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ASADUL ISLAM

Yasar University, Turkey

CROSS-MODAL COMPUTER GAMES AS AN INTERACTIVE LEARNING MEDIUM

Abstract:

Cross-modal computer games are boundless mediums for interactive learning in a visually and graphically simulated interactive sphere. Where the challenges and rewards for the users are constructed according to the increase in difficulty level. This paper will study about the significance of cross-modal based computer games for learning in the context of different visuals and sounds. As the computer games give the user a virtual platform with new learning experiences. In this method of learning the user becomes an independent learner. The computer games can draw player's attention, team building, feedbacks, interest, time, self-confidence, and desire will also be explored in this research. Furthermore, this research will also explain the current issues faced in the game based learning with positive and negative aspects of this learning process. It will also explain about the different tools to analyze the game based learning. Hence, the game based learning in the curriculum is one of the very beneficial and engaging ways of the learning. It can make learning environment interactive for becoming an independent learner from a dependent learner.

Keywords:

Cross-modal Game Based Learning, Computer Games, Independent Learning, Storyline, Virtual Classroom.

1 Introduction

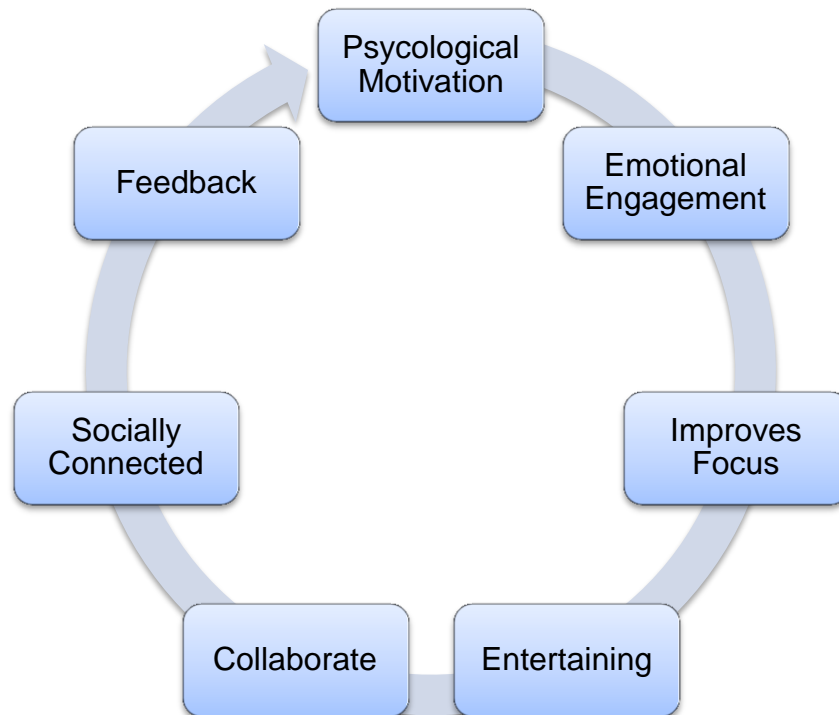
Cross-modal educational games are very widespread and interactive medium for engaging learners. These games have given learners a virtual world to gain new experiences for a certain amount of time. A cross-modal educational game engages entertainment with the structured method of learning. Where the users multi-senses are integrated with the learning process. The user can see, hear and speak to make the interaction in the game. These games can teach goals, rules, adaptation, problem-solving, and interaction in a story structure (Teaching learning, 2011). During gameplay, the users are encouraged to apply their logical thinking, decision building, social interaction and fun engagement. A designed gameplay encourages the motivation of the player with involving a person in cognitively, physically and emotionally. As games are distinct in which the learners may let their imaginations to interact with the space without affecting the real world. Additionally, cross-modal educational games experiences will have effect on people's lives to improve their skills and knowledge. The cross-modal abilities improves in learning and applying to the real world (Castrejon,L.,Aytar,Y., Vondrick.C., Pirsivash,H.,& Torralba,A, 2016). The constraints in a game can determine the parameters and limits of interactivity. A fundamental feature of a game is structured and competitive activity, which is compelled by instructions to be respected to accomplish the objectives. The most successful educational games benefit learners to accomplish the learning objectives. It will let students to work with others and progress deep thinking and problem-solving skills rather just memorization of a subject. Games can add life in teaching topics specifically for dealing with problem solving approach. It can reduce the gap between quicker and slower learners. The flexible and adaptable nature of the games can be molded to suit a variety of learning settings and environments. A cross-modal game design for game-based learning should include cross-modal effects to recreate the visuals and add the sense of suitable realism to relate with the real world (Chalmers.A.,& Debattista,K., 2009).

