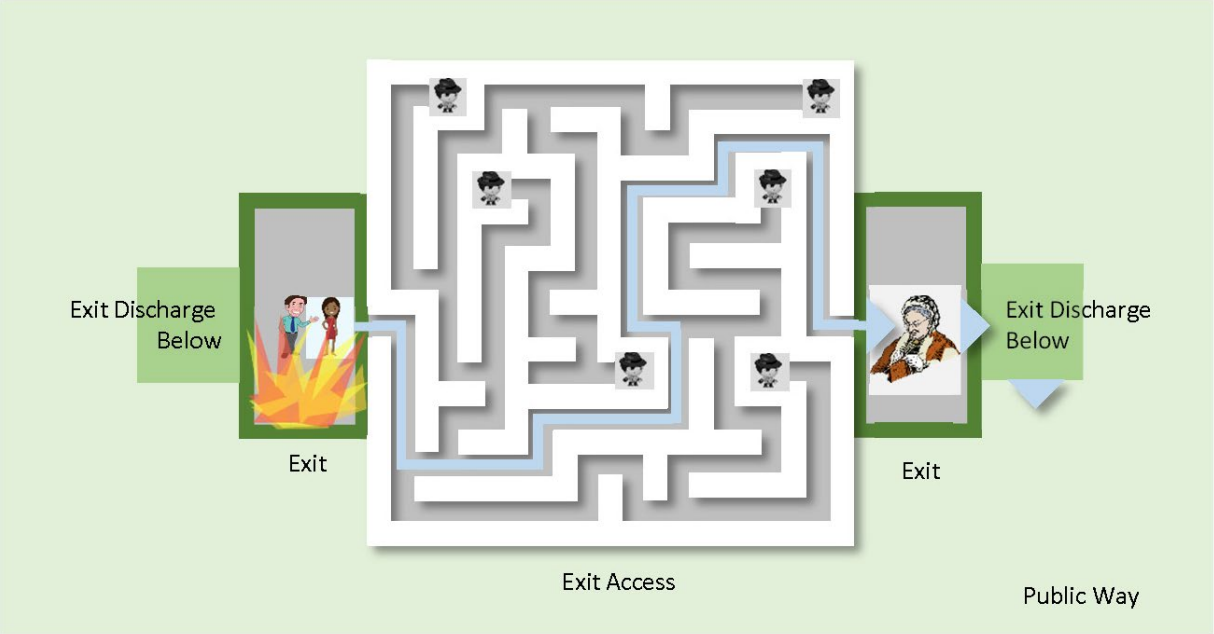
ARTIFACT 1.2 – GAME DESIGN

Goal	Design and Development of Learning Systems
Objective	Students are able to design/develop learning opportunities and systems for meaningful learning; promote student engagement in online learning environments; and select appropriate technology and learning objects to support learners.
Course	ISLT 7384 – Designing Games for Learning
Instructor	Dr. Rose M. Marra
Links	View the video description Play the game (.swf)

DIGITAL GAME ASSIGNMENT

MAZE RUNNER: BACK TO SCHOOL[1]



UNIVERSITY OF MISSOURI

Student: Keith E. Hedges, AIA

Professor: Rose Marra, Ph.D.

IS_LT 7384 Designing Games for Learning

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Maze Ronner: Back to Shcool[1]

Overview of Game Concept

If you want to pass the architectural license exam, you will have to go back to school! The game prototype, Maze Ronner: Back to Shcool was developed due to the extremely low National Council of Architectural Registration Boards (NCARB) Architectural Registration Examination (ARE) passing rates (NCARB, 2018a). For the 11,749 examinations taken since November 1, 2016, the passing rate ranges between 47 and 61 percent. Since the traditional means of a designer-first approach has yielded marginal results, this interactive method was developed. The notion is that an occupant-first user experience would permit the designer to become more intimate with the architectural concepts through the perspectives of traditional occupant. Maze Ronner: Back to Shcool targets a couple of the most important concepts surrounding means of egress (exiting a building) and life safety in buildings during a disaster event. The game is single player. The player must successfully navigate through maze and answer questions posed by an oracle in order to reach safety.

