2013

3D Learning Environment Design Report

Brain Training Center

İrem Gökçe Aydın - e155026

Rukiye Altın - e190250

Tuğba Altan - e190039

Yasaman Alioon - e189142

CEIT 609

Instructor : Assist. Prof. Tuğba Tokel

4/14/2013

Table of Contents

1. INTRODUCTION

We will develop a virtual environment, named Brain Training Center(BTC) in OpenSim platform aiming that the participants can improve their brain abilities in terms of memory, attention, speed and problem solving. There will be four main building for each ability. These buildings are like brain activity training centers including background information about the related concepts and one game for improvement. Moreover, there are cafeteria, seminar hall and shopping store for more collaboration.

2. LEARNING OBJECTIVES

It is desired that the desing can improve the cognivite skills of the participants such as:

- Memory
- Attention
- Speed
- Problem-solving

3. TARGET GROUP

Specificly for the people who have cognitive deficiency and for case study (for sample) our target group is elementary school students.

4. MACROSTRUCTURE and ACTIVITIES

The following table depicts the Macrostructure and Activities which will be used for Brain Training Center.

Activities	**Macrostructers**	**Synchronour/Asynchronous**
Customization of Avatars	*Agency*	Asynchronous
Extra Representation Features(Having T-shirts)	*Agency*	Asynchronous
Playing the Game	*Experience*	Asynchronous
Writting the Comment	*Experience*	Asynchronous
Sharing the Opinion in the Cafeteria with Other Learners	*Connectedness*	Synchronous
Being Participant in the Shopping Store	*Exploration&Connectedness*	Synchronous
Being Participant in Seminar Hall	*Connectedness*	Synchronous
Moving around the building and	*Exploration*	Asynchronous

interacting with objects		
Having Rewards	*Agency*	Asynchronous

Table 1 - Macrostructure and Activities

5. PROCEDURE

3DLEs Design Principles

Kapp and O'Driscoll states that to achieve the desired design outcomes, their proposed model outlines eight design principles (Figure 1) to guide instructional designers in their quest to create immersive and engaging 3DLEs[1]. Their model consists of two main principles: grounding principles and experiential principles.

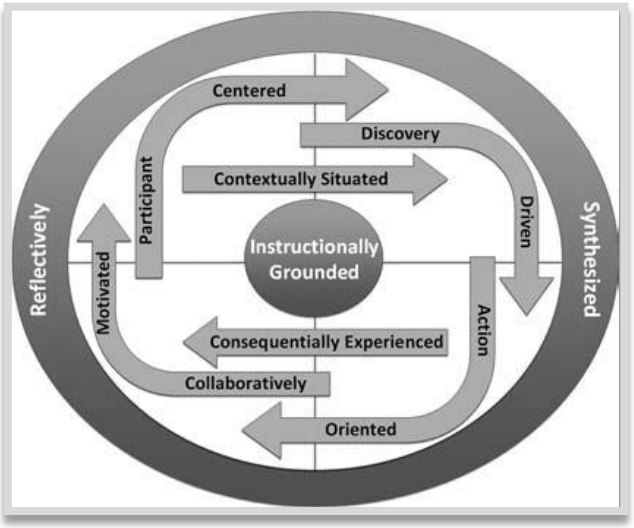


Figure 1 - 3DLEs Design Principles[1]

According to their model, for a virtual environment to be instructionally grounded, an environment should target a vetted business need and should ensure the 3DLE approach is the most effective way to transfer the learning objectives to on-the-job performance. To be reflectively synthesized self-reflection and group based experience should be included in the design. To be participant centered, the participants' actions and interactions in the environment should have consequential outcomes within the learning experience itself. To be contextually situated, the context must be authentic and action oriented, but it must also be bounded in such a way that it ensures all of the learning objectives are encountered by the participant without it being too obvious or onerous. To be discovery driven, once and the agency has been defined, the next instructional challenge is to establish motivation for sustained and engaged interaction within the 3DLE.

[1] Kapp, K. & O'Driscoll, T. (2010). *Learning in 3D.* SanFrancisco, CA:Pfeiffer, pp. 70-77

Macrostructures

The defined 3DLE principles are logically fit into four larger macrostructures: Agency, Exploration, Experience and Connectedness (Figure 2). These macrostructures are activated within these 3DLEs principles[2].

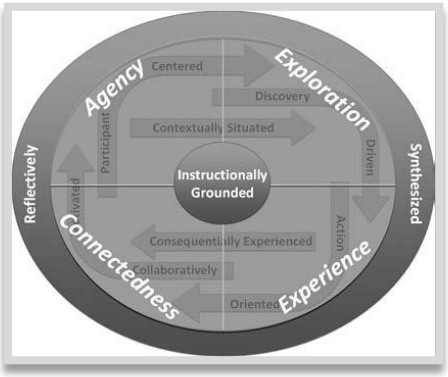


Figure 2 – 3DLE Macrostructures[2]

Archetypes and Sensibilities

Archetypes (Figure 3) are the basic building blocks of 3DLEs. Each archetype implementation achieves a specific set of learning outcomes and activates a specific macrostructure.

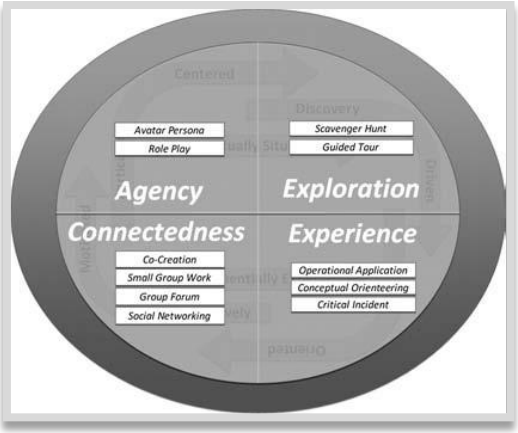


Figure 3 - 3DLE Archetypes[2]

Finally, to round out the development of a comprehensive 3D learning architecture, it is also possible to house the seven sensibilities(Figure 4) within the same four macrostructures.