2 Advantages of Game Based Learning

Using games can motivate learners in an enormous approach. As games are designed in a reward based system. Whenever you accomplish an event you will either gain points or rewards. This psychologically motivates the learner to play the game again. By replaying several times the user becomes proficient to clear the difficulty level and moves into next level. An interesting level design with new surprising elements in gameplay and visuals will grab the learner's attention. Games can motivate students positive emotional engagement and can make learning experience appealing (Tanner, H., & Jones, S., 2000). It is very important to prevent learners boredom and ensure that the learners remain concentrated throughout the game. As a result of this, the learner will improve focus and use best of his concentration to overcome an obstacle in a game. By playing with the same kind of difficulty level with trying several times the learner can facilitate the reminding to the information, which is acquired. The efficient recalling of the information will enhance the long-term learning further proficient. Games can reiterate the learning in a joyous environment. One of the other advantages of game-based learning is that the knowledge can be strengthened efficiently.

The information's can be structured in different stages and it can be learned in stage by stage. Games are also stressed free way of learning. In computer games, there are always new elements designed together with the sound. When the user wins or losses, the music, and the visual changes. This type of event makes the users try another time. Games also promote team building. If we understand it from the traditional point of view. Many games in the history always promoted the team building. It build's confident and expectation from the other user if the two or more players are in a team.

Figure 1: Advantages of Game based Learning



Source: author

As they can collaborate, communicate, share knowledge and get socially connected. Additionally, games can track performances development of user. It can easily monitor how much growth he/she is making in how much time. This process also provides a real-time feedback about how they are learning and developing skills as they progress in their training. Games provide learners the prospect to learn by doing, facing situations first hand and role-play. This kind of computer-generated learning environments allows for the growth of higher level of learning, collaboration and practical reasoning (Rickard, W., & Oblinger, D., 2003).

3 Sounds in Computer Games

In cross-modal games, the sound is one of the important aspects of games. A well-designed sound always compliments the game. Different sound effects excite us. It provokes our focus and grabs our attentions. An interesting sound design in games makes us feel more connected to the game. It comprehends the feeling of experiencing the virtual game world.

In the virtual environment player's perception can improve by the proper use of the sound. Sounds can be used as in the positive and negative side in the game. For example, when the user earns points, the visual graphics can be more interesting with complimenting sound. On the contrary, if there is any danger or enemies coming then there could be an alarming sound. Sounds develop an impression on the user of interacting with the game. It helps to convince the graphics. Sound can be used as a background and also as Foley music. In Foley, the sound what we hear every day are reproduced by using different types of tools. In Foley, various sound FX are created such as footsteps, car noise, door opening etc. Sounds give messages to the player with the visual information. Sounds can be used to provide important clues that may be beneficial for the player in order to complete his quest.

However, the use of sound in the educational games must be related to the purpose of the game. It should comprehend with the characteristics of the game. When sound simulation used in the beginning they can introduce a concept, alert for a problem, increase motivation and foster the motivation to learn. And then different sounds are used in the middle to drive the concepts, correct errors, gaining points, exploring opportunities for new possibilities. The sounds used in the end are for summarizing, feedback and retrying. (Lindy,H.,1969). In addition, sounds can be designed based on the various themes, social practices, genres and game types. We need to understand the efficient use of sound in cross-modal games to create compelling virtual worlds (Shaffer, D., Squire, K., Halverson, R., & Gee, J., 2005).

4 Computer Games in School Curriculum

Cross-modal computer games can be a part of school curriculum. As it can add significant educational value to the teaching and learning. A game with attractive visuals, sounds, graphic simulation, integrating character and story line will make the learning more interactive. For example; strategic games where children use thinking and planning skills. There are several types of strategic games such Team strategy, abstract strategy, war games and create societies games. All these types of games require focus and thinking for a planning to achieve the objective (Wikipedia, 2017). There are also several strategic games where children learn to build societies, trading and plan to use their resources efficiently. If this kind of is structured according to the curriculum. Then it can make the learning more engaging. However, when developing a game with curriculum it is necessary to use game-based scenarios and principles for making the learning engaging. A curriculum based game designed for learning should not be reproducing exactly from the books.

In a game based education, we can design characters fictional and non-fictional with a narrative structure that can allow the player to be a protagonist in a disciplinary expertise (Barab, S., Pettyjohn, P., Gresalfi, M., Volk, C., Solomou, M., 2012). For example, a teacher wants to teach about ancient Indian mythology. They can use as a multiplayer game where the gods and goddesses can be characters. So when the user plays a role of a character such as Lord Rama, they can learn to play a role and experiencing the history by living inside it. During the play, the learning will be more interacting, as they will feel like the character in the virtual world. They can learn by experiencing as real life scenarios by playing the character

such as decision making, planning, team building, strategic thinking, leading, sacrificing and valor. There are several strategic such as DOTA, Age of empires, Warcraft, and Civilizations; those are very popular among children. This type of designed games can even allow children to become a scientist, historians, educationist depending on the context of the game (Barab, S., Pettyjohn, P., Gresalfi, M., Volk, C., Solomou, M., 2012).

