The Role of Storyboard Design in the Development of 3-D STEM Educational Simulations

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Motivation

- Traditional educational resources do not sufficiently convey the three-dimensional nature of astrophysical concepts.
- Many common misunderstandings come about due to an inability to learn through interactive methods that tailor to individual learning preferences.
- Extended Reality (XR) can be an effective tool to address knowledge gaps and increase student engagement.
- The topic of seasons and seasonal constellations was chosen from a list of about two dozen for the process of storyboard creation and simulation development.

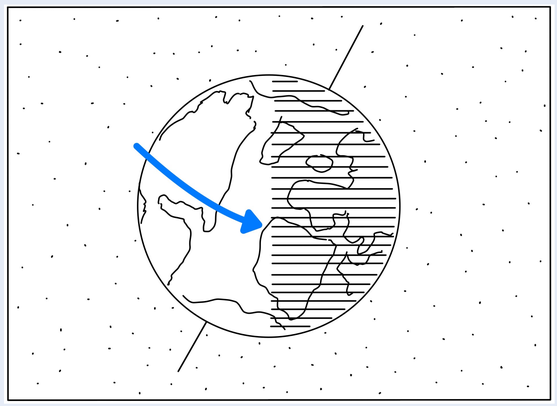


Figure 1: Sketch from preliminary storyboard displaying Earth's rotational and orbital motion.

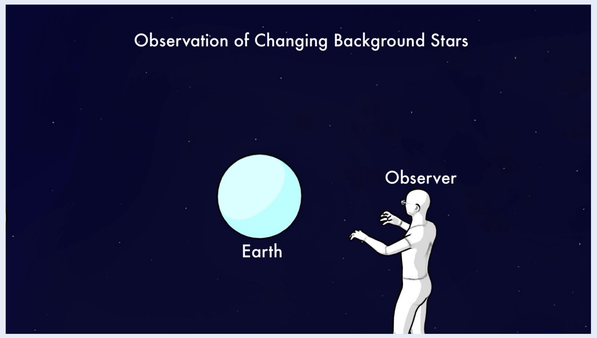
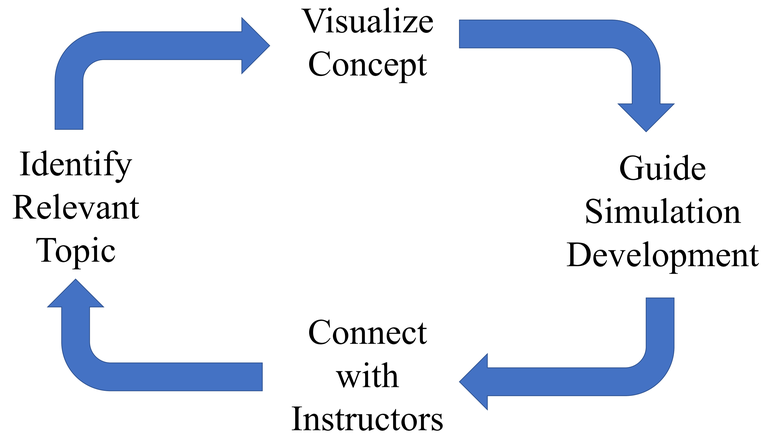


Figure 2: Recreation of Earth's motion scene using Storyboarder program.

Use of Storyboards



Creating a Storyboard

- Identify the Topic: communicate with educators to acknowledge learning objectives and widespread gaps in students' knowledge
- Create Storyboard:
  - Step 1 – Use iPad to design a cohesive outline along with individual scenes
  - Step 2 – Use Storyboarder program to quickly visualize scenes and change reference frames

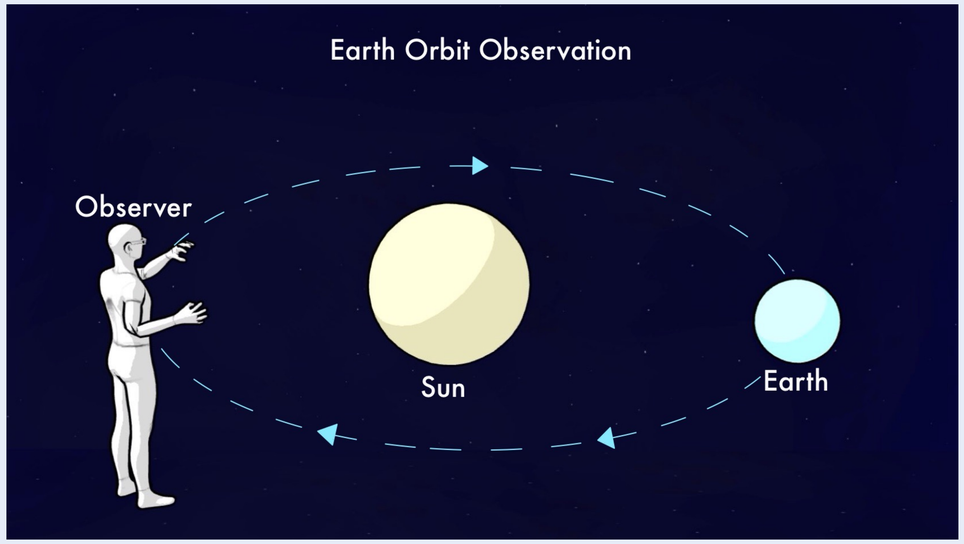


Figure 3: Scene depicting observation of the relationship between Earth and the Sun.

Timeline

1. Create storyboard explaining seasons
2. Develop Simulation
3. Develop lesson plan
4. Implement and test in classrooms