

a method for designing educational games

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Serious games in education

Positive effects of serious games:

include

- ▶ increases the self-efficacy of students
- ▶ learning is made more relevant to students
- ▶ autonomy supports students with low self-esteem or self-efficacy
- ▶ encourages students' participation in scientific arguments
- ▶ leads to using higher-level vocabulary words

Learning effects of serious games:

vary in studies across educational contexts.

Recommendation:

- ▶ align game objectives and learning goals
- ▶ integrate games in the learning environment

Existing design methods for serious games:

DODDEL, RETAIN, lemniscate, ...

These methods focus in particular on game design.

Our work:

combines the general design method ADDIE with the instructional design method developed by Van Merriënboer and Kirschner to obtain a method that provides guidelines for the design of a game with clearly defined learning goals and objectives, and with a connection to the existing curriculum.

ADDIE

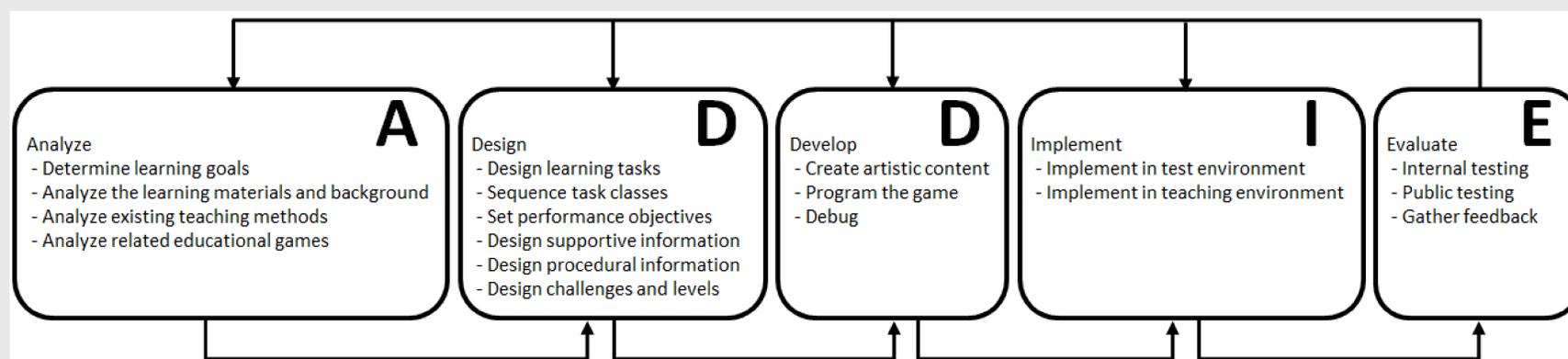
- ▶ Analyze
- ▶ Design
- ▶ Develop
- ▶ Implement
- ▶ Evaluate

Ten Steps to Complex Learning

Van Merriënboer and Kirschner (2007):

- ▶ Design learning tasks
- ▶ Sequence task classes
- ▶ Set performance objectives
- ▶ Design supportive information
- ▶ Analyze cognitive strategies
- ▶ Analyze mental models
- ▶ Design procedural information
- ▶ Analyze cognitive rules
- ▶ Analyze prerequisite knowledge
- ▶ Design part-task practice

The 5/10 method



The interface of the Moth game



Practice optics in the final year of Dutch high school.
<https://sites.google.com/site/yarentertainment/>

Using the method: highlights

- ▶ Analysis:
Learning goals: use Refractive Index and Snellius Law, use the lens formula, including being able to calculate and use focus points, lens strength and construction rays for a positive lens.
- ▶ Design:
Turn learning goals into tasks. Sequence tasks according to advice from the teacher and the order used in the book.
- ▶ Developed using GameMaker.
- ▶ Evaluate:
Players were very motivated to finish the game (8.7/10), and thought the game helped them practicing the material (8.8/10). The difference in difficulty between some levels is far too big (4.3/10), and the user interface needs to be improved (5.1/10).

More information

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Future work: a serious game for communication skills