

THE IMPORTANCE OF ENJOYMENT IN GAME-BASED LEARNING

Alexandros Papadimitriou

Department of Digital Game Design of the SAE College, Athens, Greece
Collaborating Teaching Staff Member at Hellenic Open University

ABSTRACT

In this paper, an effort is being made to collect as much research work as possible on game enjoyment. Thus, with an in-depth literature review this paper aims to answer the research questions as : what are the definitions of enjoyment? What are the theories of enjoyment and what are the factors or attitudes that affect digital game enjoyment? How important is the game enjoyment for users? What is the impact of enjoyment on student performance or achievement and learning outcomes in serious/ educational games? The role of the digital games enjoyment is analyzed and a collection of factors (key elements) affecting the player's game enjoyment is examined. Moreover, the effect of enjoyment on student performance and learning outcomes in games is examined. In discussion, all the answers to above research questions are presented and discussed.

KEYWORDS

Serious/Educational games, enjoyment, fun, entertainment, pleasure, student performance

1. INTRODUCTION

Since we deal with games, it is appropriate to describe what they are and what their usefulness is, in terms of their enjoyment offered by them, with more emphasis on serious/educational games.[1] define a game as a system in which players are involved in an artificial conflict, defined by rules, which lead to a quantified result. According to [2], games should be fun first and then should encourage learning.

Learning is defined as the acquisition of knowledge or skills through experience or practice, and what better way to learn than through a game [3]. Games can provide the motivation to learn, increasing the likelihood that the desired learning outcomes will be achieved. Games can include opportunities for social engagement and provide contexts where peers and social interactions occur to enhance learning [4]. Games are likely to promote satisfying psychological needs and yield positive experiences, which then informs their engagement with the games [5]. According to [6], games and activities are fundamental parts of the experience because they keep students busy, they are exciting and engaging. Good games are problem-solving spaces that create deep learning that is better than what we often see in schools [7]

Play the game is free movement within a more rigid structure. Player is a human interacting with a game. A videogame is a game which we play thanks to an audiovisual apparatus and which can be based on a story and is mainly designed for entertainment purposes and where players can explore and experiment [8]. The main goal of playing video games is enjoyment. The unique characteristics of video games, including interactivity of the medium, allow players to participate actively in the narrative, pursue goals, and experience feelings of self-efficacy that remains a fundamental aspect of game enjoyment [9].

A computer game or digital game is a game played using computer and video display or dedicated gaming devices where players interact with a user interface or objects displayed on a screen. Video game experiences provide opportunities for players to satisfy their curiosity and experience a sense of achievement [10]. Newly available technologies are reshaping the way we experience video games and in particular immersion and social interaction [11]. The terms computer games and video games were used interchangeably throughout this study.[12] suggests that computer games fulfill all of the requirements for an effective learning environment and believes that they satisfy them better than most other learning mediums. According to [12], playing computer games is linked to a range of perceptual, cognitive, behavioral, affective, and motivational impacts and outcomes.[13] has pointed out that the combination of entertainment and computer games education has created some not very good educational games and some not very fun learning activities.[14] argues that the game generally creates a zone of child's proximal development. In a game, a child always behaves beyond his or her average age, above his or her daily behavior. Digital games offer ideal levels of challenge in the zone of proximal development, allowing players to go beyond themselves and expanding their capabilities.

According to [2], digital games have rules, goals and objectives, outcomes and feedback, conflict/competition/challenge/opposition, interaction, and representation or story. Also, games have many common characteristics as follows:a) rules which are the structures, boundaries or freedoms provided to players during gameplay. Dynamics is the actual behavior of a game, resulting from its basic rules, b)goals which determine what the player has to do to win the game, and give the player a sense of accomplishment and progression. A goal is an assignment of value to the possible outcomes of a game. The game's dynamic can actually be the game goal or the means by which players achieve the goal, c)objectives which motivate players to engage in a gameplay to achieve the goal of the game. Examples are construction, exploration, solution etc., d) outcomes which is the final state of the game and represent the end results such as a win, lose, or draw, e) feedback which is the reaction of player interaction and can provide rewards for successful gameplay or consequences for mistakes, interactivity which is the actions or processes players undergo during gameplay. A game's gameplay is the degree and nature of the interactivity that the game includes, f)conflict which is the in-game challenge, friction, or opposition between players, the game system,or rules, and g) competition in which individual players or teams face conflict and challenges, h) challenge which is the problem or scenario presented to the player to overcome, i) opposition is the action of opposing or of being in conflict, and j) representation which involves the construction of the mental image of a world populated with individuated agents (characters) and objects. Representation of a story is called narrative and is a fixed sequence of events (storyline) that is advanced via features such as cut scenes, in-game actions, dialogues, and voice-overs.

