Designing educational games: a hand-on approach for academics

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What makes a game a game in educational context?

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What Makes a Game a Game in an Educational Context

Fun: An activity chosen for its light-hearted nature, which in education, fosters engagement and enjoyment in learning.

Separate: Games take place within a designated time and space, creating a structured learning environment that is distinct from everyday activities.

Uncertain: The outcome of the game is unpredictable, keeping students motivated and engaged through challenges and discovery.

Governed by Rules: Educational games are defined by a set of rules, different from those of daily life, that guide behavior and learning objectives within the game.

Fictitious: Games often involve elements of fantasy or simulation, allowing students to explore alternative realities and experiment with new concepts in a safe environment.

Balancing game mechanics with educational objectives

- Avatars & Personalization. Allowing students to create avatars can foster **engagement and ownership of their learning journey**.
- Easter Eggs. Hidden elements can encourage **exploration and deeper interaction with educational content**.
- Goals: Clear learning objectives aligned with game mechanics ensure students **understand the purpose of their activities**.
- Hints. Provide hints or scaffolding to help students **overcome challenges and ensure progression** in their learning.
- Levels and Progression. Gradually increasing difficulty to **challenge students** at the right times, mirroring their learning curve.
- Medium and Genre. Selecting the right type of game (e.g., puzzle, simulation) to best match the subject matter and learning outcomes.
- Number of players. Design for single or multiplayer modes to encourage **collaboration** or individual reflection.
- Obfuscation. Strategically withholding information to encourage **critical thinking and problem-solving**.
- Randomness. Introducing variability in game outcomes to **keep students engaged** and ready for new challenges.
- Rewards and Achievements. Provide feedback through badges, points, or progress markers to **encourage continued effort**.
- Game Rules. Provide clear instructions and boundaries to ensure fair play and **effective learning**.
- Skill, Strategy, and Chance. Balance skill-based challenges with strategy and elements of chance to accommodate **diverse** learners.
- Timing. Structuring game sessions to **fit into instructional schedules** while maintaining momentum.
- Tools. Using tools that **complement the educational content**, such as digital platforms or physical manipulatives.

Most popular scenarios for educational games

Role-Playing Simulations

- **Example.** Medical students acting as doctors in virtual hospitals or law students participating in mock trials.
- **Educational Benefits.** Develops practical, real-world skills through immersive experience.

Problem-solving and Puzzle Games

- Science-based games where students solve physics or chemistry puzzles.
- Enhances critical thinking, analytical skills, and content knowledge.

Adventure Quests

- Students embark on virtual historical quests to learn about different time periods.
- Encourages exploration, inquiry-based learning, and engagement with course content.

Strategic Decision-Making Games

- Business or economics students making strategic decisions to run virtual companies or cities.
- Teaches strategic planning, resource management, and consequences of decisions.

Collaborative Team-Based Games

- Students work together to solve a crisis or complete a group project within the game.
- Promotes teamwork, communication, and collaboration skills.

Quizzes and Trivia Games

- Students participate in quiz battles where they answer questions based on their learning.
- Reinforces knowledge, provides instant feedback, and encourages competition in a fun environment.

Simulation of Real-World Processes

- Environmental science students manage ecosystems, or urban planners design sustainable cities.
- Helps students understand complex systems and the impact of decisions over time.

Educational games and gamified tools

Case1: City of mathematics

- For 9-10 graders (gymnasium students)
- Helps to prepare for mathematic exams
- The aim of the game is to stimulate interest in mathematics, to show the different applications of mathematical knowledge, to consolidate and reinforce it in a fun, playful learning environment. It will not only help you to prepare for the maths exams, but will also show that maths exists not only in a notebook or a textbook, but also in the world around you. The game is not intended as a substitute for a traditional lesson, but will help to consolidate existing knowledge, develop the ability to use mathematical concepts to solve real-world problems, and to understand different contexts that require mathematical preparation. The game provides support to help students develop their understanding of the mathematical text. After correctly solving one problem after another, the pupil receives praise-motivating feedback and, if unsuccessful, is encouraged to try again.
- **https://matmiestas.smp.emokykla.lt/**

Case2: Serious game Monopoly: integration of technology, geography, storytelling and economics

- A game developed by pro-gimnasium children
- Students develop:
  - Geospatial literacy
  - Critical thinking and research skills
  - Digital storytelling and communication
  - Collaborative learning
- https://storymaps.arcgis.com/stories/4a1f888aa9624ff88f636c956612aa46

Kahoot!