[2] Kapp, K. & O'Driscoll, T. (2010). *Learning in 3D.* SanFrancisco, CA:Pfeiffer, pp. 77-82

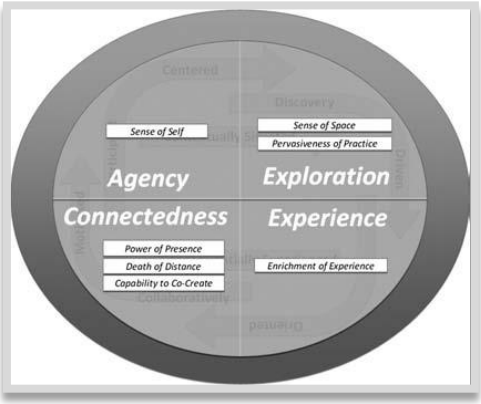


Figure 4 - 3DLE Sensibilities[2]

6. 3D LEARNING ENVIRONMENT

a. Brain Training Center

The learning space is divided into four different buildings which are designed for traing four different cognitive skills namely attention traing, concenteration trainig, memory traing, problem solving buildings. Each building includs three floors with various purposes. Learners can teleport into the various floors. In the learning procedure four diffrent types of brain traing games such as attention training, concentrating traing, memory traing and problem solving training games are used in the second floor of each building. The instruction of the game will be provided for learners in second floor as well. Moreover, there will be a comment board in each building which learners are supposed to write their ideas and suggestions about games that they have played. Therefore, the environment supports more interactive condition. Moreover, learners will be able to use the cafeteria providing that they leave a comment on boards about the games. In the third floor, learners can get rewards such as hat or other symbols based on their performance.

b. Description of Learning Spaces and Environments

i. Memory Training Building(MTB)

Learning spaces:

The learning space is a building including three floors with different purposes. Learners can use the train for teleporting into the various floors. The learning procedure consists of memory training game in the second floor. Memory training game is acquired from "Lumosity" about to enhance the participants' memory ability. The game is a simple remembrance of tiles in a matrix plane. The instruction of the game will be provided for learners in second floor. In the third floor, learners can get rewards such as winner cups or other symbols based on their performance. Moreover, there will be a comment board which learners are supposed to write their ideas and suggestions about games that they have played. This will increase connectedness.

Objects:

The used objects for learning space which is a building with 3 floors consists of slides for giving important information about attention training and the importance of the attention in learning process. Note cards will be used to guide the learners about where they need to go and about the game instructions which are needed for playing the game. playing board (for playing the game) ,comment board (for leaving the comments about the game) decorations(some pictures, lights, symbols or cups as rewards) are among other objects which will be used in the environment.

Media:

Presentations (power-points), videos (embedded web pages) will be used for informing the learners about the attention training itself and attention training game.

Navigation:

Learners will be guided to navigate in the building using labels for each floor and the directions signs will be used in order to show the directions which the learners are expected to use. The floor changing will be done by teleporting. Because we don’t want participant to start the game without getting background information.

ii. Attention Training Building(ATB)

Learning spaces:

The learning space is a building including three floors with different purposes. Learners can use the train for teleporting into the various floors. The learning procedure consists of attention training game in the second floor. Attention training game is acquired from "www. Lumisoty.com" about to enhance the participants' attentions.The game includes some arrows which are in the same directions, however, one arrow is in diffrenet direction with others so the participants are supposed to find the different arrows as an attention training game. The instruction of the game will be provided for learners in second floor. Moreover, there will be a comment board which learners are supposed to write their ideas and suggestions about games that they have played. Therefore, the environment supports more interactive condition. Learners will not be able to use the cafeteria unless they leave a comment on boards about the games. In the third floor, learners can get rewards such as hat or other symbols based on their performance.

Objects:

The used objects for learning space which is a building with 3 floors consists of slides for giving important information about attention training and the importance of the attention in learning process. Note cards will be used to guide the learners about where they need to go and about the game instructions which are needed for playing the game. playing board (for playing the game) ,comment board (for leaving the comments about the game) decorations(some pictures,

lights, symbols or hats as rewards) are among other objects which will be used in the environment.

Media:

Presentations (power-points), videos (embedded web pages) will be used for informing the learners about the attention training itself and attention training game.

Navigation:

Learners will be guided to navigate in the building specially different floors using labels for each floor and the directions signs will be used in order to show the directions which the learners are expected to use.

iii. Speed Training Building (STB)

Learning Spaces:

Just like the learning space of Attention Training Building, Speed Training Building includes three floors with different purposes. In first floor, learner will get information about the background of how speed is important in learning. There will be documents as slide shows and video in first floor to learn more about speed. A brain mascot will welcome learners at the entrance of building and it will give notecard about the building, what should be done in this area and who they should contact with for any problems they have. After learners are done with reading information, they will see a teleport sign for second floor where they'll compete on game about speed. There will be score board which will keep score each player. We'll set a limit for game so if the learners pass the limit s/he will be teleported to third floor to get the winner cup. If not, s/he cannot Access to third floor.

Objects:

The used objects for learning space which is a building with 3 floors consists of slides for giving important information about attention training and the importance of the attention in learning process. There will be a group tag giver for each building to make learners more immerse. Note cards will be used to guide the learners about where they need to go and about the game instructions which are needed for playing the game. Playing board (for playing the game) ,comment board (for leaving the comments about the game) decorations(some pictures, lights, symbols or hats as rewards), score board (for keeping each players scores) are among other objects which will be used in the environment.

Media:

Presentations (power-points), videos (embedded web pages) will be used for informing the learners about the attention training itself and attention training game. Also, brain mascot will let users to connect with admins via mail so there will be some webpages to be linked in our land.

Navigation:
Learners will be guided to navigate in the building especially different floors using labels for each floor and the directions signs will be used in order to show the directions which the learners are expected to use.

iv. Problem Solving Building (PSB)

Learning spaces:
The learning space is the problem solving building and there are three floors in the building. The first floor will be designed to introduce the topic to the learners. The second floor is the game floor and the last floor is reward floor.

Objects:
In the building, the objects are billboards, presentations, embedded web pages (videos), t-shirts, reward cups and posters. Also, there is a brain mascot at the entrance of the building.

Media:
In the building, presentations and embedded web pages (videos) represent the media.