Goals of the Game

Kapp (2012, pp. 28-29) articulated that the intervention of a goal into an activity extended traditional play into a game situation. Maze Ronner: Back to Shcool has game goals and instructional goals. The game goal is terminal where the player must exit the building as a win state. To exit the building, the player must solve a maze puzzle that represents a complicated floor plan. The maze provides autonomy where the player may attempt different paths based on their choices of getting to the exit within a maximum timeframe. Once inside the exit, the question and answer session offers an opportunity for player reflection once the initial enabling objective is completed. When players do not meet the game constraints, the death of play (Salen & Zimmerman, 2004, p. 259) was considered, but cast aside. Replayability was incorporated instead to better support the learning objectives through the aforementioned incremental accomplishments. Please see the Instructional Objectives and the gameplay flowchart in Figure 1 for specific details regarding the process.

The Learner / Player

The players are individuals seeking architectural licensure. Licensure is obtained through earning an accredited professional degree in architecture, completing an apprenticeship governed by the architectural experience program (AXP), and passing the license examination (ARE) (NCARB, 2018b). The players will be either students in higher education or recent graduates. The expected age range for traditional students and candidates would be 18 to 26 years of age, while the nontraditional path

[1] The title is intentionally misspelled.

players may be much older, but are fewer in number. If the players are not students, they would most likely be within their first five years of employment. The Flesch reading ease score would average about 50, which is the demarcation point between twelfth grade and college (Flesch, 1979). The level is fairly difficult, but equivalent to *Time* and *Newsweek* magazines. Minimal gaming knowledge is required. The players will be using the computer keyboard arrows keys for directional movement (up, down, left, and right) and the left mouse button to select multiple choice answers. Some prerequisite content knowledge will be required. The players should be aware of the: (1) *International Building Code*; (2) means of egress terms of exit access, exit, exit discharge, and public way; and (3) the maximum travel distance, dead end corridors, number of exits, separation of exits, separation of exits, and fire-rated construction topics.

Context for the Game

The game will be played during non-school or non-employment hours. Weekday evenings and weekend daytimes are expected. The game will occur at the student's or candidate's preferred study location. An institutional or public library, or at private apartments or residences are likely possibilities. About 30 minutes should be dedicated for repetitive gameplay. The game would be played on a personal computer or laptop. Architectural degree programs have a laptop requirement. Therefore, most players will have their own laptops. The players will not have to learn new technologies. Maze Ronner is part of the larger Back to Shcool series that contains a palette of games to assist with license preparation in other topics. The player may spend evenings playing several different architectural education games.

Instructional Objectives

After playing Maze Ronner: Back to Shcool, the learner will be able to explain the primary components of the means of egress system and its supporting life safety features. The means of egress is a "continuous and unobstructed way of egress travel from any accessible point in a building or facility to a public way" and consists of three separate and distinct parts: the exit access, the exit, and the exit discharge (IBC, 2012, p. 28). The life safety aspects are the maximum travel distance in the exit access, dead end corridors, number of exits, separation of exits, and the fire-resistance-rated construction.

Learning the Terminology

Exit Access: Explain the exit access. The code definition is "that portion of a means of egress system that leads from any occupied portion of a building or structure to an exit" (IBC, 2012, p. 19).

Type of Knowledge	Conceptual knowledge. The players are experiencing the concept by being immersed in the exit access, which is a less safe environment (Kapp, 2012, p. 175)
Player Task	Advance through the maze (exit access) to the exit stair entrance (exit) using the directional arrow keys
Measurement	Finding the door to the exit through any possible path within the required timeframe (*completeness*)

Exit: Explain the exit. The code definition is "that portion of a means of egress system between the exit access and the exit discharge or public way" (IBC, 2012, p. 19). The exit is equipped with fire-resistance-rated construction and opening protectives as required to provide a protected path of egress travel.

TYPE OF KNOWLEDGE	Conceptual knowledge. The players are experiencing the concept by being immersed in the vertical exit, which is a safer, fire protected environment (Kapp, 2012, p. 175)
PLAYER TASK	Advance through exit stair (exit) to the exit discharge entrance by answering questions
MEASUREMENT	Answering all of the oracle's questions correctly (*completeness*)

Exit Discharge: Explain the exit discharge. The code definition is "that portion of a means of egress system between the termination of an exit and a public way" (IBC, 2012, p. 19). The exit is equipped with fire-rated construction as required to provide a protected path of egress travel to the public way.

