

CS 4366: Capstone Project
Instructional Plan (1) for our Group's Educational Mobile Application

NAME: Elementary Classroom Instructors

DATE and TIME: During the school day science class or afterschool STEM educational program

LENGTH: 40 minutes total suggested: 30 min activities, 10 min to spare

LESSON TITLE: Introduction to Skele-Pedia Educational Mobile Application

- (This Instructional Plan is to be implemented as the very first introduction and use of the Skele-Pedia app for students.)

NUMBER OF LEARNERS: 4 to 15 per instructor ideally

MATERIALS (Teaching Aids):

****Pre-Printed Images as "Platform":**

—This image is needed, one for every camera being used, which the Skele-Pedia app will recognize and use as a "platform" upon which the 3D augmented reality ("additional reality") human skeleton will be projected.

—*Image available to view and download* within "Nuts & Bolts" section in Menu Panel within the application.

Mobile Device with Android, Functioning Camera & Functioning Touchscreen:

— Do not use a technology device that is made by Apple; do not use an iPad, Mac or iPhone.

—The app is only compatible with Android smartphones (Motorola, Samsung, Nokia, etc). (Web browser-compatibility soon to come.)

****INTERNET or MOBILE DATA:** Needed only when instructor(s) pre-download(s) mobile app.

****Pre-Downloaded Software:** Skele-Pedia app from the GooglePlay store for every camera-equipped device in use for learning.

****first with IRB approval** Pre- and Post-STEM Interest Surveys:**

****Print the pre-lesson STEM interest survey before the FIRST LESSON** using Skele-Pedia.

****Print the post-lesson STEM Interest survey** after the students have completed at least 5 lessons with Skele-Pedia.

—*Both surveys are accessible to view and download* within "Nuts & Bolts" section in Menu Panel within the application.

SEATING ARRANGEMENT:

—All students in room or space with at least 2 feet radius of circle of empty space around them, to have ample space to access the 3D augmented reality skeleton through the camera of the mobile device.

—Instructor(s) at the front of the room to introduce the activity and begin **the (printed) pre-lesson STEM interest survey.**

IDEAL CONDITIONS:

— Significant lighting for camera to recognize pre-printed image. Little to no wind to move the image, or, instead, adhere the printed image to a still, flat surface, for the camera to recognize the pre-printed image as the "platform" for the 3D augmented reality human skeleton.

— Additionally, cameras must be in good condition to recognize the specific pre-printed image as the "platform".

—The touchscreen of the mobile device must be able to recognize clicks and drags by the user.

—The mobile device will be fully charged to have sufficient battery life to work with the camera, touch screen, and the substantial hidden working files for the mobile app.

Learning Goals, Objectives, and Example Instructional Plans: Viewable and Downloadable within “Nuts & Bolts” section in Menu Panel within the application.
FOR REFERENCE ONLY--Direct Link to App’s GitHub: <https://github.com/Juanita-Benjamin/Skele-Pedia>

LEARNING OBJECTIVES:

- When prompted to open the Skele-Pedia mobile application, student users will be able to complete the application opening process, including successfully using the tracked imaged recognition by the instructor’s walk-through demonstration of tracking the image on the instructor’s device.
- After successfully opening the application and typing in their name, students will be able to use the Menu panel to switch between any scenes of the application by verbal and visual explanation of the instructor.
- Students will be able to operate the Skeleton Information scene of the game with 3D augmented reality by their own trial and error in the touch screen and the instructor’s baseline verbal guidance.

INTRODUCTION (short to maximize student attention)

Great morning/afternoon/evening students/apogees/prodigies/pupae! Great morning/afternoon/evening!!

Today we are learning something new ... and something cool! We are going to learn about the human body and our bones! And, we are going to learn with our *[mobile device listed here]*’s camera and see an entire skeleton stand on the floor!

