Worksheet - Function Dungeon Level Generator Version 1.2 (TransEET)

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Game Description

In Function Dungeon the player is an explorer trying to find a way through the dungeon (see Figure 1). In order to accomplish this goal, the player has to traverse through a labyrinth of different rooms. Many rooms are originally locked so it is up to the players to find a way to open them. The players can achieve this by interacting with different objects in a room. This will allow them to find function-related problems hidden throughout the rooms. Solving these problems will in turn open up the way to other rooms. While exploring the player can make friends by bringing hidden objects to Non-Playable Characters.

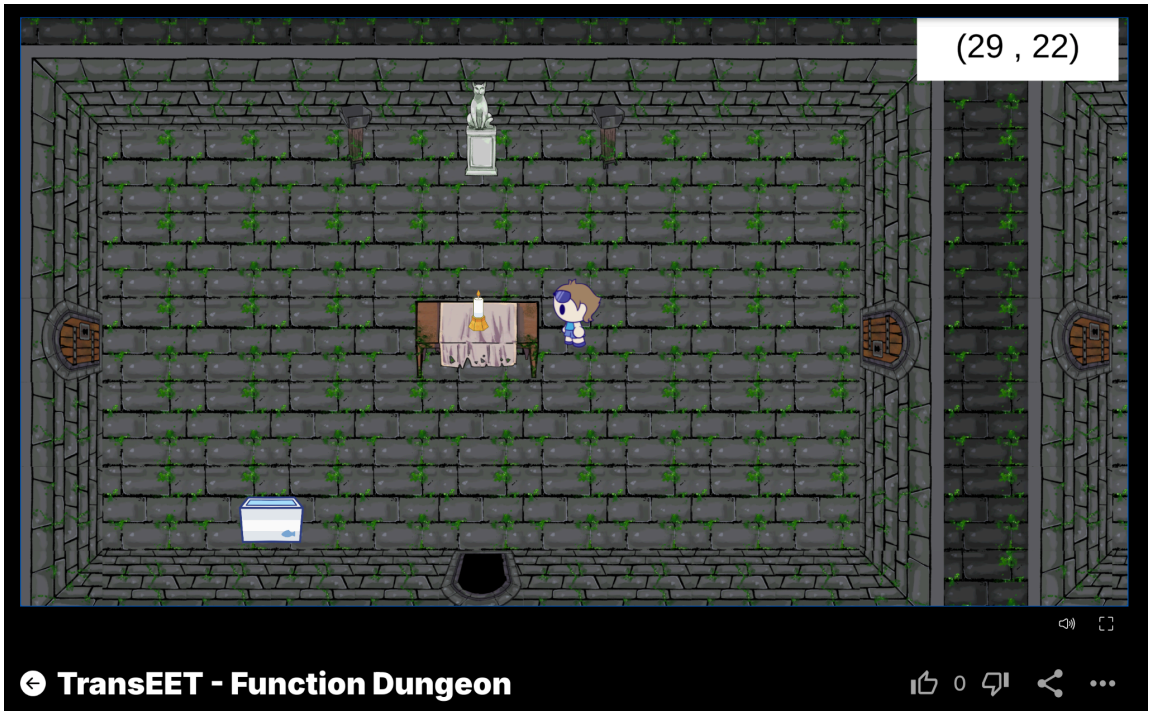

Figure 1. Screenshot of the Function Dungeon game.

Play the Game

Function Dungeon can be played online here.

Target Audience

Learners in secondary school, aged 12 to 16, approximately.

Language Settings

The language of the interface, questions and answers can be set to Dutch or English, by clicking on the flag in the bottom right corner of the screen (see Fig 2).

