Play and Learn Case Study on Learning Abilities Through Effective Computing in Games

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Summary
Effective computing has now become a more active research topic. It includes a multidisciplinary knowledge and background such as cognitive, physiology and computer sciences. Our research topic is also based on effective computing through games in which we try to gather the data of the user experience obtained after playing games targeted by us. We have gathered their experiences by our questionnaires that we provide after playing games. These questionnaires give us insight and help us to make decisions. This provides us a way in which we have to examine the result about the game which people like to play more, as everyone likes to play game but which type of game one prefers to play and why? As we have discussed that everyone likes to play game, so we have endeavored not to target any particular user or aged group and ensured not to take users from any specific environment or background. This research study is for everyone or to say, for general users. This study also examines either effective computing has produced positive impacts on learning abilities or not? This paper summarizes the efficient use of effective computing that facilitates user to get or learn some things by the help of these games. It may not be harmful to the users by any way in terms of health which can be made possible by the making use of effective sciences, and relevant methods and techniques from effective computing, to support good level of game designing with respect to user requirements.

Keywords:
Emotion, Computer games, Effective computing, Feedback, Differences, Cognitive ability.

1. Introduction

Now-a-days, human computer interaction is playing a vital role between human and computer because without good human computer interaction, human is not able to communicate with computer easily and effectively to achieve a particular goal [1]. Day by day, human computer interaction devices are evolving and tremendous research is under progress to increase modes of human computer interaction because it is a clear fact that without good interaction human is not able to communicate with computer or any other electronic device in a good and reliable way [2]. Human Computer Interaction is not only serving humanity for gaming and entertainment, it is also providing significant assistance in enhancing security related objectives [3]. Security based human computer interaction includes, finger-print verification, face Recognition, iris recognition etc. These modern facilities are possible through HCI. In effective computing, we have tried to allocate computer with human like capabilities like observations, expectations and some other amazing features [4]. It is has now become most popular topic related to Human Computer Interaction. This paper explores the potential of emotional social gaming applications for Users. With the term social gaming, we refer to gaming that improves inspiration towards social interaction by providing such options as a part of the game. Social gaming is attracting a lot of interest as it is becoming increasingly clear that a major element of fun for games is social interaction with other players and also because of rising concerns regarding the negative impact of computer gaming upon the social development of users. Currently, a large amount of research has been performed in the field of gaming and emotions. However, most research has been done with adult participants and children. Therefore, it would be interesting to conduct our study with all the users no specifications of the age group, background and environment, as we discussed above that everyone were playing games and enjoyed it.

It will be definitely interesting to notice that how our users interact and display their emotions while playing affective games. This research paper summarizes the core areas of affective computing, showing us the performance of users by engaging the games. The aim of the this research is to get the review of the users by using sufficient information about affective computing methods and techniques that were apply on the game testing. The review result is based on the questionnaires' results that were filled by the users after the experience of the playing games. We have also focused on the efficient use of affective computing that user gets or learns something by using these games. It may not harm the users by any way in terms of health which can be possible by the use of affective sciences, and relevant methods and techniques from affective computing, thus supporting affect-focused game designing. By efficient it is meant that the users playing game for a certain time may not affect their health and also will not waste their time. As we target Human and Computer Interaction Concepts, we also consider

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usability factors and try to give knowledge to users to use any computer application in an efficient manner.

2. Previous Studies

After performing review of work done by researchers during the last few years, researches that have been conducted on effective computing are via utilization of games through which it is possible to examine experience, emotions and impact of games on the users. These games have also affected the ability of users to learn things while playing and enjoying the games. Researchers have particularly targeted mostly age limited audiences i.e. adults or children for conducting their research and finding results. In order to grab emotions of the player, different computer techniques have been deployed by the researchers.

Some of the research has been done on user emotions. In them, researchers are fetching user emotions during the duration of playing games when the user is playing the game with focused mind. The detection of emotions is done by the use of software that is face reader which gets or targets the user facial expressions. Some of the research has been also done on the game designing principles, focusing on ways to develop games so that the user has the freedom to explore and learn. In our research, we have concentrated on user experience after playing both types of games (reward and non-reward) and tried to record their reviews by filling questionnaires. This has guided us to take out the results about which game they want to play again. We have restricted ourselves to target all the users to get vast result on effective computing instead of users belonging to a specific age or occupation.

