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CURRENT METHODS IN RESEARCHES REGARDING SERIOUS GAMES: REVIEWING THE PROSPECT OF FINDINGS CONCERNED WITH LEARNING

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ABSTRACT

Moving toward technology-based and constructivist learning approach is the bridge for filling the gap for those believe that this method is so much easy. Of course, implementing technology-based and constructivist learning approach is so far for many people. So, teachers need consultation concern with navigating the maze of this approach and to understand how to use these games. Game is intrinsically constructive. Players travelling the world in which people's experiences as focal point build their knowledge and make them progress. Taking care of learners' needs lead to paying less attention to traditional methods of learning. In traditional methods, teaching take place step by step and students consider teachers as the core the class who transfer information to learners and they memorize that information with no thinking at all and retain them.

KEYWORDS: implementing technology, Players travelling

INTRODUCTION

When researchers points to the use of games in learning and education they mean serious games. They believe in cognitive and emotional aspects of serious games in learning (Oneil et. al., 2005). Because these games match with human cognitive and emotional needs (Malone). However, intensive investigations have been done on these kinds of games to prove these claims (Tobis, Fletcher, 2008). These studies are based on the results of learning, because, first of all, serious games are aimed at pursuing specific objectives and learning outcomes, second, most of studies on serious games are based on the results of cognitive learning. As a whole, comprehensive classification of the results of learning not only help to improve playing conditions, but, investigate the aspects of learning which are not discovered at all.

What is Game?

Serious games is a game based on computer game that its main aim is entertainment and propaganda and military training to (Chen, Michael 2005). As a whole the definition should include these lines: definition should be based on goal, competitive, interactive (on player with computer, several players) and a framework of specific rules (lindley 2004). Furthermore, the definition provides continuous feedback which monitors players' advancement to reach their targets (Princely 2001)

A Classification of Learning Outcomes of Serious Games

Wide classifications of learning outcomes are based on cognitive aspects. Other studies are based on changes in

ideas and finally a kind of classification based on several factors such as cooperation, teamwork, communication and self-regulation was presented (Baker and Mayer 1999). An interesting classification of learning outcomes presented by Kraiger, Ford and Salan (1999) which indicated the distinction between cognitive, based on proficiency and communicate.

Following figure shows a view of these outcomes:

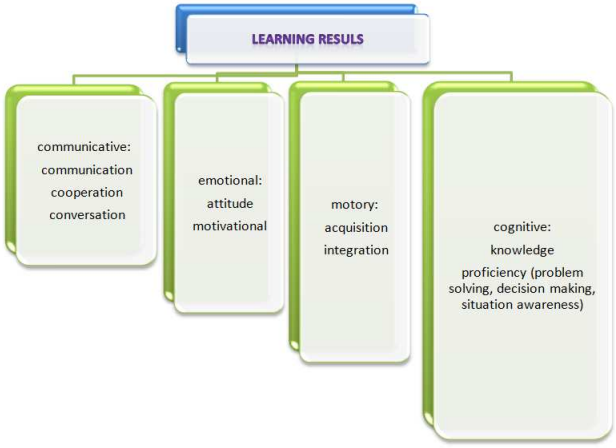

Figure 1: A Classification of Learning Outcomes

The outcomes of cognitive learning can be divided into knowledge and cognitive skills. Knowledge points to textual and non-textual encoded knowledge. There are several kinds of encoded knowledge, such as declarative knowledge (Proper knowledge of the facts) and the knowledge about how to do jobs. The skills regarding to cognitive process in problem solving are more complex. For example, students use knowledge and rules to solve their problem. People sometimes have to make decision in more complex situation in a deadline which need they would be aware of situation, understand the related information and predicting probable situation. (O Brien, O Hare, 2007)

The second kind of learning outcomes is motor skills which contains of several steps. Learners, at first, pass through declarative knowledge to reach procedural knowledge in order to acquire skills they need. In later stages, learner does full treatment. So, faster act with fewer error and more dependent verbal practice will be done.

Emotional learning outcomes have two subgroups. First outcomes are the changing people's attitudes which points to their inner states. These states may turn the negative states to positive attitude or changing in their daily behavior. Motivation is to pay attention to materials and cognitive sources for information processing.

The last kind of outcomes relates to communicative learning; cooperative learning is the proof of this claim which leads to the deeper level of understanding and long term adaptation of learned materials. Also, this kind of learning emphasized specifically on creating opportunities to develop cognitive skills, social interaction and group cohesion (Krijns, *et. al*, 2003).

FUTURE DISCUSSION ON THE RESULTS OF GAMES

Classification of a Variety of Games and the Results of Learning

Different results of investigation showed that suitable design of games is appropriate for specific results of learning, so that different types of games brings different cognitive and emotional reaction for players (Ravaja, 2004).

Educational games designers should pay deep attention to basic concepts in doing their jobs. So, we suggest a framework which concerned about game classification based on cognitive and emotional level (Leindley et al). This scale is a framework with four various layers of complexity of cognitive and emotional levels which were described accordance with previous layers. These layers create new facilities in training while maintained previous levels and altogether, act for acquiring the results of learning. First level includes text or symbolic games in a simple perspective which are clear and explicit. Game players should develop a mental model of game regulation and its consequence cognitively. In this basic level, game can be used to teach the problem solving skills, decision making, verbal teaching and conceptual knowledge. The second level includes playing game in cyberspace. In this level, spatial dimensions have been interpreted and the interrelationships between the various objects are explained so that, this model will be added to mental model made in previous step. In these kinds of games, we can see some situational and general information such as escaping from the nearest route in case of fire, Hand-eye coordination and motor skills too. But the upper levels of this layer; players either move or immerse in game world includes sense a wide range of emotional reactions such as controlling or anxiety reduction. Various kinds of presentation with different levels of people's presence have been used to design three dimension games (Nons and Belki 2003).