FACTS TO BE TAUGHT (Content)

- The Skele-Pedia app teaches us about the adult human skeleton.
- To create the standing skeleton we need to use the printed image as a platform that the camera sees at the start of the game.
- With the application open and the camera pointing to the printed image on the ground, the Skele-Pedia game adds something to what is around us in “augmented reality”.
- Augmented reality is like drawing something on top of a photo already printed, so it adds to the photo, and it looks like its part of the photo, but it wasn’t there in the beginning, and it can be taken away.
- There is a menu button (a glasses image) to

LEARNING EXPERIENCES (Activities)

- If attention and technological resources allow (if the instructor’s device’s screen is easible viewable to all students), students watch the instructor open the Skele-Pedia application, follow the name and camera prompts, and start the additional virtual skeleton projection into reality.
- Click and open the Skele-Pedia application on the students’ available mobile devices.
- Follow the prompts to put their name and use the camera to track the image upon which the skeleton is projected.

<p>change between the different views and games within the app.</p> <ul style="list-style-type: none"> • The button opens a panel with the names of the different mini-game (quiz, trivia, puzzle) options within Skele-Pedia. • Click the text of the mini-game (quiz, trivia, puzzle) to switch to that part of the Skele-Pedia app. • Skele-Pedia has four views. (1) Skele-Info, the default AR skeleton with descriptions. (2) Drag Bones, the broken apart AR skeleton with the ability to drag and fit the bones into their correct place together. Like a puzzle. (3) Skele-Quiz, with short multiple-choice questions based on the descriptions in the Skele-Info default AR skeleton view. (4) Skele-Trivia, with fun fact multiple-choice questions based on descriptions in the Skele-Info view, and important knowledge regarding nutrition and anatomy. 	<ul style="list-style-type: none"> • Explore the 3D augmented reality skeleton in the opening “Skele-Info” view. Students are able to click the bones to view the description paragraphs. Students are able to move around their view of the skeleton (like rotate around the skeleton). • Click the Menu button (glasses image) to open the side panel on the left. • Click each word-button on the side panel to change the view of the game. • Troubleshoot with instructor and neighboring students if a part of the program is not visible or if a change in view (switching between the mini-games/quiz/trivia) is not working.
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CLOSURE:

Wow, wasn't that fun?! I've never seen a skeleton appear in my phone before! My favorite part was *[share your favorite part]*.

((REVIEWING)) The app we used today was Skele-Pedia, and with our camera and the printed sheet of paper Skele-Pedia created a new virtual addition to our environment, a Skeleton standing on the floor! And in exploring the application we learned the names and facts about the bones.

CHECK FOR UNDERSTANDING (Evaluation):

Ask students what paper they need before they are able to view the skeleton (printed track image.) Ask students the name of the first scene explored, Skele-Info. And, ask students how they can switch between scenes.

RESOURCES:

BONE - FACTS & DESCRIPTIONS::

<http://www.startsateight.com/the-skeletal-system/>
<https://www.uc.edu/content/dam/uc/ce/images/OLLI/Page%20Content/THE%20SKELETAL%20SYSTEM.pdf>
<https://www.wlwg.k12.or.us/cms/lib/OR01>

TIME PLAN:

- Welcome & Introduction: 5 min; includes quieting students and reading above introduction
- Walk-Through of Opening App & Tracking Image: 5 min
- Students try Tracking the Image: 5 min
- Students Explore 3D AR Skele-Info: 10 min
- Use Menu to Switch between Scenes: 2 min

[812/Centricity/Domain/1730/Ch.5skeletalstem.pdf](#)
<https://www.austincc.edu/sziser/Biol%202404LecNotes/2404LNExII/c.Skeletal%20stem.pdf>
https://www.pbs.org/wgbh/evolution/library/2/image_pop/l_042_01.html
<https://www.healthline.com/health/fun-facts/about-the-skeletal-system#8.-More-than-half-your-bones-are-in-your-hands-and-feet>

- Conclusion & Summary: 3 min

Total: 30 min, Spare: 10 min

CONTINGENCY PLAN:

Have alarms set 2 minutes for each different activity start time, that way it is possible to prepare students for switching activities.

If one or two students are having trouble while the rest of the class is ready to move on, explain the next section to the rest of the class, and work closely to troubleshoot the other students' technical difficulties.

If the lesson extends overtime:

We will not explore the menu to switch between scenes. In addition, if necessary, we will shorten the time to explore the first Skele-Info AR scene.

If the lesson ends sooner than expected:

Explore the Drag Bones scene, or, encourage students to move around the Skele-Info skeleton more.