Researchers achieved upto 92.6% agreement of students over enjoyment alongwith learning through effecting gaming in the field of Science, Technology, Engineering and Mathematics (STEM) [6]. It was also observed the student group which was subjected to effective gaming lead to an enhanced understanding of mathematics than the group which was taught without any use of effective gaming [7]. Research in the paper has discussed about modes of evaluating player's experiences through gaming and inter-relationships [8]. Researchers have pointed out the rise in frequency of using games for teaching in primary education level with various outcomes [9]. Researchers have reviewed studies involved in using serious games for easier psychological counseling due to it the greater engagement property of the games [10]. Investigation has been performed by the researchers on the factors that show effects related to increasing engagement and learning in game-based learning (GBL) [11]. Studies have been conducted to relate effective gaming with cognitive abilities of the children by letting them play selected games for specified number of times under observation [12]. Researchers have also written about findings relating increased learning in students when exposed to challenging games [13]. Computer programming concepts were shown to be learnt by students more easily through effective gaming in contrast to traditional way of teaching [14]. The need to perform more thorough scientific evaluations of effective gaming for enhancing learning abilities is also emphasized by the researcher along with the discussing about genres of game research [15].

3. Purpose of Study

Our purpose of this study is to conduct research that is based on effective computing. During the study, we have performed an experiment of letting our participants play those games that have been selected by us. We have targeted all the users of all aged groups and recorded their reviews and experience and their level of satisfaction after each user has completed playing the game. This is achieved by asking every user involved in the study to fill out the questionnaires given after they have played the games. We have taken into consideration that all questions in the questionnaire represent the purpose of our study properly. In this study, we are trying to find the role of HCI in games and its impacts on the user. We have also tried to find effective computing involvement in the games by finding whether the computing is effective for games or not. We have also tried to find the impacts of computing on games. Furthermore, our study also tries to fetch positive, negative and neutral impacts on learning abilities of the user.

4. Methodology

During the research on effective computing in games, we observed that people have many questions in mind like, what are the impacts of effective computing in games and what are the learning options through games? Through these confusions in the people, we realized that we need to do some type of research that shows the impacts of effective computing in games and learning abilities. Then, we decided to conduct this study through questionnaire because the reason of choosing questionnaire is that many users had many concerns with computer and the way of interacting with the computer. So, we decided that to we make a questionnaire and include all those questions that are related to the concerns of all users. By using questionnaire, it was easy for us to gather data and questionnaire became helpful for us to do analysis and transformation of the collected data into various views. In questionnaire, we have multiple questions related to our study and users who are participating in this research need

to give answers of all questions. On the basis of these answers, we can estimate the effects of computing in games and also we can examine possibilities of learning during playing the games. We are conducting research on two types of games that represent two basic categories, namely, Rewarding and Non-rewarding. To examine the effect of computing and learning abilities, our study continued by selecting two games, one from each category, letting the users play the games and getting reviews of the users on the games which they like and reasons to like them. Our task is set to get reviews of the users who are playing games and ask them about games. We want to measure both positive and negative perspective of the users related to game and learning. We have tried to make the results on the basis of the analysis, emotions and their perspective. By following this methodology, we have completed our research, results and analysis.

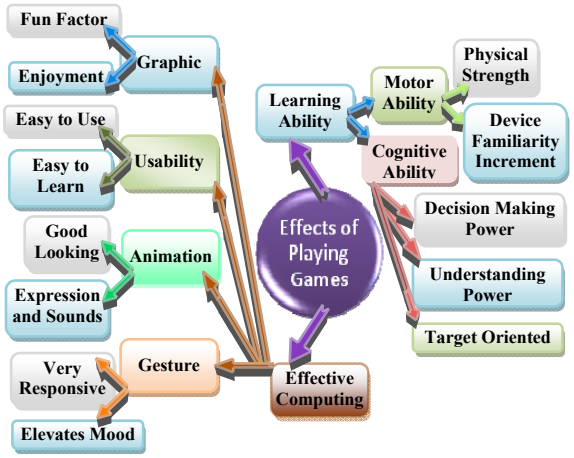

Fig. 1. Playing games and outcomes in relation with affective computing and learning abilities

4.1 Participants

In our study, we have involved all the users who are general users i.e., they do not belong to any particular environment, health condition, financial condition, age group, cast, race, religion, education level, gender and marital status. Our target is to get reviews of all the users as perspective varies from user to user. By following this technique, we came to know about the affective computing as understood by the general users. If we would have selected a particular user, our result would have been based on his/her perspective only. As a consequence, we could have not properly deduced our concerned impacts in general users. In contrast to that approach, we have selected all users due to which we have vast results of analysis. Hence, our approach leads to analytical results that are not biased towards any particular factor connected to the daily life of the participants. This has allowed us to summarize all our concerned points of study with the least possible error, and estimate their effects on general population, counting exceeding beyond the number of participants in the study.