Navigation:
Learners will be directed using signs, arrows etc. for exploring the building. Also floors will be labeled with different names.

v. Cafeteria

There will be a cafeteria for learners where they can enter and use some foods or dirnks. It is assumed that this section will provide more interactive environment for learnes where they can share and discuss their ideas about the games. Moreover, it can encourage them to choose different games as a result of other learners suggestions which can improve different cognitives abilities of the individuals.

Learning spaces:
In the cafeteria participants can learn about different games which they have already played and share their ideas. This part provide more interactive types of learning. Moreover, participants can be motivated to play various games and enhance their abilities in different aspects.

Objects:
The used objects in the cafeteria is some chairs and and tables. Some drinks. Pillows for sitting on them and pictures.

Media
The media is used for announcements and encouraging participants such as “There is a challenge in cafeteria”.

Navigation
There is some labels which show and inform participants about the place of the cafeteria.

vi. Shopping Center

Learning Spaces:

Shopping Center will be near Social Café in our Brain Training Center land. There will be a small building and it will include all t-shirts and hats we designed for each building. There will also be some other stuff such as, cookies, drinks, candies, balloons... etc. We will provide our visitors toy of our brain mascot which will have pose script of holding it.

Objects:

Shopping Center will have shelf for each type of objects (t-shirts, hats, foods… etc.). All the objects will be given for free. There will be a notecard giver to inform visitors what they can find in our store.

Media:

Media will be embedded as posters and signs for giving information about the store to visitors.

Navigation:

There is no navigation in store. Learners will just come and get the things they want to have for free from store.

vii. Seminar Hall(Open Auditorium)

Learning Spaces:

Near to the center of BTC, there will be an open class environment, both to welcome the participants in a community place after first teleporting and to increase connectedness throughout the environment. There will be video shows and presentations about interesting brain ability concepts.

Objects:

There will be chairs, tables and one panel to show the media content to the participants.

Media:

Media will be embedded video shows and presentations on the display panel.

Navigation:

There is no navigation in the auditorium environment. Learners will just come and sit down and start to get information.

7. SCRIPTING REFERENCES[3]

- Because there are interactive objects in the environment, like notecards, their scritpts will be used: mainly llGetNotecardLine will be used.
- The navigation through the floors will be enabled as teleportation. So teleport functions will be used: llTeleportAgent

[3] http://opensimulator.org/wiki/LSL_Status/Functions

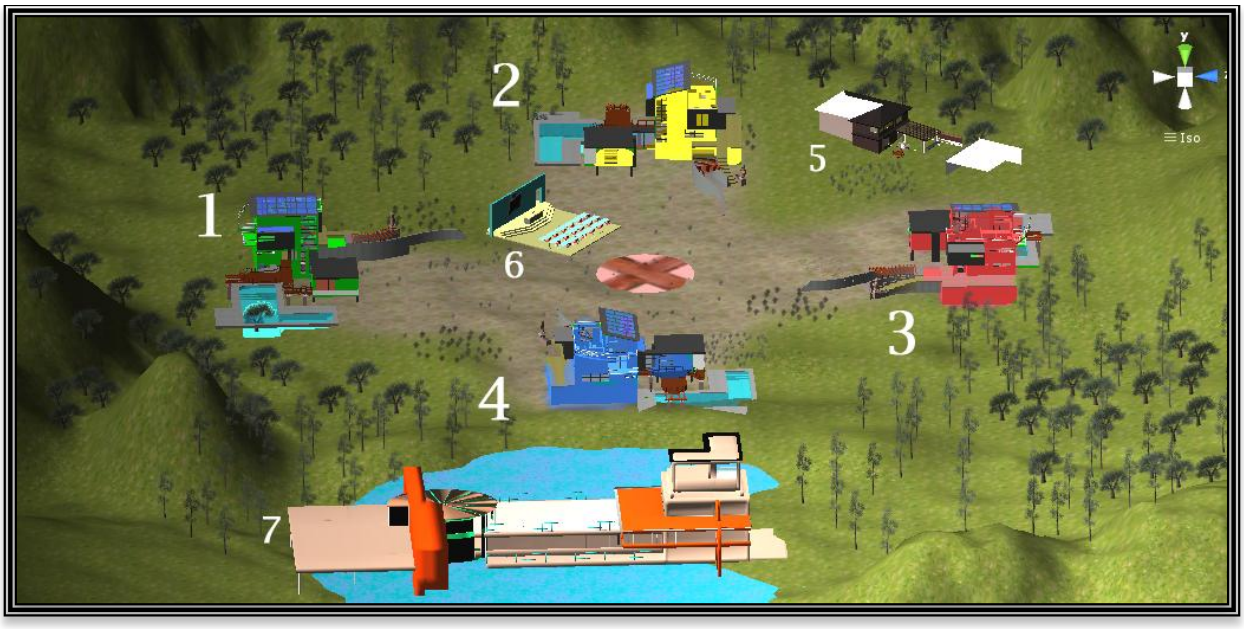
- While dealing with the media objects, some functions will be used when embedding, or getting parameters from the media etc.: llSetLinkMedia
- And some other movement and rotation functions can be used for interaction objects to move or animate.

8. STORYBOARD

Instructional Elements and Sequences:

a. Main Environment

In the environment, there will be seven buildings totally. As yo can see at the below figure(Figure 5), buildings with number 1-2-3 and 4 are the training buildings – Memory, Attention, Speed and Problem Solving. Building with number 5 is the Cafeteria building and the structure with number 6 is a seminar area. Lastly, the building with number 7 is shopping center.



Storyboard 1 - The Main Environment of Brain Training Center

Each training building will have three floors as in the Figure 5 below. Each floor will be contextually designed such as, information, game play and reward.

Figure 5 - Training Buildings Conceptual Structure

- **What do learners do?**

Learners go around and obvserve the objects and buildings. Mainly the exploration feature will be reflected.

- **How do they receive instructions?**

There will be some notecards attached some objects or mascots around the environment.

- **How do they know what to do?**

They just interact with the objects. Some base information about what to do will be given to them automatically when they arrive to the environment.