TYPE OF KNOWLEDGE	Conceptual knowledge. The players are experiencing the concept by being immersed in the horizontal exit discharge, which is as safe as the vertical exit (Kapp, 2012, p. 175)
PLAYER TASK	Advance through the exit discharge to the public way using the directional arrow keys
MEASUREMENT	Finding the exterior exit door to the public way through the only path available (*completeness*)

Means of Egress: Explain the sequence of exiting a building during an event through the sequential identification of the means of egress components. The code definition was previously provided.

TYPE OF KNOWLEDGE	Procedural knowledge. The players practiced the procedure through play mode under difficult circumstances (Kapp, 2012, p. 184). In order to exit the building, the players passed through the exit access, exit, exit discharge, and public way
PLAYER TASK	Sequentially advance through the exit access, exit, and exit discharge to the public way
MEASUREMENT	Finding the exterior exit door to the public way through the only path available in the exit discharge (*completeness*)

Life Safety Features

Maximum Travel Distance: Explain why an occupant can never be too far away from an exit to have enough time to seek safety.

TYPE OF KNOWLEDGE	Rules-based knowledge. The players are experiencing the consequences by being timed while they are immersed in the exit access, which is a less unsafe environment (Kapp, 2012, p. 178). If they travel too far and do not reach safety at the exit in time, they must replay at the entry to the maze.
PLAYER TASK	Advance through the maze (exit access) to the exit stair entrance (exit) using the directional arrow keys
MEASUREMENT	Finding the door to the exit through any possible path within the required timeframe (*completeness*) and *correctness* verified by oracle.

Dead End Corridors: Explain why the exit doors must be located at the ends of long corridors otherwise the occupants will collect and become trapped.

Type of Knowledge	Rules-based knowledge. The players are experiencing the consequences by being timed while they are immersed in the exit access, which an unsafe environment (Kapp, 2012, p. 178). If the nomads trap them in a deadend corridor, they must replay.
Player Task	Advance through the maze (exit access) to the exit stair entrance (exit) using the directional arrow keys
Measurement	Finding the door to the exit through any possible path within the required timeframe (*completeness*) and *correctness* verified by oracle

Number of Exits: Explain why buildings with large amounts of people will have more than one exit.

Type of Knowledge	Rules-based knowledge. The players are experiencing the consequences by being timed while they are immersed in the exit access, which an unsafe environment (Kapp, 2012, p. 178). If the nomads trap them in a deadend corridor, they must replay.
Player Task	Advance through the maze (exit access) to the exit stair entrance (exit) using the directional arrow keys
Measurement	Finding the door to the exit through any possible path within the required timeframe (*completeness*) and *correctness* verified by oracle

Separation of Exits: Explain why the exits are not too close together, such that a disaster event would encompass both exits.

Type of Knowledge	Rules-based knowledge. The players are experiencing the consequences by being timed while they are immersed in the exit access, which an unsafe environment (Kapp, 2012, p. 178). If the nomads trap them in a deadend corridor, they must replay.
Player Task	Advance through the maze (exit access) to the only exit stair entrance (exit) since the earthquake disabled one exit, using the directional arrow keys
Measurement	Finding the door to the only exit through any possible path within the required timeframe (*completeness*) and *correctness* verified by oracle

Fire-Resistance-Rated Construction: Explain why the exit access is generally less protected than the exit and exit discharge.

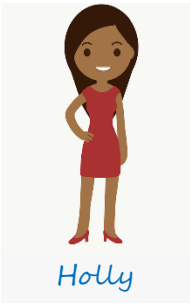
Type of Knowledge	Conceptual knowledge. The players are experiencing the concept by being immersed in a safe and untimed environment (Kapp, 2012, p. 175)
Player Task	Advance through the exit discharge to the public way using the directional arrow keys
Measurement	Finding the exterior exit door to the public way through the only path available (completeness) and *correctness* verified by oracle

Description of the Characters

The single-player game includes two primary players known as maze runners, one interactive character identified as an oracle, and several wandering building occupants recognized as nomads.

Player Characters

The primary players are the Maze Runners. As a single player game, only one maze runner may play the game at one time. The player may choose from one of two personas, Holly or Jack. Holly and Jack have no architectural training, but have lived and been inside houses and buildings their entire lives.



Holly is a middle-aged female. She is an outgoing and happy person that enjoys all aspects of life. Holly has two grown children that have graduated college. She is an empty nester and can now spend more time traveling with her husband Pierre. Holly graduated from Le Cordon Blue in Paris. Her favorite recipe is an Asian variant of the *crème brûlée*. She owns and operates Les Miso, an upscale urban restaurant with a flair for mixing French and Japanese cuisine. She is in the building to meet with her tax attorney. She is not familiar with the building and goes to the wrong floor.

