Designing Educational Computer Games as a Form of Active Student Learning

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A new educational paradigm: Instead of memorisation - understanding

What is this understanding?

PERCEPTION

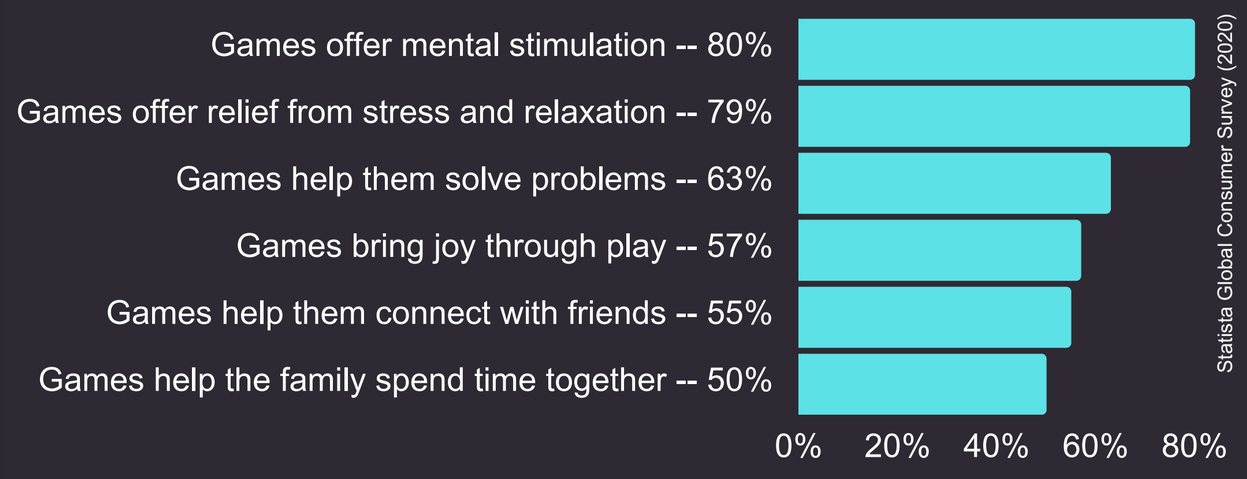
COMPREHENSION

The main purpose of educational computer games: nontrivial thinking

The main task of education is not to perceive and memorise new information but to think in a way that no one else has ever thought about what everyone sees.

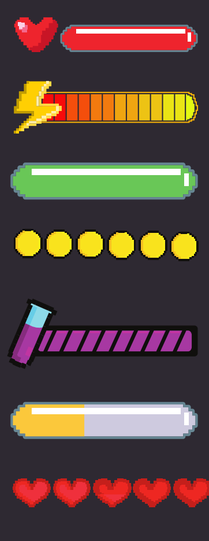
According to Statista's 2020 Global Consumer Survey, here are the times that gamers spend on playing games. Certainly, in the years of the Covid-19 pandemic, time spent on computer games has increased, and the trend is unchanged to this day.

The Potential of Computer Games:



Knowledge and Assessment in Computer Games

Computer games provide different ways of assessing a student's level of 'advancement' in the game:



Strength
Dexterity
Intelligence
Wisdom
Charisma
Willpower
Perception
Luck
Experience

Knowledge can be interpreted, comprehended, criticised, supplemented, accepted, rejected, used, accumulated, and never be fully understood.

Basic Game Design Documentation

Game Concept Document – a document with illustrations showing the game's primary features, roughly showing what resources will be required for game development (staff, budget, timelines etc.)

Proposal Document – a brief description of the game, without details of the development, explaining to a potential investor why the game will be profitable and its socio-economic impact.

Interface and game mechanics – a description of the functional part and how the game is world organised, what characteristics its objects have, motion patterns, role system, and physics.

Technical Design Document and UML Diagram – a description of the technical requirements for the game (memory size, use of databases, etc.); defines utilities and programming language.

Didactic Expertise Document – a description of the educational features of the game, what skills the player will develop, what areas of knowledge and topics the game will cover, what types of tasks the player will solve, and how assessment and feedback will be provided during the game.

Interdisciplinary game development team:

- Designer – a person who designs gameplay, conceiving and designing the rules and structure of a game. This is a specialist in the field in which the educational game is being developed: biology, chemistry, physics, history, law, psychology, management, philosophy, etc.
- Programmer – a software engineer who develops related software.
- Level designers–specialists who create video game levels, challenges or missions.

- Artist – a person responsible for the graphical visualisation of the game. This specialist creates a collection of drawings, renderings, and sketches of the main characters and objects in the game.
- Sound designer – a sound engineer who is a technical professional responsible for sound effects and sound positioning.
- Tester – a specialist who analyses games to document software defects as part of quality control.