

Proposal for a
Digital Media Capstone Project
In Partial Fulfillment of the Requirements
For a Master of Liberal Arts Degree

Harvard University
Extension School

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Proposed Start Date: August 30, 2019

Anticipated Date of Graduation: May 2020

1.1 Project Title

FunEduGeo (may change in the future), an Interactive AR educational Geography Game.

1.2 Capstone Category & Related Courses

Select the category of your capstone:

- Device & emerging media

List the courses you took that relate to the selected category.

- CSCI E-10A
- CSCI E-10B
- ISMT S-170

1.3. Project Goal

The goal of the project is to make education “funnier” as new generations are more used to interactive and digital content and education has not evolved at the same rate.

There are some companies that are already addressing this very same problem using AR such as Yahart, EnvisionAR but their focus and methods are different.

The advantage of FunEduGeo over its competitors is the accessibility. Even though some Physical map will be required it can be easily printed.

1.4. Learning Goals

What skills are you planning to develop during the completion of your project?

- AR Development: Even though I have 3 years of professional experience using the main tool UNITY, I don't have much experience developing AR.

What new approaches or technologies are you planning to learn?

- Photogrammetry which is a technique for 3D scanning. You can capture large objects, like buildings or even mountains, that would be impossible to scan using other methods. Moreover, photogrammetry is also extremely affordable since you probably already own the most important piece of equipment: Your smartphone camera. All that's left is photogrammetry software to create a 3D file of the object you have photographed(*Max von Übel, 2019*).