Jack is a middle-aged male. He is an extrovert that has found his special someone, but has yet to propose. Jack enjoys playing and watching sports with friends and family. His favorite sport is football. Jack frequently brags about his glory days as running back and scoring four touchdowns in one high school game. Although Jack sells insurance by day, he is best known for his character voice of Bob for one of his clients. Bob is the pitchperson for a kitchen sponge company. Jack frequently goes by Sponge Bob. Bob lives for the moment and is not always mindful of his immediate surroundings. He does not ask for directions when he is lost. Although Jack knows where colleagues are, he is not paying attention to where he is going and winds up on the wrong floor.

Non-player Characters

The game has two non-player characters. The primary non-player character is Pythia who has meaningful dialogue with the players (Kapp, 2012, p. 150). The secondary NPC does not have meaningful dialogue with the players.

Pythia is a high priestess that serves as an oracle who resides in the exit and exit discharge. The oracle is the interpreter of the building code in the Back to Shcool game series. The oracle is an elderly wise person. The personality traits are wisdom, honesty, fairness, patience, and humility. Her appearance is that of a floating head with long white hair. The role of the oracle is that of a gatekeeper. The player only engages in social interaction with Pythia during question and answer sessions. The player may only pass the oracle and continue to the next level by answering code questions correctly. An incorrect answer will lead the oracle to turn back time and respawn Holly or Jack back into the exit access for replay.

Nomads reside in the means of egress. The nomads are building occupants that wander the hallways. They sometimes collect at dead end corridors and there are generally more nomads exiting on the lower floors of the building. The nomads are benign. The nomads do not socially interact with the players although they may bump into the players while moving around the building. The nomads do not have any personality traits.

Description of the Game Environment

The story takes place in the Winchester Building in Los Altos, California. The building is a low-rise office building with a couple of floors leased to Torrance, LLC. Torrance is a behavioral Health company specializing in treating phobias. Some of their floors are mazes used for patient therapy. Holly and Jack are in the building during an earthquake event and subsequent fire. The player will select Holly or Jack as their character. Holly and Jack accidentally enter onto the therapy floor of the building and must safely escape to safety. The player will see a floor plan of the Winchester Building on the computer screen. They will navigate through the maze using the directional arrow keyboard keys (up, down, left, and right). The players will hear sounds in the exit access representing the earthquake environment such as the breaking of glass and background cries. The emotive response is one of tension. The player will see a timer that is winding down. When they enter the exit, the sounds will stop, and the floating head of the oracle will appear and ask the players questions.

Narrative

The narrative is constructed through the characters, plot, tension, and resolution (Kapp, 2012, p. 42). The characters are Holly and Jack. Holly is a restaurant owner and chef, while Jack is an insurance salesman. They have accidentally stepped out of the elevator and into the maze floor of the Winchester Building. An earthquake event strikes and they are not safe in their current location. The earthquake damage has generated a fire within the building. Holly and Jack disagree on the direction out of the building. The player chooses to be either Holly or Jack and tries to find their out of the building. The player is confronted with a maze while they hear the crackling of the collapsing building. Holly or Jack must successfully navigate through the maze and reach the exit stair. The oracle Pythia is inside the exit stair and gently asks questions of the player in a calming voice. If the player successfully answers, they move closer to the building exit door. If the player answers incorrectly, she informs the player that they have a do-over (replay). She restarts the timer and sends them back into the maze. After a couple of correctly performed cycles, the player exits the building to beautiful blue skies and chirping birds.

Description of Gameplay

The primary elements of gameplay are the navigational choices made inside the maze and the interaction with the oracle inside the exit stair and exit discharge all occurring during an earthquake event while inside a multi-story building.

Gameplay Description

Gameplay begins in the third floor elevator lobby of the Winchester Building in Los Altos, California. Holly and Jack have just exited the elevator onto Torrance's third floor maze. The earthquake event has rendered the adjacent emergency exit stairs inoperable. The player must exit the building and is initially confronted with a maze. The game occurs in present day California.

Learner Activities

Figure 1 describes what the learners are doing during the gamification event.