- **How are the learners going to be observed?**

For the environment itself there will be a log keeping the number of participants who logged in. For the actions in the environment itself will be explained in the buildings section.

- **What happens first?**

When the participants teleport to BTC, they will start from the center of the environment which is surrounded by the training buildings. The participant will be welcomed and guided by a notecard which tells about the environment.

- **How do learners interact (voice/text)?**

Both of the is possible in OpenSim.

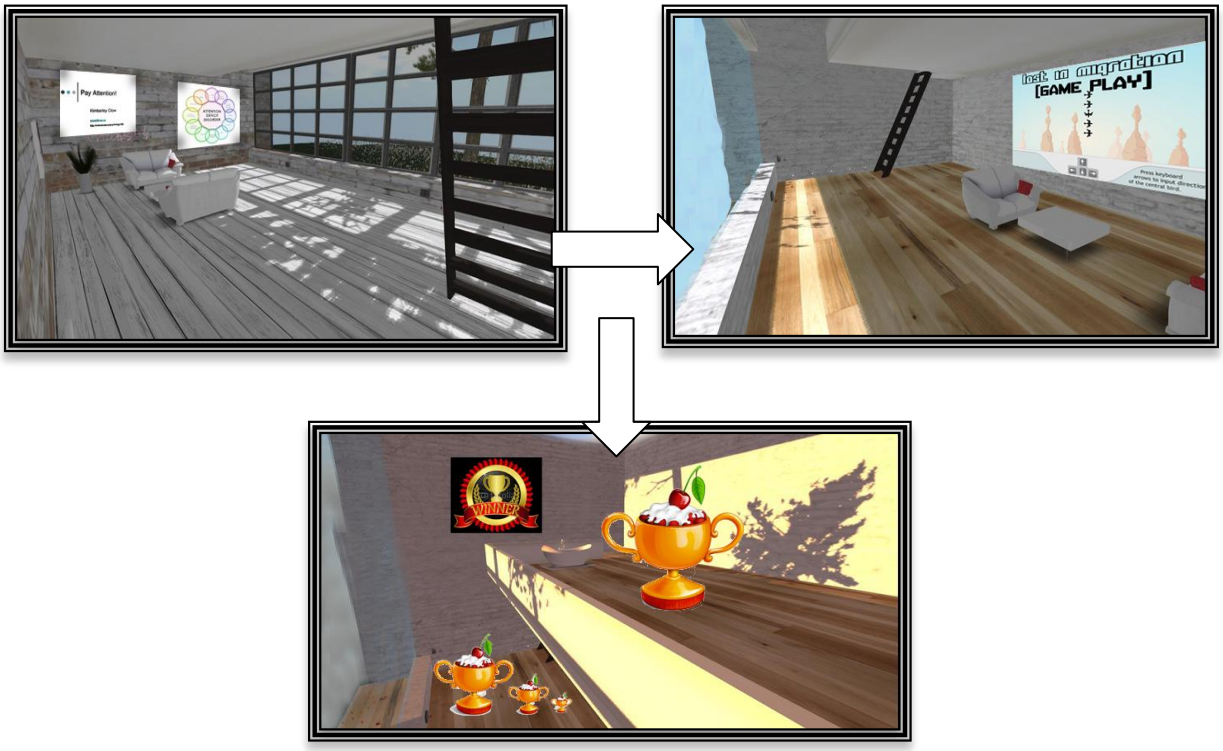
- **Where do you want the learners to go?**

As stated in the welcomed notecard, the training buildings will wait for the participants to visit.

- **What are the desired learning outcomes?**

Self-development and improved sharing merits.

b. Memory Training Building



Storyboard 2 - Attention Training Building

- **What do learners do?**

Participants learn to develop their memory ability with the help of presentational information and game play. According to their success in the games they will be rewarded.

- **How do they receive instructions?**

There will be some a greeting mascot in each training building which gives the learner a notecard about what can be done there and how.

- **How do they know what to do?**

They just interact with the objects. The guidance objects(like mascots or notecard objects) will be design to be easily distinguished from other interactive objects(like media objects)

- **How are the learners going to be observed?**

The scores will be logged and the progress information will be given to the participant as a feedback.

- **What happens first?**

When they enter the building, a mascot will welcome them and after clicking it, they will receive a notecard about the aim and structure of the building. Moreover, the participant will be given a group name accordingly and given a specific t-shirt (as shown below on Figure 6) on them. Then according to the guide signs the participants go among floors.

Figure 6 - T-shirts given to the Participants by the BTC environment

- **How do learners interact (voice/text)?**

Both of them are possible in OpenSim.

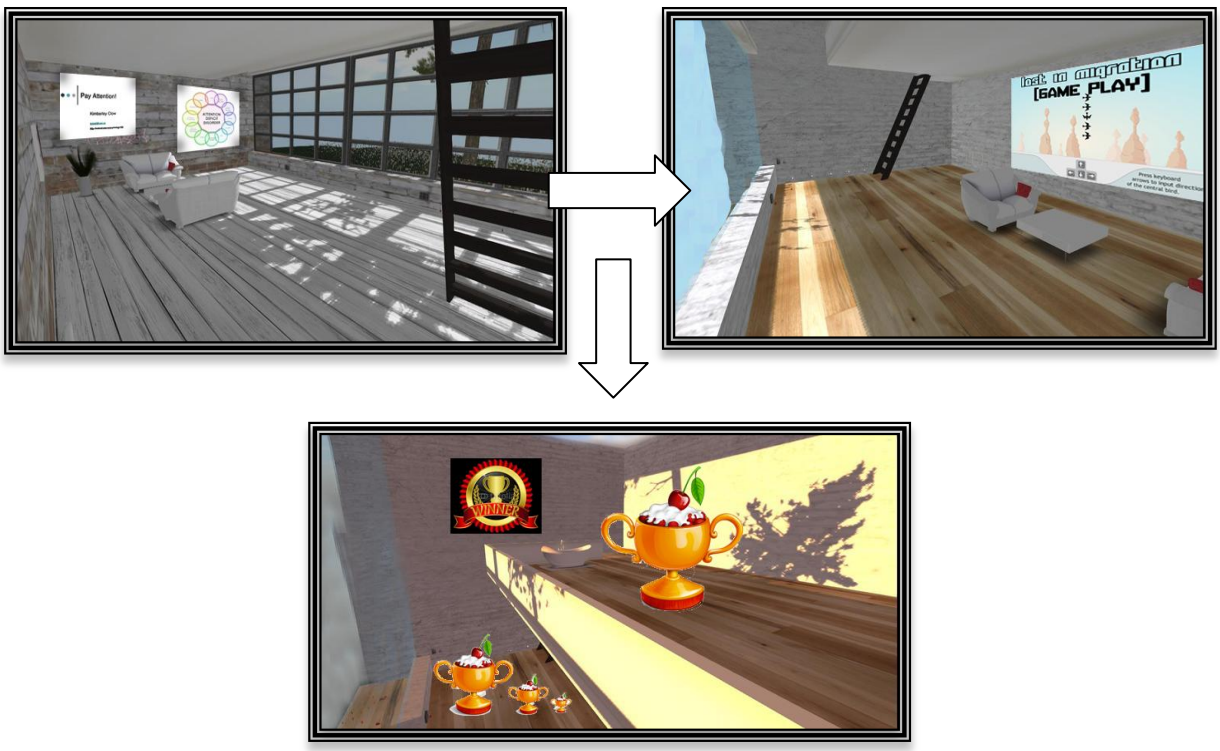
- **Where do you want the learners to go?**