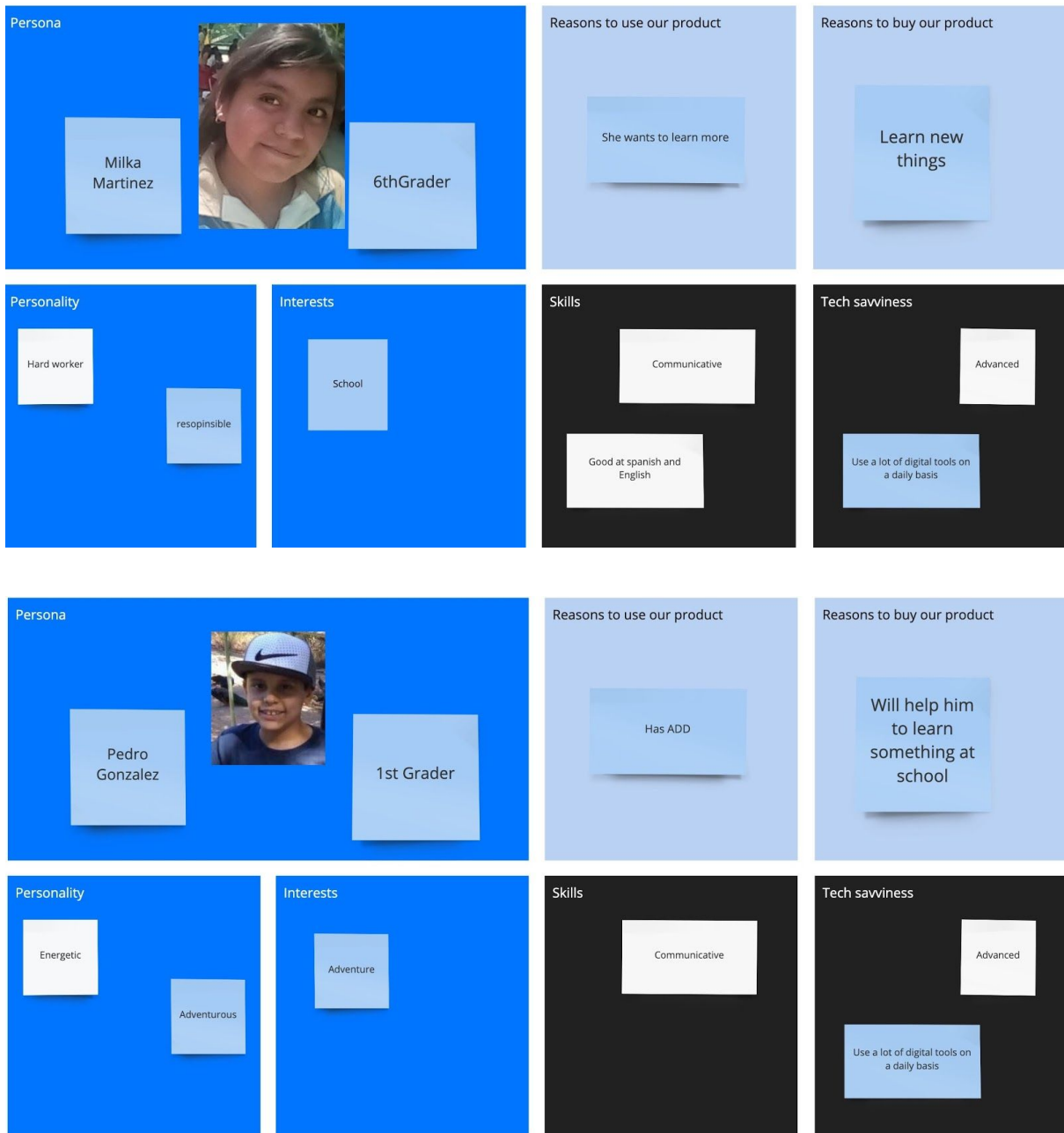
1.5. Elevator Pitch

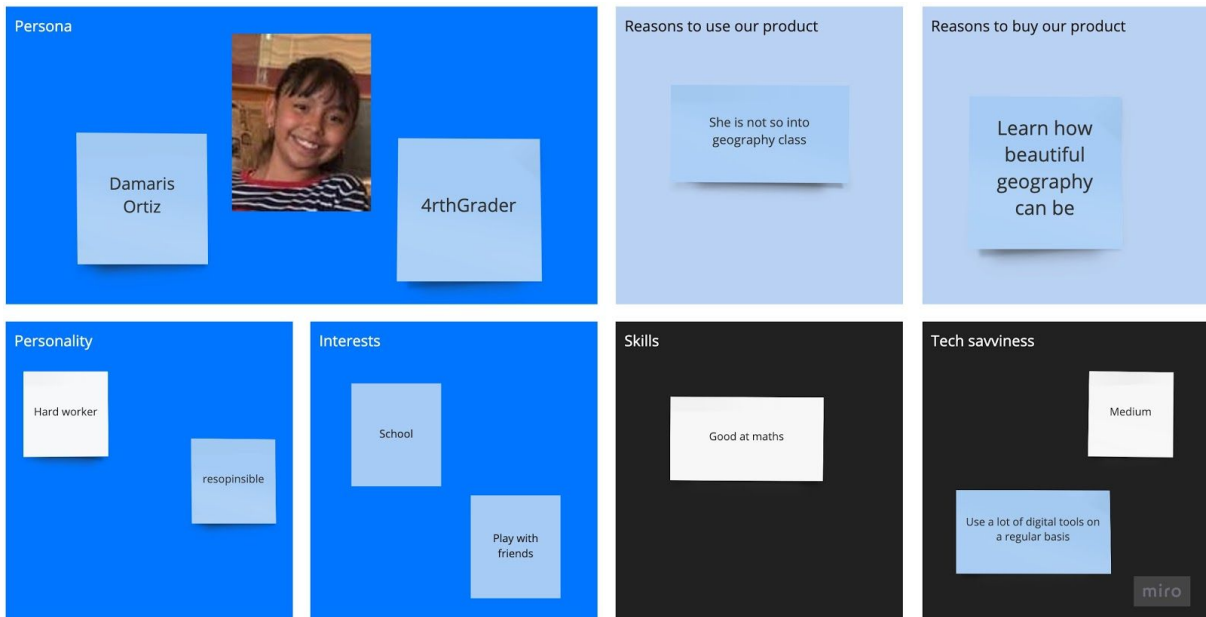
FunEduGeo will make usually considered “boring” subjects “fun”, such as Geography or history (sadly). AR technology will be used and will be accessible to everyone with a smartphone and a Printer.