4.2 Procedure

To conduct this experiment, we made some questionnaires in order to get our result. As we have mentioned earlier, we took two games in which one game had reward and the second one did not have any reward. We asked the users to play both the games. When the users had played both the games, we gave them questionnaires which were easily understandable. As we had to target general public so, we did not include any complex question and asked the users to fill these questionnaires in order to perform analysis of data and measurement of the result.

Table 1: Game Categories used during the study

S.No.	GAME TYPE	DESCRIPTION	CATEGORY
1	Reward based	A game that gives some kind of incentive and bonus to the player at different stages during the game play	Rewarding
2	Non-reward based	A game does not award at any stage while playing the game	Non-rewarding

Table 2: Effective computing considered during the study while gaming

S.No.	AFFECTIVE COMPUTING	DESCRIPTION	IMPACTING FACTORS
1	Graphics	Attributes related to text, color and shape of foreground and background objects in the game	Fun factor and enjoyment in the game
2	Usability	The degree of difficulty for understanding the game	User friendly gaming
3	Animations	Graphics changing ability	Good looking and good to listen. Increasing dynamic properties of graphics

Table 3: Changes in Learning Abilities Studied while Gaming

S.No.	LEARNING ABILITY	DESCRIPTION	IMPACTING FACTORS
1	Motor	The skill and ability to perform an action with the movement of muscles in the body	Strength in physiques, etc
2	Cognitive	The abilities and skills that are based on brain activities and are used to perform any simplest to most complex task	Concentration power, decision making, remember power, etc

5. Results and Discussion

It was also made important during the study that the users play game in an efficient manner, considering the importance of their health and precious time. After getting the reviews of the users through questionnaires, we came to know that 82% of the users liked to play games because they considered gaming as better source of enjoyment and entertainment if they are presented with rewards in the form of coins, stars, gems etc. while gaming. In contrast to this fact, 18% of the users informed us that their interest is not dependent upon the rewards offered while playing games as these rewards have no significance in real life.

We also found out that 60% of the users played different types of games on daily basis as they believed that playing games refreshed their mind and body in such a way that they enjoyed doing their daily life work more. 25% users informed us that they played games on weekly basis instead of indulging themselves in this everyday activity. 10% of the users indicated to us that they consider playing games as a less important part of their whole life activities and thus, they do gaming but with one month interval between two consecutive games. Smallest group of users belonging to 10% of the total users told us that they played games only once in a year as they preferred almost all of their life activities more over just playing games.

It was also seen by us that, 37% of the total game playing users showed most of their attraction towards games that involved large amount of action and movements. 21% of the users informed us that they like to play those games more that comprise of puzzles in different forms. Shooting type of games were liked by 21% of the users while, only 14% of the users showed their liking for playing games of other varieties.

It was also observed by us that, 33% of the users agreed about the fact that gaming holds a key position in making effective computing for users. Contradiction to this fact was also shown by 24% of the users. Still 33% users were unable to decide whether playing game is related to effective computing or not.

When we asked from the users about their perspective regarding enhancement in their learning abilities through gaming, 55% replied in support of this phenomenon. This fact was declined by 30% of the users. A portion comprising of 15% of the total users indicated that they are unclear about the improvements produced in their learning abilities by playing games. 62% of the users pointed out that both of their motor and cognitive abilities are improved by playing games. Users who said that only cognitive ability is enhanced by playing games were 22% of the total gamers while, 16% of the users were convinced that through gaming only motor ability can be made better.

26% of the users gave negative remarks about getting fun through playing games. They said that it is a waste of time and money and should be avoided as much as possible. 17% of the users remained neutral. Majority of the users (57%) informed that playing games is a delightful event of their lives.

The importance of the role played by graphics and animations during gaming was accepted by 75% of the users while, only 8% of the users believed that a good game does not always require good graphics. Among the users, 17% of the users were unable to decide whether graphics is significant in gaming or not.

