Research Article

Stop the Loop Board Game: Microbiologist Version

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Abstract: Experiences in the laboratory can stimulate interest in science. Experiments are one of the hands-on activities used to develop knowledge and understanding of scientific concepts. Microbiology is a subject that involves the study of complex microorganisms and intricate protocols. Early instruction can help students prepare for all the opportunities that may arise when experimenting in the lab. "Stop the Loop" is a board game that integrates the concept of microbiology and learning through play into an educational game. In this game, the player must face the challenge of stopping the loop and, by chance, finishing the game first and winning. Students experience the challenges that can occur during the experiment and the actions that can be a solution or a problem for the given situation. Through this game, students learn through play while learning the basic concepts of microbiology using visual mnemonics. The situation can help students imagine a real situation that could happen and think about the situation to minimize the error. This game not only increases motivation and participation but can also promote critical thinking and problem solving. This game concept can also be used for different kinds of experiments in many study subjects as a teaching tool for lecturers or teachers in colleges. It could also be marketed as a commercial family game that can be experienced and played by all ages.

Keywords: strategy board game; game-based learning; mnemonic device.

1. INTRODUCTION

The microbiology laboratory requires skillful handling and is a challenging classroom to develop practical knowledge and skills. In addition to safety rules and regulations, there are protocols that require techniques and skills such as aseptic technique, microbial swabbing, dilution, diffusion, and staining techniques, as well as microscope use skills (Candace & Marcos, 2022).

Game-based learning integrates educational play with instruction and self-directed learning and links the learning experience to skills (Pan et al., 2021). Game-based problem solving incorporates strategies and methods and is more fun (Zhao et al., 2021). Many components can be assessed through learning games, including learning attitudes, motivation, fun, and engagement (Zhao et al., 2021). The board game is one of the strategies to increase students' engagement and achievement by simplifying difficult concepts (Sin Yoon, & Khambari, 2022). In addition, a visual-mnemonic device, a memory concept is used to increase students' memory performance while playing this game. Students can visualize the situation that may occur during experiments using the concepts presented in this game.

By playing this board game, students can get an idea of the hands-on experience they can have before doing the real experiments. Also, students can avoid any circumstances that may occur during

the experiments. This valuable experience helps students to be prepared and ready to perform experiments confidently and without hesitation.

2. MATERIAL & METHOD

2.1 Game Mechanistic

This game was developed based on the strategy board game of overcoming the challenge or obstacle in conducting the experiments.

2.1.1 Game Components

This board game consists of six components, including a game board, tokens, dice, a deck of cards and benches, as shown in figure 1. The layout of the game board was designed based on the laboratory space where the benches for conducting the experiments are located. A loop contains seven benches that must be completed with eight steps per bench. The counters represent the players playing the game. The deck of cards consists of 21 cards that represent the loop challenge that the player must complete while performing the experiment. A loop challenge card contains a "challenge" that must be answered. The loop dice represent "P" (proceed) and "L" (loop).
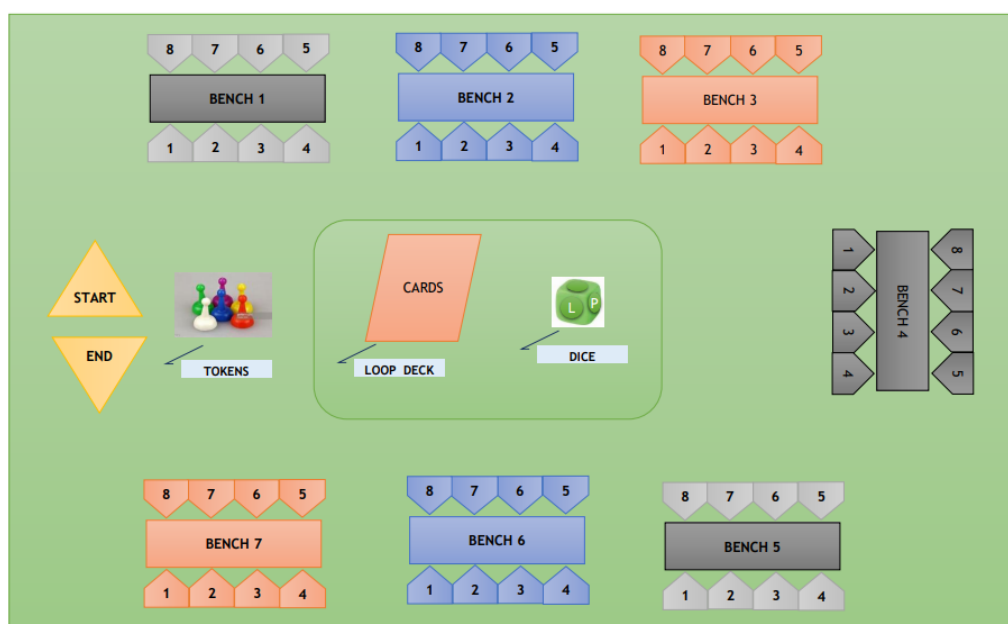

Figure 1. Game board

Table 1. Gameplay

Step 1	To start, 1. Place all the tokens on the starting board. 2. Shuffle the loop card deck and place it face down next to the game board.
Step 2	On your turn, 1. Roll the dice. 2. If you roll an "L", stay back and you lose the turn. A "P" only you can pick a challenge card and proceed. 3. Go to the loop deck and draw a CHALLENGE situation card. Read the card and follow what it says.

	4. A symbol on the card indicated the category of the challenge that you may face. Pick a CHALLENGE card based on the symbol provided. Read the card and solve the CHALLENGE. If your ANSWERS are correct, move to next loop.
Step 3	Now, your turn is over. The next player starts.

5. CONCLUSION

"Stop the Loop" microbiologist version is the game that introduces a strategy of a board game with visual memory aid concepts and applies the concept of microbiology experiments as challenges in the loop. Therefore, this game could have the potential to be introduced as a tool for teachers in schools or instructors in universities to apply the science concepts in a game-based learning approach. Given the limitations, the following recommendations can maximize the potential of this game concept and market it in the future. This conceptual idea for a board game should be prototyped and evaluated among participants and experts to obtain feedback. The difficulty level of the game is not fixed and could be designed to allow the player or students to experience the difficulty level of the game. The difficulty level could be based on risk (low, medium, and high risk) or comprehension level (easy, medium, hard). The game can be made more dynamic by recommending that it be played with real instruments, real players, and real experiments to expose students to possible situations and not only increase participation but also raise awareness and train the ability to respond more quickly to risks and dangers.

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