It will be developed mainly with Unity, Maya and Photoshop.

1.6. Target Audience, Personas & Empathy Maps

My target audience is kids between 6-12 years old who have access to smartphone, internet and have knowledge of the english language. I will use AR technology and will be accessible to everyone with a smartphone and a Printer.





1.7 Metric

	Inadequate	Marginal	Fair	Good	Exceptional
<p>Entertaining The objective of this app is to be entertaining. Once way we could measure how entertained they were is through review and replay.</p>	The users give bad reviews and never open it again.	they give not so bad reviews but never open it again.	The give good reviews and replay it once.	The give good reviews and replay it more than once.	The users are so excited and entertained about using the product. They give excellent reviews and replay it several times.
<p>Easy to use We could measure how easy to use a product is by the time taken by him to do certain task and the amount of questions required. In this test we</p>	5 or more questions. 1 minute. Unable to complete task.	2 or more questions. 30 seconds	0 questions. 15 seconds	0 questions 10 seconds	5 seconds. 0 questions required.

would make a task that would take 5 seconds to make for an experienced user.					
Educational Since the goal of the product is to make the users to learn something new it can be measured through the quizzes.	Users were unable to answer correctly all the quiz.	Users were able to answer correctly 40% of the quizz	Users were able to answer correctly 60% of the Quiz	Users were able to answer correctly 100% of the quiz	The users learned all the information provided. and all the quiz were answered correctly.

1.8 User Survey

1. Rating from 1(worst) to 5 (best) how was your experience using the product?
2. Rating from 1(worst) to 5 (best) How much did you learn while using it?
3. Rating from 1(worst) to 5 (best) How much fun did you had?
4. Rating from 1(worst) to 5 (best) Would you use the product again?
5. Rating from 1(worst) to 5 (best) Would you use this as a compliment to school?
6. Describe what you enjoyed the most.
7. Why?
8. Describe what you didn't enjoyed.
9. Why?
10. What would you improve about the platform.

2 Competitor Review

1. Yahart

- **Description**

Their main focus is creating educational games for children using several technologies.

I will be focusing this review on certain development which is an AR solar system carpet which helps children to learn more about planets, moons and stars inside it. They can select certain planet, rotate it and read information about it. the video (Yahart 2015).

- **Pros**

1. Visuals: All the products developed by them look gorgeous, they have great animations and art style and concept. It's satisfying to watch.
2. Engaging: Their products are so engaging and you're naturally so curious about everything, even though they're for kids and I am 27 I am considering buying at least some of them.

- **Cons**

1. Not necessarily a game, even though they're interactive they cannot be considered a Game.
2. You need to buy their physical products (in this case the carpet).
3. Low Replay value
4. Not free

2. Envision AR

- **Description**

This AR expertised company alongside with many other developments have created an AR educational platform creating content mostly in science and Biology for young learners.

The One in Particular I will be focusing on I think it may be a great example of AR Education is a Chemistry Game where you put different elements into a flame and see the flame's reaction depending on the element that the user decides to put into the flame. the video(EnvisionAR 2019).

- **Pros**

1. Visual: It's so beautiful everything that's made from them.
2. Engaging: This looks so fun to play and it's a game where they even test you.
3. It's easily accessible, you only need to print a piece of paper.

- **Cons**

1. Their games even though excellent, have low replay value.
2. Not Free

- **Arkids Cards**

Description: This company developed an amazing game that helps students to learn about animals and the food chain, electricity, maths using AR and Interactive Cards.