Fig. 2. Chart for preference over Reward and Non-reward type of game

Fig. 3. Chart for duration of playing games

Fig. 6. Chart for learning ability development in gaming

Fig. 4. Chart for preference over type of games

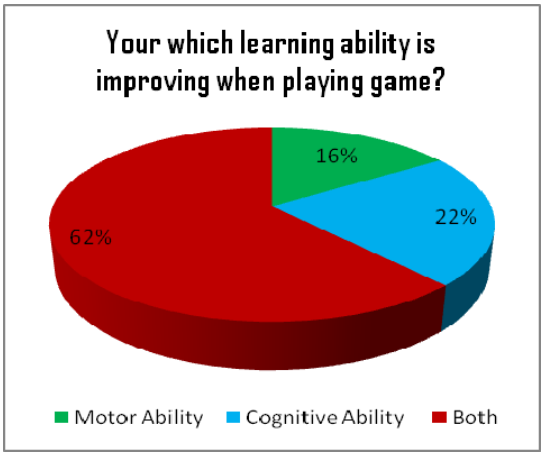

Fig. 7. Chart for the type of learning ability development in gaming

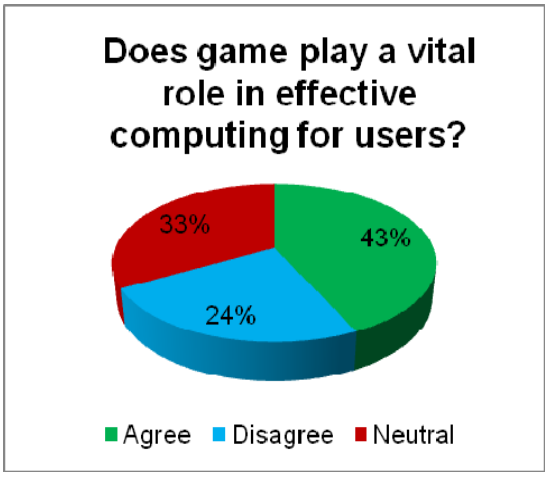

Fig. 5. Chart for effective computing significance observed in gaming

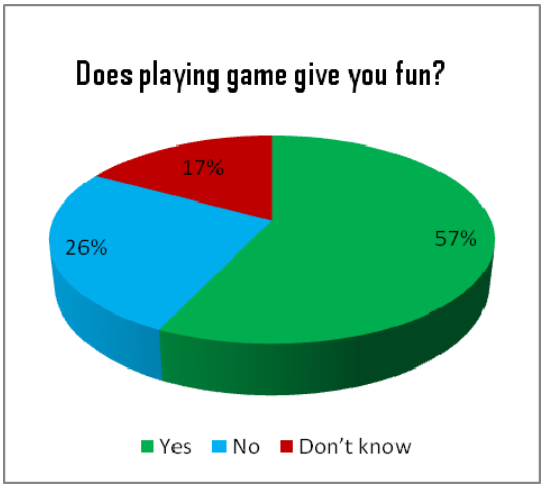

Fig. 8. Chart for experiencing fun in gaming

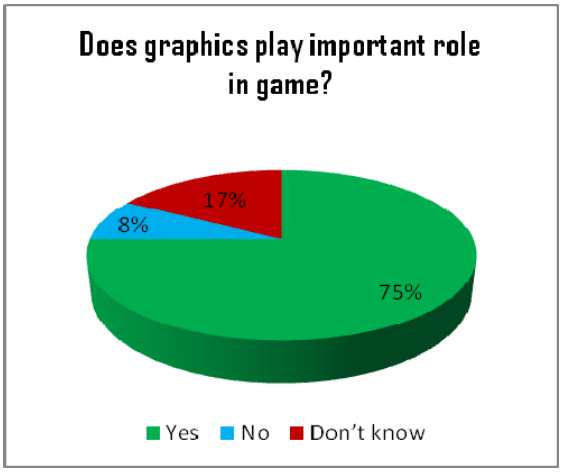

Fig. 9. Chart for significance of animation in game

6. Conclusion

This paper summarized the idea of effective computing in games and how these games can be mapped through human computer interaction. In this study we have investigated that how users responded emotionally when playing effective games. Our results show that all users had emotional state and that they were happier after playing the games. The use of effective computing techniques in the design and development of computer games has been a growing and evolving feature as games narratives and interactions have become more complex and realistic. However, our research in this area is the need to ensure that components or elements introduced into a game are properly contextualized, and appropriately utilized, relative to the narrative and game-play, no complexity is involved in the game and it is mapped with the usability factors in order to satisfy the users when they played game and enjoyed it. We have also endeavored to get reviews from the users about their wants and needs as well as the thoughts they have about effective computing in games, which is possible only when we consider our users.

7. Recommendations

To make attractive games, most of developer and designer use a lot of graphics in games, which may create trouble for the users, users cannot read the elements and can no see the component in games because of complex graphics and it is not good for their eyes. There is a need of more consideration while designing a website must satisfying the user's needs in order to make good game we have to used graphics in efficient manner it not be too high or too low speed of the game also matter try to consider all type of users that it can accessible by all users and used good story lines that the users learn something from the games.

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