As stated in the welcomed notecard, the participant should explore all three floors and experience the objects each.

- **What are the desired learning outcomes?**

Self-memory ability development and improved sharing and self confidence merits.

c. Attention Training Building



Storyboard 3 - Attention Training Building

- **What do learners do?**

After entering the building in the first floor, learners are expected to wear the T-shirt which is given to them in each building representing for each game and building they have already chosen. they receive some important information about the importance of attention in learning and the ways which can help them to increase their attentions. The required guidelines will be provided using various slides (Posters) in order to complete the game which assume to enhances their attention as well.

- **How do they receive instructions?**

Note cards will provide necessary information and steps which are expected to be taken by the learners in the environment in the second floor. Moreover, they will be informed about the scores which they acquire after playing each game. They will receive rewards such as different T-shirt or symbol for each game once they have completed them in the third floor.

- **How do they know what to do?**

In order to inform the learners about interacting with the environment we are going to use message window. Therefore, learners will be introduced and informed about the methods to interact with the environment easily.

- **How are the learners going to be observed?**

It is desired that we will be able to cache the learners' logs for each game that they have played. Their scores will be saved as well which can help learners and trainers to determine the performance, effectiveness of the learners and games respectively. Learners can access their summary progress report on their inventory.

- **What happens first?**

First of all, learners wear the specific T-shirt of the game in the first floor of the building, then they need to read the important and background information about the attention training games before starting the game in second floor using note cards. The required information and guidelines about the game and its procedure will be provided to learners using note cards in the second floor of the building. afterward, they will go to the third floor where they can get their rewards bases on their performances.

- **How do learners interact (voice/text)?**

The time duration and encouragement announcement will be by alert system using voice. For instance, learners will be reminded about their remaining time during the game specially when they are in shortage of time. In order to encourage the learners to interact with each other some announcements such as "There is a meeting/challenge in the cafeteria will be used. Furthermore, for answering the learners questions we will use text based chat which are enabled in OpenSim.

- **Where do you want the learners to go?**

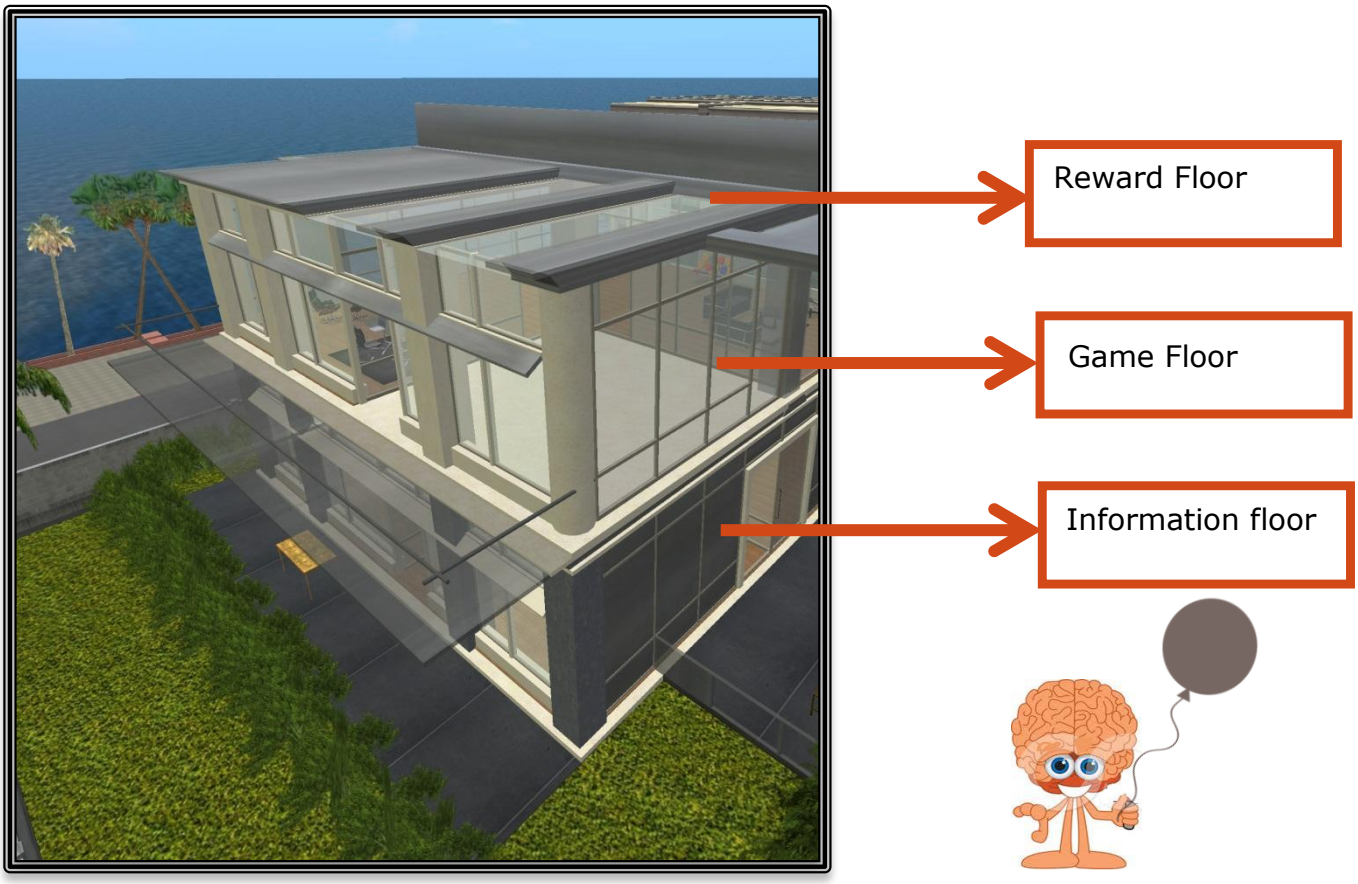
The building for each training part includes three floors which are designed based on different purposes. The learners need to start from first floor in the building