The one I will be focusing now is on their Math Game using Cards. the game is diverse you can play by either giving a number(on the AR camera with cards) answer depending a given equation or you can create your own equation using cards the numbers on the cards will become 3D modelled and will give you feedback about the answer if it is correct or not. the video(Arkids Cards 2019).

- **Pros**

1. Engaging: their products look so fun to play and they also look so educative.
2. High Replay value.

- **Cons**

1. You need the physical equipment(cards, etc), they aren't available for printing.
2. Not free.

	Yahart	Envision AR	Arkids Cards	FunEduGeo
Visuals	✗	✓	✓	✗
Sound	✗	✓	✓	✗
Engaging	✓	✓	✓	✓
Fun	✗	✓	✓	✓
Interesting	✓	✓	✓	✓
Educative Material	✗	✗	✓	✓
User Friendly	✓	✓	✓	✓
Price	✗	✗	✗	✓

Replay Value	✗	✗	✓	✓
Easy Acces	✗	✓	✗	✓

3 Required technologies

Unity 3D

- description: This Software is used mainly for video games although it can be used to develop several AR and VR apps.
- related courses or professional experience: Worked for 3 years as a professional gambling game developer using this tool.
- alternative technologies, technologies used by competitors: Unreal Engine
- reason for selecting this technology vs. its alternatives: I know this tool better.
- how it will be used in your project: The main core will be developed with it.

Adobe Photoshop

- description: This software is used mainly for editing and creating new images or textures.
- related courses or professional experience: DGMD E-50
- alternative technologies, technologies used by competitors: Sketch, gimp.
- reason for selecting this technology vs. its alternatives: I know this tool better.
- how it will be used in your project: The main map and textures will be done with it.

Autodesk Maya

- description: This software is used mainly for creating 3d models and 3d animations.
- related courses or professional experience: I have a bachelor's in Animation and Digital Art
- alternative technologies, technologies used by competitors: Blender.
- reason for selecting this technology vs. its alternatives: I know this tool better.
- how it will be used in your project: all the 3d models and 3d animations will be done with it.

4.1 Product Architecture

First Thing you need to do in order to use the Product is Printing the Map, which will be available for easy printing.



Second, Open the App and the app will access your Smartphone's Camera and then point to the Map you previously printed.



Third, Select the continent by pushing a button and a 3D display about the continent and its major countries will appear. The app will locate on it's DB the references you're looking into and will internally load it.



Fourth, Select a country all the information will be inside the program's memory so there will be no need for awaiting for internet connections.



4.2 Instructional design Brief

6 Facets of Understanding: The 6 facets are a tool to help unpack what deep learning looks like. Not all facets are applicable for all projects; however, consider each one. What could a possible desired understanding or learning outcome be through the lens of each of the six facets? Share your notes here.

Explanation: The user will be able to receive an explanation on different topics.

Perspective: The user is able to play a game and read about a country (sometimes a stigmatized one) in a different perspective, Will read the good things about it, interesting facts and play a game about it.

Interpretation:

Empathy: People will understand new cultures and be able to appreciate its differences.

Application: Exams at school or just conversations.
More open Minded.

Self-Knowledge: The user will awaken an interest in different cultures and if interested enough, Will pursue more knowledge.

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Why/Enduring Understanding(s): Frame your big idea as 1–2 understanding statements. The understanding statement is expressed as a full-sentence statement and represents an insight, inference, or conclusion about the big idea that learners should gain. Rather than the facts you want them to learn, the understanding statement looks to the meaning of the facts.

Learners will understand and gain some new knowledge about certain countries and will relate something about the place to a game, for example Yemen's game they will build so once they think about Yemen they would think Oh they were great builders.

Evidence of Understanding: How will you know that your learners have obtained the desired understanding? This is often thought of as assessment in formal learning environments. For self-paced and informal learning experiences, this may be more difficult to identify but try.

They will answer a Quiz, and this results will be uploaded to a DB.