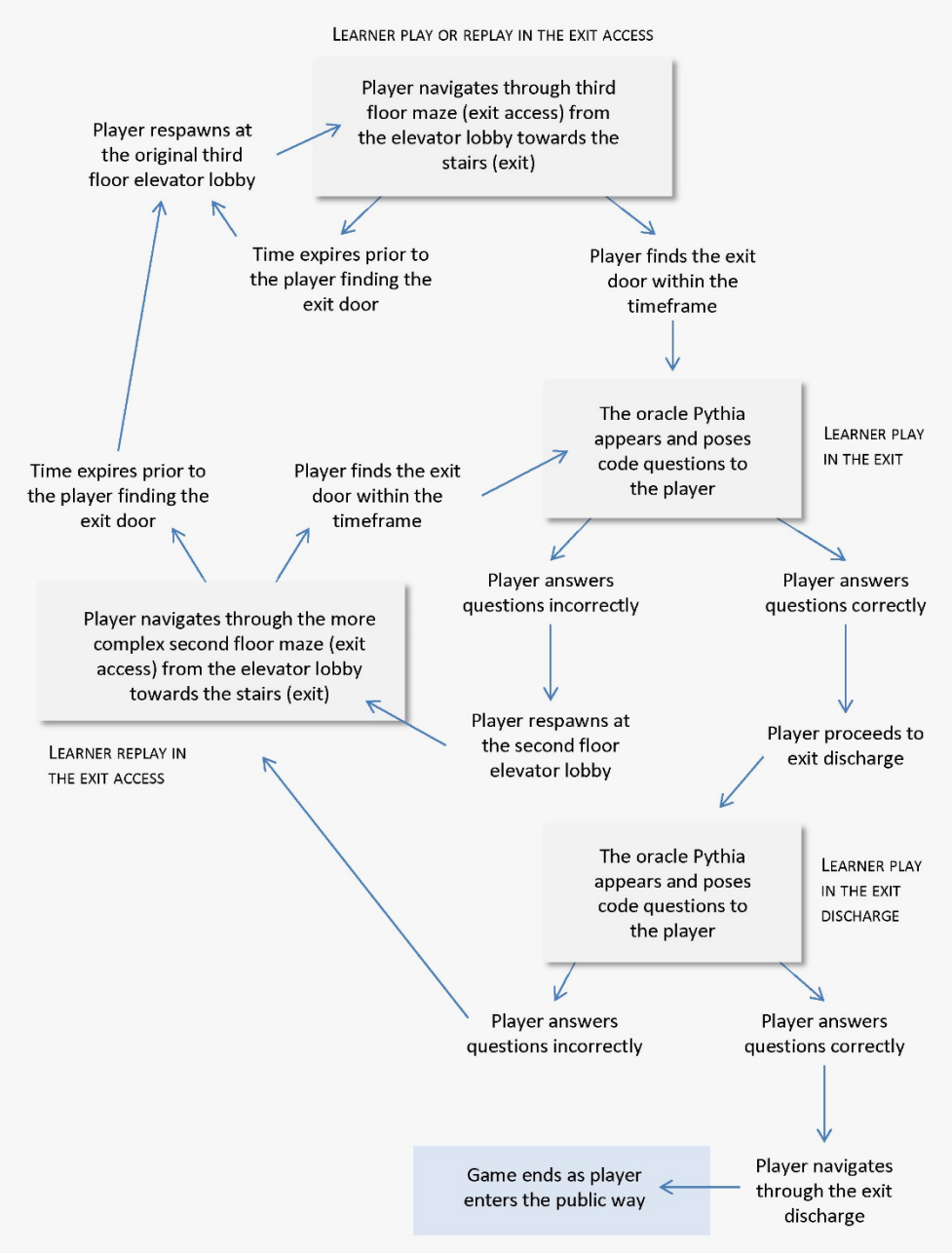


Figure 1. Gameplay flowchart.

Winning and Losing

The winning state occurs when the player exits the building into the public way. Winning is achieved by navigating the third floor maze within the required timeframe and correctly answers code questions regarding the terminology of the exit access, exit, exit discharge, and public way, and the life safety aspects concerning the maximum travel distance in the exit access, dead end corridors, number of exits, separation of exits, and the fire-resistance-rated construction. Losing occurs when the player does not meet the timeframes and incorrectly answers questions. The built-in replay mode permits learning to occur while losing as the player is inside a perpetual activity loop.