and after getting required information about the attention training program they can teleport to the second floor for playing the attention training game. The required taken steps will be illustrated using slides in the second floor and guide the learners how to play it. Once they have completed the game they can teleport to the third floor where they will receive their rewards based on their performance. Moreover, there will be a cafeteria where learners meet each other and share their opinion about the games they have played. In addition, the learners can be informed and encouraged about the games in the center of the building.

- **What are the desired learning outcomes?**

The aim for designing such an environment is to enhance individuals brain training abilities. Since the attention play significant role in learning process we try to improve learners attention using simple but effective attention training games. We assume that learning process can be more interesting using such a game and will motivate and encourage learners to use them. It is desired that the learners' attention will be improved after using and playing the attention training game. Moreover, The comments board is predicted to provide more interactive learning environment where students can share their opinions, interests about games with each other. If learners reject filling the form or writing on the board after playing the games, they will receive prohibition for using the cafeteria. It enables developer to receive feedbacks as well.

d. Speed Training Building



Storyboard 4 – Speed Training Building

- **What do learners do?**

When learners enter to STB brain mascot will welcome them. The mascot will have a text on its top to make users click on it (such as click on me). By clicking on mascot, learners will get a t-shirt special made for STB to wear and a balloon with Brain Trainer logo to hold. First floor will have information about how speed games are using to make brain work and how they are important in education. The information will be embedding on boards as slide shows, posters and informative videos. This will be as an ice-breaking to warm learners for the game.

- **How do they receive instructions?**

The information will be received as notecards, warning audios, posters and signs. There will be notecards to explain each step of game to learners. Also there might be posters on walls with same information on notecards by having some visuals. Moreover, they will be informed about the scores on score boards which they acquire after playing each game. Learners will have t-shirts that are designed for STB and at the end of the game, if they can pass the set score they will receive a winner cup on third floor as a reward.

- **How do they know what to do?**

To inform learners about what they are going to do, there will be notecards and message boards. Learners will be clearly informed through these materials. There will also be some audios to warn learners about what they should do.

- **How are the learners going to be observed?**

Visitors will be kept in logs and we will check the log frequently. Also, games will have a score board which will let admins know who scored how much. Learners can access their summary progress report on their inventory.

- **What happens first?**

First of all, when learners stepped into STB building, they will receive a group tag as "Speed Trainer". Then they will see the brain mascot and will click on it to receive notecards to be informed about the building and a t-shirt which is special made for Speed Trainers. In first floor, they will read information about speed games. Signs, slides and posters will be used for background information. After learners clicked on all information boards, the teleport sign for second floor will be appeared. To see teleport sign, learners have to click on all boards so this will be controlled by security scripts. When learners go to second floor they will inform by both notecards and audios about what they are going to do. Speed Training game will have time limitation. It is matching cards in 30 minutes. Within each match learners will get 20 points and with each mistake they will lose 5 points. If they reach 250 points they will see the third floor teleport to get the winner cup. Therefore, third floor will be open to learners who reach 250 points.

- **How do learners interact (voice/text)?**

Users will be informed about games duration and announcements by gesture, voicing system. This will make learners to interact with environment. Also,

avatars can interact with each-other by using local chat, Instant Messaging, group chat and voicing. In order to increase interaction between users, we will have a "social café" in our land.

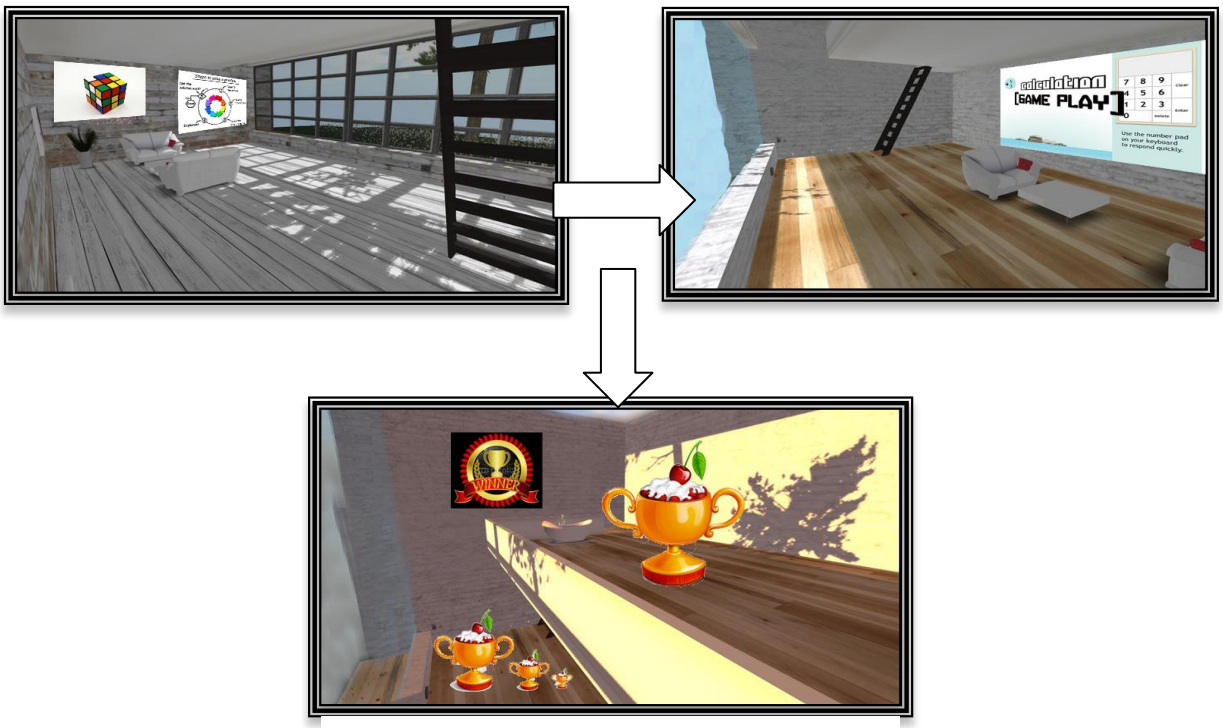
- **Where do you want the learners to go?**