Learning Flow: What is the general flow of the learning experience? You may provide a bulleted high-level list, create a Journey Map (a timeline that graphically maps the experience), or other graphic organizer.

Learning Theory(ies): What learning theories—the way in which how people learn—will your learning experience draw upon? List them and make sure you research them further to see how they inform the approach you'll take.

Pedagogies: What pedagogies—methods of how people teach—will your learning experience draw upon? List them and share why.

Constructivist: Since people learn through Experience.

Constructivism: Because people will learn through experience.
Liberationism: Because it is a non standard construction.

Inspiration: Identify at least three other learning experiences/products that inspire your project, e.g, workshop, training, e-learning course, game, curriculum, museum exhibit, YouTube channel, etc. Be specific.

5 User Journey

First Thing you need to do in order to use the Product is Printing the Map.



Second, Open the App and the app will access your Smartphone's Camera and then point to the Map you previously printed.



Third, Select the continent by pushing a button and a 3D display about the continent and its major countries will appear.



Fourth read the Basics of the Country.



Fifth Play the Game.



Depending on the country there will be 2 possible games:

1 - Climber

- a) The game is simple, you only have 2 buttons (half and half of the screen) and the objective is to dodge obstacles , if you press on the right part of the screen the climber will go left, if you press the left one then it will go left.

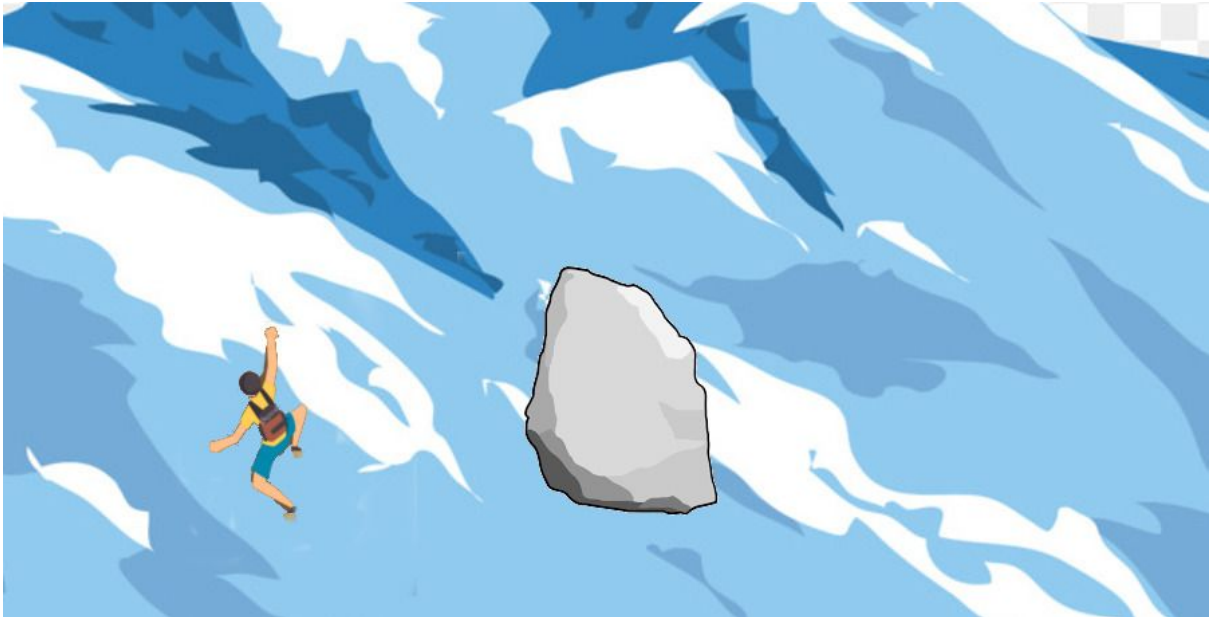
The climber will go up Eternally until some rock makes him fall down, the game will be progressively harder (faster and more obstacles)



Ups a rock appeared!!