Replayability

Replay is a continuous feature in Maze Runner: Back to School. There is an implied theme that the player will die if they do not get to safety quickly enough, but they will replay instead. The gameplay continues indefinitely until the player exits the building, or gives up. Replay occurs based on not meeting the time and question and answer requirements. When the time expires in the maze or when an incorrect answer is given the player will respawn in the elevator lobby (See Figure 1). Replay permits reconsidering their approach and exploring different options (Kapp, 2012, pp. 48-49)

Learning Activities and Outcomes

Playing	Navigating the maze This player activity reinforces the experiences concepts and consequences of travel distance and the dead end corridors inside the maze. The player must make choices to find a more direct route. Question and answer session with the oracle The time spent in the exit with the oracle is meant to be reflective where the oracle will ask questions about the means of egress system and is life safety aspects as the player practices by sequentially passing through the means of egress components: the exit access, exit, exit discharge, and public way. Oracle provides meaningful feedback.
Winning	Winning occurs when the player reaches the public way. This only happens after the player experiences time inside the exit access, exit, and exit discharge. These are three of the primary components of the means of egress system. Therefore, winning supports the acquisition of conceptual, rules-based, and procedural knowledge.
Losing	Losing is the replayability feature. When a player does not meet a time constraint or incorrectly answers the oracle, the player will be sent back to the elevator lobby. Therefore, losing supports the learning outcomes through replayability until winning occurs later.

Scoring, Rewards, Assessment

The game activities are driven by a level-based structure where the player progresses through the means of egress (Kapp, 2012, p. 37). These are mission-based so that the player experiences the concept (time dependent measured of completeness) and consequences (untimed measured on correctness) of

their choices. The game has four primary levels and one secondary level. The primary levels are: (1) maze navigation in the exit access; (2) question and answer session with the oracle in the exit; (3) question and answer session with the oracle and single path navigation in the exit discharge; (4) and the winning state as the player enters the public way. The secondary level is maze replay.

Motivation has intrinsic and extrinsic aspects. The reward is in the form of advancing to the next level. The reward is earned when the player finds the exit and the oracle appears. This is a variation of the variable reinforcement ratio (Kapp, 2012, p. 61). The reward system will intrinsically motivate players the element of time is involved (Kapp, 2102, p. 32). The players are extrinsically motivated through their desire to become architects and pass the license examinations. The game does not have a scoring system and relies on completion and correctness. Although the player may choose to replay a improve their time spent inside the maze.

Reflection

I learned how to develop a game idea into a functional prototype. The easiest aspect is to create an initial idea. My architectural design background has equipped me quite well in that area and I have several game ideas. The most fun contribution was creating the characters. I subtly connected the maze building to Sarah Winchester, heir to Winchester Rifles and owner of the wild mansion with all of the doors and corridors, and to Jack Torrance, the caretaker of the Overlook in Stephen King's *The Shining* movie. Jack is a combination of Al Bundy (*Married with Children*) and SpongeBob Squarepants attributes. The most challenging responsibilities are instructional objectives and the functional prototyping. The instructional objectives must triangulate the knowledge or skill gained through the player activities and outcomes along with the performance measures. Stencyl was a good tool for novices to create games. There is a risk that using such a tool may diminish the breadth and depth of the game idea in order to create a functional prototype. This is a concern in architecture as well. A student may have a great idea, but begins to use computer software that is too complicated and cannot finish the project. There may be some aspects within Stencyl that may not fully demonstrate the original intent. I do intend to use Stencyl in the future. I may further develop the Back to Shcool palette and talk to my publisher to pitch the idea. We are already in discussion about license exam preparation content and gamification would be a unique contribution.

Scene Implementation

The third floor maze is the scene selected for gameplay. For functionality, the player uses the directional arrow keys to move about the maze. For demonstrating learning, the time spent in the maze is related to experiencing the maximum travel distance limitations set by the model building codes. Even though the exit walls are protected, they are only built to last for the time necessary for occupants to properly exit the building. One cannot take their time and expect the exits to still be there forever. A direct path to the exit is not a problem, but a longer indirect path through a maze, may become problematic. For the Gee's (2013) learning principles, the primary principle is manipulation. This is achieved by the player controlling movement inside the maze. Neuroscience has shown that manipulation immerses the player where "they have gone into that environment" (Gee, 2013).

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Character and Fire Images

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