Learners will be landed on the center of land. There will be informative posters and signs at this part and learners will be free to choice which training (attention, memory, speed and problem solving) they want to attend. When they entered to Speed Training Building, they all have to start from first floor. After they finished all requirements here, they will be teleported to second floor and play the game. Once they have completed the game with passing the set score they can teleport to the third floor where they will receive their rewards based on their performance.

- **What are the desired learning outcomes?**

The aim for designing Speed Training building is to make learners catch the signs correctly and match them. It will help them to increase their concentration and memory skill. Learners will be able to learn how to deal with limited time to get the score. As constructivist learning requires learning by doing, this game will give a great chance to learners to improve their multitasking, memory and attention skill.

e. Problem Solving Building



Storyboard 5 - Problem Solving Building

- **What do learners do?**

Firstly learners take a note card from the brain mascot at the entrance of the building. Then, according to first instruction in the note card they go to take the

problem solving building t-shirt and wear it. In the next step they have knowledge about problem solving and its importance for learning and brain via reading information from slides or posters on the billboards and watching videos. Until they complete all steps in the first floor, the system doesn't allow them o go to the second floor at first visit the building. After that, they go to the second floor to have instructions for playing the game from note cards and play the game. In the game, they try to solve some problems including basic summation, subtraction, multiplication and division with two numbers in particular time. As the game progress, more problems appear on the screen faster. If the player can't answer three problems one after the other, the game is over. On the third floor, learners take a reward such as a cap or another object if they complete the game with a higher score than lower limit score.

- **How do they receive instructions?**

There are note cards, billboards, presentations, posters and embedded videos on web pages for learners to receive instructions. They have also some messages from the system to know their scores on the game and how they progress after playing the games.

- **How do they know what to do?**

Firstly, orientation of the brain training center provides learners information about how they interact within the buildings. When they are near to the building they have message from the brain mascot about where they are and what to do such as "Welcome to the Problem Solving Building. Take the note card for the instructions, please. Good Luck!"

- **How are the learners going to be observed?**

A game log will be kept for each learner including the learner's scores and her/his progress information. Also, learners can keep the game log in their inventory.

- **What happens first?**

Firstly, when learners get close to the building, they have a message about where they are and what to do from the brain mascot that is at the entrance of the building. Then, they enter the building and they interact with objects in the building according the instructions provided from note card.

- **How do learners interact (voice/text)?**

In the problem solving game, learner answers the questions with text typing on the keyboard. Also, OpenSim allows learners to interact with each other via text or spoken chat.

- **Where do you want the learners to go?**

Firstly, learners have the message about what they have to do in the building. After that they get the note card learners and go to inside the building. In the note card, there are instructions for what they do in the first building orderly and the instructions for learning about problem solving topic. According to note card, firstly they pick a t-shirt and wear it. Then, they go to the billboards for presentations. After they have information about the topic, the system allows

them to go to upstairs, second floor. On this floor, they have a brief instruction about how to play the game and they play the game. Then they have information about their scores on the game and their game log. After that, system allows them to go to the third floor and they enter this floor where they have their reward cups if they have higher scores than the lower limit score of the game. Finally, they can leave the building via a teleport tool and they can try another game or go to cafeteria etc.

- **What are the desired learning outcomes?**

Learners are expected to develop their skills on mental calculation and making estimates. They are also expected to increase their aptitudes with numbers with playing the problem solving game.

f. Cafeteria

Storyboard 6 - Cafeteria

- **What do learners do?**

Learners can eat, drink, chat&interact with other participants and share their ideas. There will be also a dance flor to increase connectedness and emmersion.

- **How do learners interact (voice/text)?**

Participants can use both text and voice chat for interacting with each other in cafeteria. They can learn more about games by sharing their ideas and be motivated to play various games. Therefore, their brain abilities such as attention, memory, speed and problem solving can be improved easily. Moreover, they can have more fun there and be encouraged about visiting the buildings.

g. Shopping Center

Storyboard 7 - Shopping Center

- **What do learners do?**

Learners visit the shopping center and they read the posters which are shown by signs to make it more attractive. These posters will give information to learners how they can shop in our store. Each item in the store will be given for free. Therefore, all learners to do is to follow instructions for how to get the stuffs in their inventory and how to use it on their avatars.