Fortunately he can just move, dodge and keep climbing!!



2- Builder

On this game the user will build an eternal skyscraper where blocks will fall from the sky and the user will direct it towards right direction.

The game will be eternal and progressively harder until the user loose.





Fifth Answer a Quiz.



Some Quiz examples:

Which is the official language of Nepal?

- a) Hindi
- b) Tzeltal
- c) Nepalese
- d) Tibetan

Correct Answer: c) Nepalese

Which is the Capital City of Nepal?

- a) Delhi
- b) Lhasa
- c) Kathmandu
- d) Amritsar

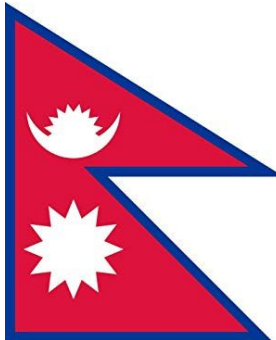
Correct answer: Kathmandu.

What is nepal most famous for?

- a) Taj Mahal
- b) Mount Everest
- c) Potala Palace
- d) Samarkand

Correct Answer: b) Mount Everest

Please select the nepalese flag.



Correct answer:



6.1 Timeline

						2020				
Card	Label(s)	Member(s)	De...	Start	End	Jan	Feb	Mar	Apr	May
Capstone Spring 2020										
List of Tasks										
Decide and research sho...	incomplete			09-01-20	08-05-20	✓				
~ Create sample Map	incomplete			31-01-20	31-01-20		✓			
Create the Map										
Create AR Indicators										
Create AR Markers										
~ Create 3d Models for Sa...	incomplete			14-02-20	14-02-20		✓			
Textures										
Models										
Animations										
~ Create the game	incomplete			20-04-20	20-04-20				✓	
3D Models										
Visually ensambled										
Algorithm										
Unity Integration										
Programming										
~ Create the Quiz	incomplete			20-04-20	20-04-20				✓	
~ Quiz question random...										
Create questions	incomplete									
Test	incomplete			08-05-20	08-05-20					✓

project: Capstone Spring 2020

last update:

Time block (incomplete)

Time block (completed)

✓ Due date (incomplete)

✓ Due date (completed)

6.2 Milestones

Milestone	Completion Date	Description of Deliverable(s)
Decide and research short but important information about countries.	January 8th 2020	Make an extensive research about the selected country and include basic information (capital, languages, flag, etc) but also include some interesting facts about the country (for example if the country is Mali we could mention Mansa Musa I Emperor of the Mali Empire and the richest man EVER)
Create sample Map	January 31st 2020	<ul style="list-style-type: none"> ● Create the Map Itself: create a good looking, memorable map. ● Create AR markers

		for Icons to appear on them.
Create 3d Models for Sample Map	February 14th 2020	Once the AR camera is on the map and detects the AR markers it will substitute them with 3d models of some representative building of countries and continents.
Create the game	April 20th 2020	<ul style="list-style-type: none"> ● Create 3D models, textures of the game. ● Organize it visually in unity: prepare the terrain for it being programmed. ● Program it: make the game actually work.
Create the Quiz	April 6th 2020	<ul style="list-style-type: none"> ● Create the questions. ● Create Question randomizer and evaluation system
Test	May 8th 2020	Look out for errors

6.2 References

Max von Übel, 2019 Best Photogrammetry Software (Some are Free), viewed november 12th 2019, <https://all3dp.com/1/best-photogrammetry-software/>

Yahart (2015) Augmented Reality Education Solar System on CARpet

Video at: <https://www.youtube.com/watch?v=UkWuVVVUD4Q>

EnvisionAR(2019)Chemical reaction using augmented reality | Envision AR

Video at: <https://www.youtube.com/watch?v=Kp5ubU2Y07Y>

Arkids Cards(2017)AR MATHEMATICS . Augmented reality elements

Video at: https://www.youtube.com/watch?v=qn_awl4b5pU