EASE steam

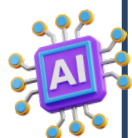EuropeAn network of steam Educators

LESSON PLAN

TITLE:
Transforming 2D Images into 3D Models Using AI

GRADE LEVEL: 10th, 11th and 12th Grade

STEAM AREAS: Technology, Arts, Mathematics

MATERIALS NEEDED:

- Computers with internet access;
- Access to CSM.ai platform (free account creation needed);
- Images for 3D model generation ((samples provided by the teacher or chosen by students);
- Blender software;
- Basic mouse and computer navigation skills;
- 3D printer (optional).

OBJECTIVES:

- Students will learn how to use AI technology to create 3D models from 2D images using the CSM.ai tool;
- Develop an understanding of the principles of 3D modeling, including geometric transformations;
- Enhance problem-solving skills by optimizing and refining 3D models for 3D printing.

PROCEDURE:

Introduction to 3D Modeling (10 mins):
- Begin the class with a brief introduction to 3D modeling and its applications in various fields such as gaming, animation, engineering, and medical science;
- Explain how traditional 3D modeling involves using specialized software and can be complex and time-consuming.

Exploring AI in 3D Modeling (15 mins):
- Introduce CSM.ai, an AI tool that converts 2D images into 3D models;
- Show a video or a presentation on how AI is transforming the field by enabling faster and more accessible 3D modeling.

Setting Up Accounts (10 mins):
- Guide the students to create their accounts on CSM.ai;
- Walk them through the process of email confirmation and log into the platform.

Selecting the Right Images (20 mins):
- Discuss the importance of choosing the right images (clear, front-facing, minimal background) for effective 3D rendering;
- Allow students to select images from a pre-approved set, ensuring they meet the necessary criteria.

PROCEDURE:

Creating 3D Models with CSM.ai (30 mins):
- Have each student upload their chosen image to CSM.ai and generate a 3D model;
- Instruct them to review the initial automated top, side, and back views generated by the AI, adjusting settings if required.

Refining Models (60 mins):
- After generating a basic model, students should use the 'refine' option to enhance the quality of their 3D model;
- This process is automated but can take some time, allowing for a discussion on how AI estimates and interprets different shapes and forms.

Downloading and Preparing for 3D Printing (40 mins):
- Once the refined models are ready, guide students to download the models in STL format;
- Introduce them to Blender. Explain the basic functionalities: import models, delete extra vertices, smooth surfaces, and prepare the base for printing.

Basic Modelling Adjustments using Blender (50 mins):
- Walk the students through the process of adjusting their 3D models (smoothing, scaling, and base flattening) in Blender;
- Demonstrate how to position the model to ensure it has a flat base and is oriented correctly for 3D printing.

Exporting Models (10 mins):
- Instruct students on how to export their final adjusted models from Blender as STL files, ready for 3D printing.

Review and Discuss (15 mins):
- Have students present their final models and share their experiences and challenges faced during the session.
- Discuss the potential applications of their newly acquired 3D modelling skills.

ASSESSMENT:
- Students will be assessed based on their ability to:
- Explain the process of AI-generated 3D model creation and refinement;
- Demonstrate the proficiency in using Blender for 3D model editing and modifications;
- Evaluate the influence of image quality on the accuracy of 3D model generation.

REFERENCES:
- "Free AI - Advanced 3D Models From Images - Ready For Printing!" by ArchiTECH (https://www.youtube.com/watch?v=uD_p8Zpa_d8);
- Blender software at https://www.blender.org/;
- Online resources on AI-generated 3D modeling, Blender software tutorials, and 3D printing basics.

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