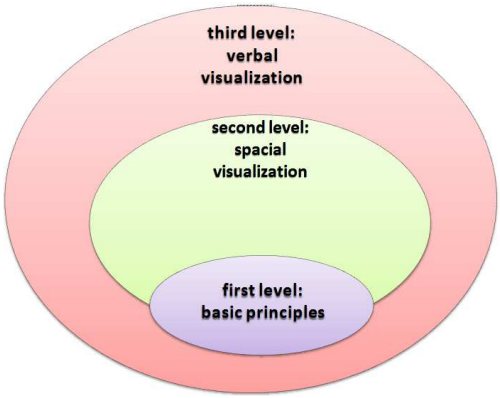

Figure 2

Finally, sense of belonging to social environment lead people interact with other creatures. This game feature lead to high levels of emotional and cognitive complexity in throughout. This level may be used to train particular personal and social skills for particular social group in large scale.

As we know, different social classes are not perfect to cope with different parts of games, it should necessarily be noted that the choice of appropriate planning model lead the game to desired learning objectives and creating intricate designs lead to a more simple learning.

THE ROLE OF HUMAN COGNITIVE ARCHITECTURE

The second recommendation relates to optimizing the effects of serious games. As reviews have shown, the features of games can lead to improve games results. Table 1 includes the results of an overview about serious games which indicates four level of learning outcomes. This table includes instructions for serious games to be more effective.

Implementing serious games is a complex job even when an appropriate design considered for special learning outcomes, such as visual facing with monitor, coordination between mouse and gesture motion, verbal signs interpretation

and problem solving during the game. General claim is that serious games must base on human information processing capacity. Base on cognitive theory, it can be said that without supporting of novice players, all the information under processing will be collapsed. So, cognitive capacity can effectively contribute to facilitate learning by means of games. Thus, the use of educational instructions affects on applying the principles of serious game planning.

Table 1: A Short Look at the Results of Game Features

Effects	Results	Game Features
	Awareness of tools lead to high level of performance	**Awareness of tools**
	Tasks is to make a positive impacts on knowledge and attitudes	**The tasks of game**
	Different types of games lead to proper recognition process	**Different kinds of game**
	Tips and advice are not effective without additional support	**Educational guids**
	Additional homework does not work	**homework**
	Interactions are not working	**interaction**
	Long term immersion on a task does not work	**Levels of immersion**
	Some levels of stress have a positive impact on cognitive skills, but has no effect on knowledge	**Level of stress**
	Related information have positive impact	**relations**

The potential educational instructions result in reducing additional information (such as adjusting the speed of information delivery) and activation related knowledge (such as breaking knowledge). These challenges provide instructions for designers which do not diminish power attraction of the games at all. The aim of these instructions is to involve in cognitive process to contribute to learning. So there is much need to rehearse and extensive research in this field, including considering cognitive theories, use of effective methods of problem solving in order to create effective recognition process. This makes us to recognize that cognitive learning process happened in what conditions. One of these conditions was investigated by Pillay (2003). He found that linear process leads to trial and error and solving behavioural problems. While adventure games stimulate and encourage people inferential thinking.

THE ROLE OF FACILITATIVE AGENTS

The third hypothesis concerned with understanding the factors which have serious impact on the game and specifically point to three factors. First factor relates to the learners' gender. For example, several studies have shown that girls need tips to use the games. Other studies have also suggested that action games have so much more benefits for boys than for girls. The second concern is related to duration of education. If players become immersed well in game, this question arises if the better performance of players is due to the time spent on the projects or we can conclude that the characteristics of the game support of learning.

The last agent relates to age. One of the main findings from cognitive researches is that the efficiency of working memory comes down with age. Older learners may find difficulties in identifying relevant information from irrelevant. The speed of information processing may be reduced and thus they cannot progress in game playing. So, without an educational support, a game would be effective for youngsters, but not be effective for older game players.

THE PROCESS OF MOTIVATIONAL UNDERSTANDING

The fourth hypothesis relates to the assumption of incentive effects of games. The property of a good game is to maintain the motivation of players. Main parts of this research have been conducted by Rigbi *et al.*, (2007) which is called self-determination theory. According to this theory, the independence of learner leads to increasing motivation in players.

One of promising approaches is the stream of relations between games and learning outcomes in game players (Garris, 2002). It is proved if players were interested in games, they would be deeply involved in games and unaware of the world around them. But there is debate how this conflict will be directed towards learning...

RESULTS OF LEARNING ASSESSMENT

The final step is related to the validity of the test, whether the test is really used to measure desired outcomes or not? Most of the games have special content which in turn have their assessment content is special to and have obvious differences with traditional assessment. Belanich (2005) suggested that traditional evaluation methods should be revised. The results of his research showed that computer based games along can help to invoke information with calling visual information. So, the knowledge which cannot be evaluated with textual method can be best measured with visual approach.

Studies which have been conducted by Day Arthur, Gettman (2001) are promising in assessment of games. They suggested that we can use the knowledge structure in order to evaluate complex skills of game players. Since, structures which consist of knowledge, information and organized concepts are similar to brain structure of students and facilitate information transfer.

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