Gamified platform that allows teachers to create tests, polls, quizzes, and discussions. Students participate in real-time by answering questions interactively.

Benefits of Kahoot! for Education

- Increases student engagement through interactive learning.
- Provides instant feedback to both students and educators.
- Facilitates active learning in both physical and virtual classrooms.
- Encourages collaboration and competition among students, fostering motivation.

Use Cases in Higher Education

- Quick assessments or revision during lectures.
- Interactive discussions or debates on course topics.
- Engaging in ice-breaker activities at the start of classes.

- https://kahoot.com/

Quizizz

- **Create Custom Tests and Assessments.** Teachers can build their own quizzes or use existing ones from a large library. Students can answer at their own pace, allowing for asynchronous learning.
- **Multilingual Interface.** Available in multiple languages (except Lithuanian).
- https://quizizz.com

Quizlet

Study Tools and Flashcards

- provides a powerful platform for creating flashcards that support learning through repetition, ideal for vocabulary, concepts, or key terms in various subjects.
- **AI integration** helps personalize learning by identifying which concepts students struggle with and providing additional focus on those areas.

Game-Based Learning

- The platform's game-like features such as ***Match*** **and** ***Gravity*** turn traditional study methods into engaging challenges. These games boost retention by making the study process more interactive and motivating.

Customizable Assessments

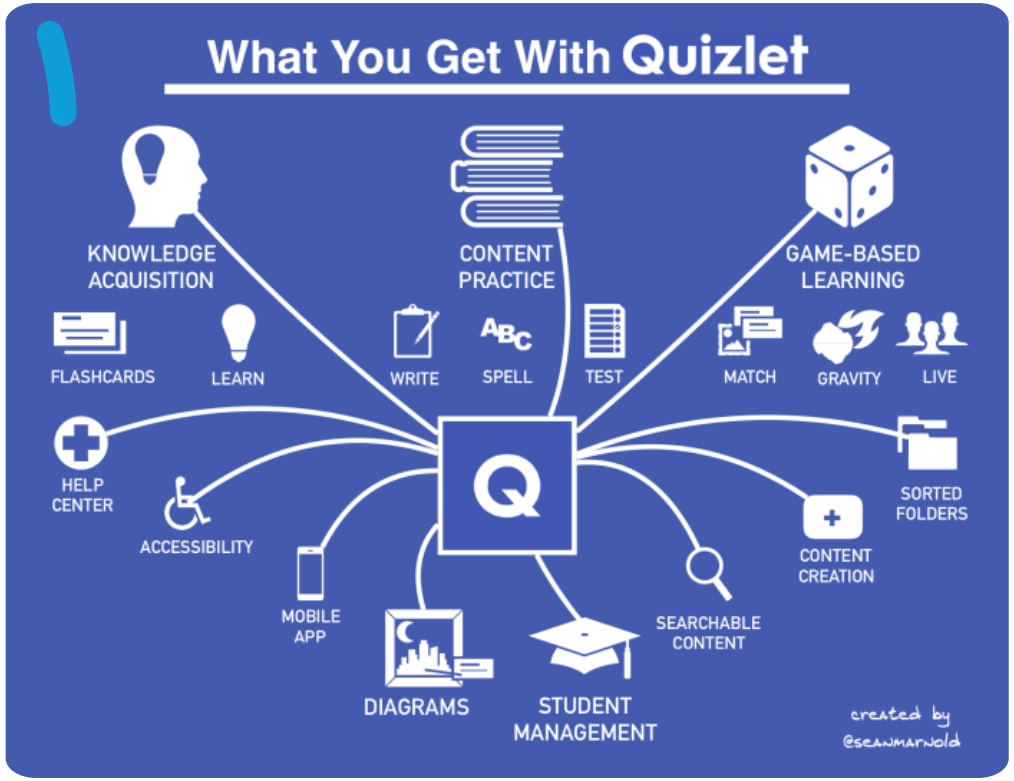
- Teachers can create quizzes and tests using Quizlet's **wide range of question formats**, including multiple choice, true/false, and written responses. This customization allows educators to tailor content to specific learning objectives.