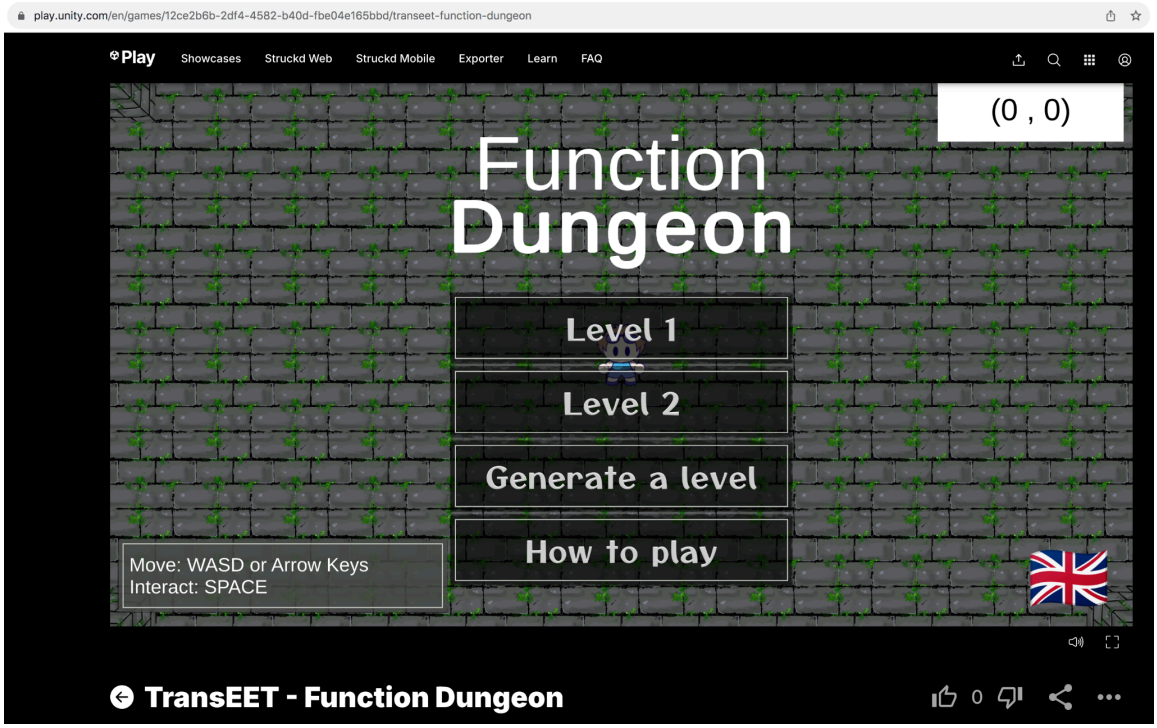

Figure 2. The start screen, including options for playing Level 1, Level 2, Generating a new level, How to play, and switching language.

Gameplay

- The player has to find a way through the dungeon to escape.
- Closed doors open when mathematical problems are solved.
- The player receives feedback when solutions are incorrect.
- Mathematical problems are hidden in the dungeon.
- The player has to search for the problems by interacting with objects in the rooms.
- The player can interact with non-player characters to get help.
- Navigate around the room using the arrow keys, or the keys W, A, S, and D.
- Interact with objects and non-player characters by pressing the Spacebar.

Music

The music can be turned off or on by pressing the speaker icon on the bottom right of the screen, below the flag for the language setting (see Figure 2).

Learning Goals

The main educational goal of the game is to provide students with an opportunity to practice with and learn about mathematical functions in an appealing and engaging gaming environment. The game should help students understand the (fundamental) characteristics of linear functions and apply them to solve questions and problems. The math problems in the game address five specific learning goals:

- Recall the fundamental characteristics of a linear function: constant rate of change; y-intercept (start value); sign and magnitude of the slope;
- Analyse examples of linear functions and apply their properties;
- Connect two or more different representations of a function (verbal, graph, formula, table, and dot patterns);
- Interpret, compare, and translate between multiple representations of an algebraic function;
- Apply the appropriate representation to solve a question or problem.

Mathematical activities

- Solve tasks involving linear functions in a variety of representations, including formulas, tables, dot patterns, and graphs, by applying properties of linear functions.
- Determine the fundamental characteristics (constant rate of change, y-intercept, sign and magnitude of the slope) of a linear function.
- Connect different representations (verbal, graph, dot patterns, formula, and table) of a linear function.

About Function Dungeon version 1.2 (for TransEET)

This version of Function Dungeon is authorable and includes a level generator and several mini-game(s), exploring alternative game mechanics and other game elements, besides multiple-choice questions.

Generating a new level

The Level Generator employs procedural level generation to dynamically create diverse and engaging environments based on predefined learning goals. It can be controlled directly from the game by pressing the button “Generate a level” (see Figure 2), and setting the desired number of rooms, branching complexity, and a selection of learning goals. Based on these settings, a level is automatically generated, filled with questions that address the selected learning goals, in a logical progression from the start to the final room.

Authorable content

In addition to playing generated levels, learners can also design their own assignments using the authorable functionality of Function Dungeon. This allows students to create their own questions and integrate them directly into the game environment. By doing so, learners can collaboratively build a custom game, for example as a class activity to prepare for a test, in which the content fully reflects the topics they want to practice.

Do you experience any problems?

- If, for some reason, the main menu opens again when you try to generate a level, it means the generator was unsuccessful. You could try making your level a bit smaller by playing around with the settings.
- The level generator can be rather slow on some laptops. If generating levels takes too long, you might want to fall back to simply using level 1 or level 2.

Your feedback is welcome!

Feedback on the game can be provided to the following email address: smart.education.gamelab@gmail.com

Thank you for playing Function Dungeon!