When considering a game in classroom teaching and learning we must focus to make the gameplay motivating to children. This will connect the children profoundly to the video games. If playing with excitement and happiness each time when they face a failure they would like to try the objective again. This gradually develops the motivation level. Many new gamers see competition as pleasurable and motivating in video games but not in classroom teaching (Gee, J.P., 2004). This is because in games they could play as a predefined character and upgrade themselves over time. There is always a sense of positive to retry another time to achieve the objective because the game is designed to give the user space where they can always see a possibility to win. This develops the emotions to facilitate the learning. However, some academics says that when a person is fearful, discouraged and emotionally overburdened their intake in learning doesn't take place. High stress, too much frustration, powerful anger, or intense fear can overwhelm our thinking and shut down our learning (Gee, J.P., 2004). It is necessary to have a good game design which can facilitate the learning from an entertainment point of view.

5 Positive and Negative Issues

Game based learning improves the memory capacity because in games to solve something you have to remember the rules and follow them efficiently. This improves your memory to train yourself for improving the skills. Games are a fun form of learning. Where the learning is happening by entertaining. Games include rules, objectives, goals and competition with an interactive experience. The learning is always happening with hands-on activities. If the game design is good then the learners always come to play and explore more the game. In a game environment, the children can do decision making, planning and learning from the experiences by situations which might not exist in real world. These element needs to get integrated into the storyline of the game with keeping in consideration of the instructional design. A structured story integration with the design of the game can provide immersive learning opportunities (Zyda, M. 2005). Another advantage of game-based learning is that learners can immediate feedback after finishing the game. Whereas in real life they have to wait much longer to get the results and feedbacks. This helps in early improvement, so when another time playing they could learning from their mistakes. This allows the user to reflect on what they did and they can plan a new strategy for another time. Also, these days' games have forums, where they could discuss with other players. This kind of platform is online where the exchanging of information is spontaneous (Gaming arena, 2015).

Games help in the development of the cognitive growth where each time the child can perform cognitive actions by remembering the rules, sequences. Which improves their thinking and logical understanding skills. As the virtual world consequences of failures are not as strong as

the real world so the user can make sound decisions and predictions. It helps them to nurture strong problem-solving skills. Game based learning also helps in learning modern technology. Playing games on a computer and mobile phones make them aware of the technical requirements. Such as using the controls, cracking the games, getting licenses, giving profiles and passwords and getting used to the web world.

However, there are some major concerns on applying games in the educational medium. Violence in video games could contribute to social problems. As when playing games users are so much indulged in the gaming virtual world. There are some strong cases where violence has been resulted because of playing games. Some researchers also brought the fact that these days games are easily assessable such as in homes, mobile phones. So applying video games in school education system could make it less interacting. As some of the kids in their homes spent time in playing video games. There is also significant concern about the funding of the games (Bryant,T., 2014). As a fair amount of money needed to develop a game. Also many have to pay for using games from the gaming websites. In addition to this, there are many teachers who are not prepared or trained to use this technology effectively.

It is important to make the teaching and learning goals clear and directed towards the assessment of the students. By which a well-designed game creation can be less expensive. Also, games can be used and motivational booster to increase learning in for the bigger context of the courses.

6 Analyses game based learning

The game based learning can be analyzed with the design of the game, educational setting, technology, outcomes, and cost. Furthermore, it should be suitable and can be easily used by all the students. In the design part, the game design should provide relevant and engaging information and not just play for the sake. We should consider the purpose of the game. Is context of the game matching with the objectives? If it is helping the user can practice and improve the skills and develop the knowledge. The appropriateness of the game should relate to the learning. Depicting violence for real can make potential problem in learning. If the graphics don't match with the learning requirement then it could be a distraction in the learning. Also, the graphics of the game can depend on the age group of the game. The gameplay needs to be quickly understood. If the game is too complex to understand then it will not be engaging for the user.

Figure 2: Analyses of an Educational game



Source: author

The game could involve collaborative problem-solving. Where other users can learn from a discussion with each other. The challenge and rewards should be suitable according to the level of the game. As a result of this user could find the game more interesting after achieving every objective. It is important to understand if the gaming experience can improve their learning, engagement, and relation with the real world. The game should lead to an acceleration in the learning process with relation to the curriculum. It should prepare the user to critical thinking and decision making with the circumstance in a real world.

7 Conclusion

Computer game based education is a significant medium of an instructional design. It helps to develop the understanding of a given topic by unfolding the teaching and learning objectives in an interactive way. The key elements can challenge and improve the learner's skills and develop their abilities. Computer games can have an imaginary environment and the educational objectives could be presented in a form of a story and characters. The Cross-modal games can engage the senses such as touch, see, speech with the interactive methods. Other elements such as active learning by doing also comes as an advantage. The games are useful in self-improvement monitoring by yourself or by others. It always has a

mystery that gives the element of surprise and curiosity. Most importantly the computer games educational objectives could have a close relevance to the real world. Which could be bounded by safety instructions and rules for the improvement of the learner. Hence, there is a need to improvise the learning process by implementing the cross-modal based educational game design.

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