Collaborative Learning

- enables **group study sessions**, where students can collaborate and compete in real-time. This encourages peer learning, which is often beneficial for reinforcing understanding through discussion and interaction.

Mobile Accessibility

- With a mobile app, students can study on-the-go, enabling flexible learning anytime, anywhere. The ability to study in short bursts during free moments can increase learning efficiency.



https://quizlet.com/

https://youtu.be/iLUlqE43vk4?si=rAF0uv7qHBfFDmxs

Blooket

Game variety
Blooket offers a variety of game modes to enhance learning, such as *Tower Defense* or *Battle Royale-style* games. Each mode applies educational content in a unique way, keeping students engaged through **different formats**.

Easy quiz integration
Teachers can create custom question sets or choose from an extensive library of pre-designed quizzes. The platform also allows for the seamless import of questions from other platforms, such as Quizlet, for ease of use.

Competitive and Collaborative Learning
Blooket encourages both individual competition and team collaboration, giving teachers the flexibility to choose which mode best fits the class dynamic or instructional goals.

Real-Time Feedback
Students receive instant feedback on their answers, which helps them learn from their mistakes and track their progress throughout the game.

Customizable content
Teachers can customize content to meet their specific curriculum needs, making Blooket adaptable to multiple subjects, from math and science to history and language arts.

Engagement Analytics
The platform provides analytics and performance tracking, allowing educators to assess student understanding and engagement over time.

- https://www.blooket.com/
- https://youtu.be/oRewpUHF0G4?feature=shared

Wordwall

- Wordwall offers a variety of interactive and printable templates, including matching activities, quizzes, and word searches, making it versatile for various teaching styles and subjects (math, language, science).
- Once the activity is ready, it can either be printed for use in physical classrooms or played interactively on a screen, allowing for flexibility in different learning environments (in-person, remote, or hybrid).
- Instant feedback to students
- Collaboration in group activities (peer-learning and teamwork)
- https://wordwall.net/

Easy as 1-2-3

Create a customized resource with just a few words and a few clicks.

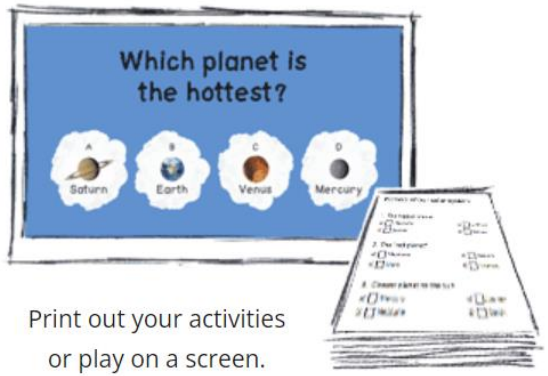
1

Pick a template.

2

Enter your content.

3



Print out your activities or play on a screen.

Classcraft

Role-Playing Game Elements
• incorporates RPG mechanics into the classroom, where students assume characters with different abilities, fostering engagement and motivation by making learning more interactive and immersive.

