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Designing an AR Quiz: Genetic Diseases – Challenges and Solutions



BIOS4YOU
AR 2.0

BIO-INSPIRED STEM TOPICS FOR ENGAGING YOUNG GENERATIONS
THANKS TO THE USE OF AUGMENTED REALITY

Project Number: 2023-1-DE03-KA220-SCH-000126516

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General Information

Name of the exercise:	Designing an AR Quiz: Genetic Diseases – Challenges and Solutions
Description of the exercises:	In this exercise, students design and create an interactive AR-based test focused on genetic diseases, their causes, challenges, and possible solutions. Using Delightex, learners build a quiz that combines scientific questions with 3D visualizations of DNA, genes, proteins, and cells. The final outcome of the activity is an AR quiz with points and lives, where users answer questions related to genetic mutations, disease mechanisms, and bio-inspired solutions. Correct answers earn points, while incorrect choices reduce lives, encouraging careful observation, reasoning, and reflection. Students act as both learners and creators, transforming biological knowledge into an engaging assessment tool by adding 3D models, designing questions, and defining feedback for each answer.
Participants:	The exercise can be carried out individually or in small groups (2–4 students) to encourage collaboration, discussion, and peer feedback during the AR test creation process.
Participants' age range:	14–18 years
STEM subject and specific topic:	Biology, Biotechnology, Medicine Related areas: Genetics, Digital Literacy, Health Education, Ethics Specific topic: Genetic diseases – challenges and solutions
Gamification process:	Points: Awarded for correct answers and well-designed quiz questions Lives: Reduced when incorrect answers are selected Progression: Students advance through quiz levels representing increasing complexity Immediate feedback: Each answer provides explanations reinforcing learning





Written or graphic description of Augmented info:	3D models: DNA double helix, genes, chromosomes, proteins (healthy vs mutated) Text overlays: Questions, explanations, and feedback Interactive elements: Buttons, choices, score counters, and life indicators
External (or extra) tools required	Smartphone, tablet, or PC with camera, Internet connection, Delightex account Optional: external 3D model repositories (e.g. Sketchfab)
Links (video, images, text online and so on).	Delightex Edu platform: https://edu.delightex.com Educational genetics resources (teacher-selected)





Pedagogical specifications

Here we will collect information on how to use the exercise in the learning session and the results and benefits of using it, from a pedagogical perspective.

How can this augmented information be used to address a STEAM topic in a more interesting way for students?

Genetic diseases involve invisible molecular processes that are difficult to understand through traditional teaching methods. By designing an AR quiz, students visualize DNA mutations, protein malfunctions, and gene-editing solutions in 3D, making abstract concepts tangible. The gamified structure increases motivation and engagement while supporting inquiry-based and creative learning.

Which pedagogical objectives are addressed through this scenario?

- Understanding the genetic basis of diseases
Recognizing different types of genetic mutations
- Linking biological causes with real-world health consequences
Developing digital, visual, and scientific communication skills
- Encouraging ethical reflection on genetic technologies

Which results are expected to be reached with its use?

Through this exercise, students gain a deeper conceptual understanding of genetic diseases and bio-inspired solutions. They learn not only by answering questions but by **designing meaningful assessment content**, reinforcing knowledge through creation, testing, and peer feedback.

Which benefits are expected to be reached with its use?

- Improved comprehension of complex genetic processes
- Increased motivation through gamification
- Development of collaboration and critical thinking skills
- Enhanced digital literacy and confidence in using AR tools
- Positive attitude toward science-based problem solving





Technical specifications

In this part it is necessary to specify whether the exercise was designed to be implemented with AR technology. This part is fundamental for the translation process. Please include text, audio text and all the necessary materials.

AR INFORMATION	
Technology	Augmented Reality using Delightex https://edu.delightex.com/Studio/Spaces
If it's needed a marker, description of the marker	 https://edu.delightex.com/PEJ-CJN
Hardware and software needed:	PC, smartphone, or tablet with camera and internet access, Delightex platform access
Type of Augmented data	Images, text, 3D models, Interactive UI elements
Written description of the AR data	Students create an AR quiz composed of multiple scenes. Each scene presents a genetic challenge (e.g. mutation identification, disease impact, or solution choice) supported by 3D models. Users answer questions, earn points, and lose lives based on their choices. Instant feedback explains the scientific reasoning behind each outcome.
If Image	-
If Text	Quiz questions, explanations, feedback





If video	-
If audio	-
If 3D model	.obj, .stl (available in Delightex Edu library) DNA, genes, proteins, cells





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