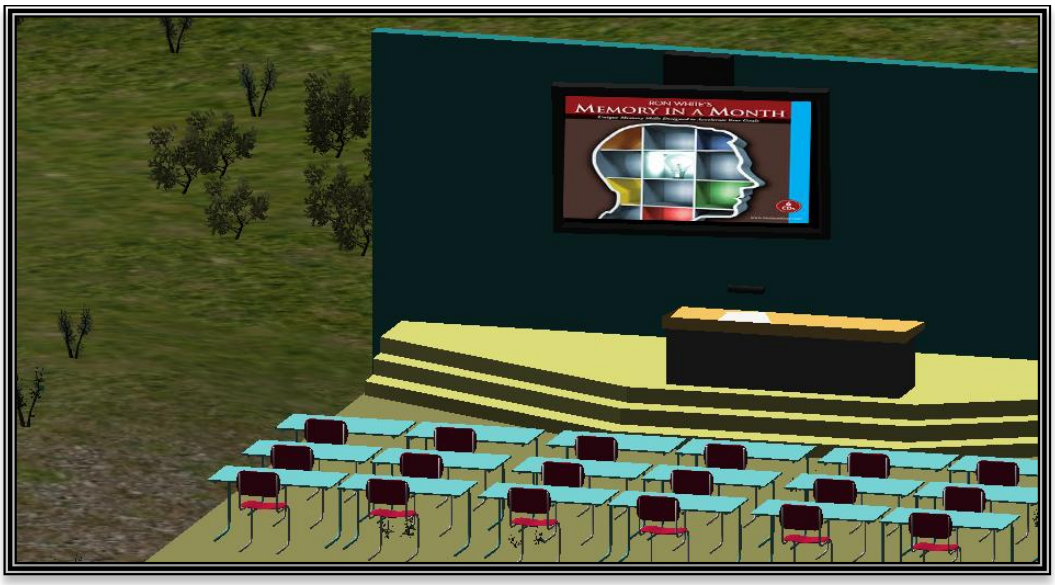
- **How do they receive instructions?**

The information will be received as notecards, posters and signs. There will be notecards to explain how learners can buy items from the store and how they can wear or attach it on their avatar. Also there will be posters on walls with same information on notecards by having some visuals.

- **How do they know what to do?**

Notecards and informative posters will let learners to know what they will do.

h. Seminar Hall(Auditorium)



Storyboard 8 - Auditorium

- **What do learners do?**

Learners will participant a presentation event in the auditorium near the center of the environment.

- **How do they receive instructions?**

The participants just click the display panel object and interact with it, then the predefined action will be sitting and follow the presentation on the screen.

- **How do they know what to do?**

Because the display panel is interactable object, they should just click to inteact.

- **What are the desired learning outcomes?**

Getting information about brain abilities concepts and being participant of a synchronous collaborative event.

- **How do learners interact (voice/text)?**

Both of them are possible in OpenSim.

9. SUMMARY

While discuss the design principles implemented in Brain Training Center, a model created by Kapp and O'Driscoll has been used. In this model, they propose to ask some set of questions to ensure the environment meets the related design principle. Below are the mentioned questions and answers for the case Brain Training Center environment:

Design Principle	Key Questions to Consider	Answers
Instructionally Grounded	Is the learning intervention addressing a vetted business or educational need?	Yes, It is answered in second floor of each building while learners play the games ,their brain training abilities will be improved.
	Are the learning objectives optimized to address the business or educational need?	Yes, Environment is answered the educational objectives using proper design which are enhanced with immerse visualization tools.
	Is a 3DLE the most effecient and effective mechanism for transferring the learning?	Yes, According to broad usage of technological devices in daily lives 3DLE can be as a appropriate method in learning.
Participant Centered	Does the design place the participants in the center of the experience?	Yes.
	What role(s) do the participants play in the experience?	Participants are just the gamers.
	What actions and interactions can the participants take to encounter teachable moments within the experience?	Participants get their information using media tools such as slides and interacting with objects which provide usefull note cards for them for acquiring necessary information.
Contextually Situated	What situational contexts best accommodate the learning objectives of the intervention?	
	What is the role of the facilitator, other participants, and the environment itself in creating an authentic situational context for learning?	Relative pictures, realistic models interactive objects.
Discovery Driven	What is the minimum set of guidelines that need to be established to catalyze action within the learning experience?	Informative information about different brain training slides and the instruction in form of note cards by interacting with objects.
	What information or incentives can be selectively revealed within the learning experience to motivate engagement and collaborative action within the experience?	Inspecting is supported within the environmet because for playing the games, learners need to interact with objects such as mascot. In addition for writing their comments on the board in each building they will interact with the board that increases the engagement and Time remaining announcement can

		increase the participants motivations as well.
Activity Oriented	What is the set of episodic activities that will immerse the participants in the learning experience?	There games are played through interacting with objects.Moreover, the information about brain traing and the instruction about the games can be received as note cards through interacting with objects. There is a series of contextually set-ups to be interacted. There is flow which starts from first floor of training buildings and continiued with reading information cards and interacting with media data or objects through the building up to third floor.
	What are the key actions and interactions within these episodes that trigger teachable moments for the participants?	The games themselves are played using interaction with objects which improve the helps participants to improve their brain training .
Consequentially Experienced	How will participants be required to demonstrate their ability to perform?	In fact there is no ability to require. To start the game they only need to read the instruction through note cards.
	How is iterative trial and error and feedback built into the learning experience?	There is no additional feedback mechanism, participant report via secondlife platform about the environment. However, there is a board in second floor of ech building where participants can write the feedbacks about the games.
	What are the consequences of failure for the participant?	The participants cannot start the game if they will not be able to interact with objects, The only option is remained for them is to leave the building. There is only one failure case about gaining experience is that if the participant only walk around and not to interact with the information objects.
Collaboratively Motivated	How will collaborative and co - creative action on the part of the teams be incented and rewarded?	There is co-creative action only about informing the participants about time remaining while they are goining to complete the games. Furthermore, seminar rooms and cafeteria are as collaborative context,where participants can share their experiences and interact with objects for eating or drinking. In shopping store they

		can buy some objects as well.
	How is collaboration encouraged by the design?	One of the purposes of designing cafeteria and seminar room is to motivate participants to collaborate with each other and express their opinions about the games and encourage them to experience the other games which they have not played.
Reflectively Synthesized	How is personal reflection accommodated in the design?	Some free concept related inventory objects are given to the participant such as representitave T-shirts and balloons in the enterance part of the buildings to make them feel like she belongs to there for that moment.in addition rewards will be given to the participant based on their performances in the building such as symbols or hats.
	How are team after - action reviews accommodated in the design?	There is no team work here yet. But some team work may be added as we continue.

Table 2 - 3DLE Principle Implementations

As a result, the below archetype&macrostructure figure can be build:

Figure 7 - BTC Archetype&Macrotructure Implementations