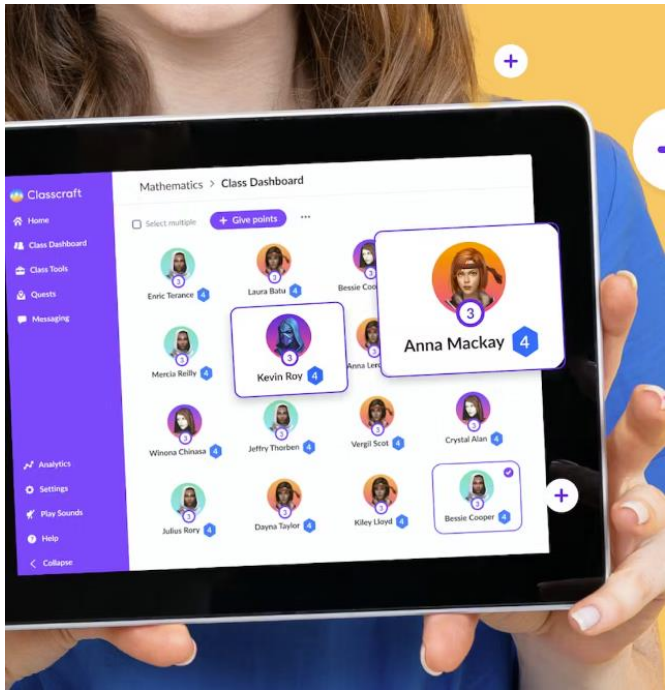
•Encourages Teamwork and Collaboration
•Students are placed into teams and must collaborate to earn points and progress. This builds a sense of community and teaches important skills like cooperation, communication, and collective problem-solving.

•Behavior Management
•Classcraft has built-in tools for tracking and managing student behavior. Teachers can reward students with points for positive behavior or deduct points for negative actions, encouraging accountability and self-regulation.

•Customizable Quests
•Teachers can create personalized quests for students, turning learning objectives into interactive storylines. This promotes inquiry-based learning and allows students to explore content at their own pace.

•Data-Driven Insights
•The platform provides detailed analytics on student progress and behavior, helping educators make informed decisions about how to support each student's learning journey.

•Integrated Learning and Social Emotional Learning
• allowing students to reflect on their choices and the impact of their actions on the class as a whole, supporting both academic and emotional growth.



- https://www.classcraft.com/

Earning and Spending Virtual Currency
Students earn virtual currency by answering questions correctly. They can then use this currency to purchase power-ups or upgrades within the game. This mechanism turns assessments into a dynamic, engaging experience where students are motivated to perform well to gain rewards.

Self-Paced Learning
Students can progress at their own pace, giving them the flexibility to focus on challenging areas. The game keeps them engaged by combining learning with fun gameplay mechanics.

Team Play and Collaboration
Gimkit offers both individual and team-based modes, encouraging students to work together to accumulate points and win. This fosters collaboration while keeping learning competitive.

Real-Time Feedback
Teachers can monitor student progress in real-time, adjusting questions or gameplay as needed to suit the class's learning pace or needs. Students also receive immediate feedback, helping them improve as they play.

Customizable Content
Teachers can create custom quizzes or use premade ones, tailoring content to the learning objectives. The flexibility makes Gimkit suitable for various subjects, including math, science, and languages.

Engagement Through Competition
The competitive elements of Gimkit, such as leaderboards and virtual rewards, keep students motivated and engaged in the learning process.

- https://www.gimkit.com/

Hands-on activity

Step 1: Choose a Gamified Tool

Select one of the gamified tools discussed in the seminar **(Blooket, Quizizz, Quizlet, Gimkit, Wordwall, Classcraft**, **Kahoot**). Choose a tool that aligns with your subject area and teaching goals.

Step 2: Create a Quiz or Survey

Develop a quiz, survey, or interactive activity on a topic relevant to your course or subject matter. Ensure the content you create is aligned with your course objectives and engaging for students. Consult AI if necessary. Design the activity to be educational and engaging, incorporating the tool's unique features such as game mechanics, instant feedback, or collaborative elements.

Step 3: Test Your Creation

Invite colleagues (other participants) to complete your quiz or survey. You can share the link to the quiz or facilitate a live session using the tool. Gather feedback on the tool's functionality, ease of use, and overall engagement from your peers.

Step 4: Present Your Findings ----- WHILE RETURNING HOME (appr. 5 pages with screenshots)

Prepare a brief presentation summarizing the key advantages and potential challenges of using the chosen tool for educational purposes. Address the following:

- Why did you choose this particular tool?
- How does it support learning outcomes in your subject area?
- What are the tool's most significant benefits in terms of student engagement, learning, or interaction?
- What challenges did you face in designing or implementing the quiz?

Step 5: Have fun!