subjects with a greater understanding.

### FRUSTRATIONS

- ☹ Having hard time understanding the theoritical subjects.
- ☹ Feeling sleepy while converting one formula to another.
- ☹ Having very little experience on the VR environment.
- ☹ I am looking for an easy solution to improve my shooting skills



## Jeffrey Waltt

“I love to play American football in my freetime”

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### DEMOGRAPHICS

Gender: **Male**

Age: **21**

Education: **High school graduation**

Job: **Student in Sports science**

### TECH

Analytical Thinking: ★ ★ ★ ★ ★

Tech knowledge: ★ ★ ★ ★ ★

Outdoor Activities: ★ ★ ★ ★ ★

VR Experience: ★ ★ ★ ★ ★

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## THE SUBJECT

I would love to play in an American football club and improve my skills and capabilities. In particular, I want to improve my throwing technique and understand the physics behind how I can make a perfect throw.

### GOALS

- ☆ Learning the physics behind a good throw
- ☆ Wants to be accepted in a football club
- ☆ For his training wants to learn a perfect throw
- ☆ Wants to gain more knowledge in physics for his degree programme

### FRUSTRATIONS

- ☹ I can't throw a football as far as I should in a normal game.
- ☹ Can't connect the link to the theoretical formulas with practice
- ☹ I don't have the opportunity to practice throwing on a large field.
- ☹ For my degree course, I also need to understand the physics behind a movement.



## Bryan Wick

"Quick resolve important issues is my priority"

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### DEMOGRAPHICS

Gender: **Male**

Age: **36**

Education: **Software Engineer**

Job: **Product Manager**

### TECH

Analytical Thinking :: ★ ★ ★ ★ ★

Tech Knowledge: ★ ★ ★ ★ ☆

Sports Activity: ★ ★ ★ ☆ ☆

VR Experience: ★ ★ ☆ ☆ ☆

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## THE SUBJECT

I am working as a Product Manager at Siemens. I am really fond of video games .Sometimes I play golf and hanball. I always look forward to new technologies gadgets, cars and games.

## GOALS

- ☆ I am working on a Project on 3D printers and wants it to successful
- ☆ I want my product to be very handy and useful
- ☆ I want to use my smartphone fast and efficiency
- ☆ I want to see detail statistics of my past transactions and payments

## FRUSTRATIONS

- ☹ Sometimes I fail to comprehend users
- ☹ The vision of the product gets lost during execution of the plan
- ☹ Difficult to prioritise product features and capabilities
- ☹ My laptop hangs a lot and I struggle to play games over it

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# Basic Layout of the Project





1

**Entering  
The  
Virtual Environment**

**Questionnaire  
Pop-Up**

2



3

**Call to Action  
Button**

**Educative Video**

**4**



**5**

**Try it yourself**

**Gamification starts**

**6**





7

User tries to throw  
into the rim

Recap of the  
throwing

8



9

Manipulation and  
adjustment of the  
trajectory



# Thank you!

Project members:  
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Anand Bihari / Ambacher,  
Julian Emanuel