Game-based learning is the act of designing interactive learning activities that can gradually convey concepts and guide students towards an end goal. Furthermore, it promotes a student-centered learning environment in which students' wellbeing and soft skills are cultivated in a dynamic, enjoyable and playful way [15]. In game-based learning, the motivation to play the game can positively influence learning processes and thereby enhance learning outcomes; motivation to learn is a better predictor of learning outcomes compared to motivation to play [16]. Game-based elements, such as narrative or competition, can be integrated into learning environments to increase students' enjoyment and engagement in a task [17].The educational benefits of game-based learning are particularly evident in subjects where students report greater concern, and it can be shown that increased levels of enjoyment are positively correlated with improved deep learning and higher-order thinking [18]. The game, as a method of entertainment, plays an important role in mood, such as sadness, happiness, and anger [19].

Emotions are assumed to play an important role in the processes of education and learning in general [20]. There are two types of emotions, positive and negative. Positive emotions are emotional states such as enjoyment, happiness, joy, contentment, gratitude, interest, love and hope, amusement, serenity, satisfaction, pride, relief, empathy, admiration, and sympathy while negative emotions are emotional states such as anger, anxiety, sadness, fear, disgust, boredom, hopelessness, disappointment, shame and guilt, jealousy and envy, contempt, antipathy and hate [21]. According to [22], virtual reality video games appear to be effective tools to elicit positive emotions and to decrease negative emotions and state anxiety in individuals and the level of body involvement of the virtual video game has an important effect in determining the ability of the game to improve positive emotions, to decrease negative emotions, and state anxiety of the players. Positive emotions facilitate learning, enhance comprehension and transfer test outcomes [23]. The primary outcome of enjoyment is positive effect, such as pleasure, satisfaction, gratification, fulfillment, awe, pride, or gratitude [24]. Enjoyment is considered the most appropriate motion because enjoyment measures how the game helps achieve goals [19]. According to [25], enjoyment and happiness have a positive effect on learning, memory and social behavior. The teacher can evoke positive emotions among his students, which brings enjoyment and satisfaction. [26] argues that happiness is a complex psychological state involving affective, cognitive, and motivational components. However, happy people enjoy life. They are motivated to achieve goals, to flourish, because they embrace life enthusiastically [26].

According to [27], the cognitive and emotional engagements of game players are: the game system (rules, mechanics), narrative (the story that connects actions, choices and events) and aesthetics (audiovisual elements, fidelity, aesthetic choices). Cognitive engagement refers primarily to the focus of attention, while emotional engagement stresses the role of emotions and feelings in supporting the desired cognitive processes. [28] supports that games can actually play a powerful role in creating empathy and other strong, positive emotional experiences. Even violent games can have a positive impact because they give the player a way to get rid of frustration. [29] generally believe that digital games have a positive influence on players. Digital learning games are instructional tools that can both engage students and promote learning [7]. According to [30], the goal of a digital game is the predetermined final state that gives the player the concept of victory. People enjoy games and learning when they can achieve the specified goals. The definitions of game-based learning mainly emphasize that it is a kind of game-based learning (mainly constructivist type) with defined learning outcomes. The digital educational game, in addition to the pedagogical method, can have detrimental consequences if teachers do not have the necessary pedagogical knowledge and training. Possible issues include health, social isolation, aggression, and depression [31].

Several pieces of research have been done so far for the enjoyment of the player provided by digital serious/educational games. This article attempts to highlight the main factors and attitudes influencing learning through serious/educational games by focusing on the fun, enjoyment, and entertainment, but mainly on enjoyment that emerges from serious/educational games, with the aim to inform future game developers to improve games' quality. Additionally, attempts to suggest what factors of enjoyment effect on students' performance and learning outcomes.

The remainder of this article consists of three sections. Section 2 presents a literature review for various definitions, theories of enjoyment and the factors affecting the enjoyment in serious/educational games as well as the impact of enjoyment on student's performance and learning outcomes. Section 3 presents the results arising from the literature review about the enjoyment of the games, and Section 4 presents the conclusions.

2. THE ENJOYMENT IN SERIOUS/EDUCATIONAL GAMES: A LITERATURE REVIEW

This work is a literature review that attempts to address game enjoyment with the aim to support future serious/educational game designers and developers to achieve the most enjoyable educational games, to improve students' performance that serious/educational games offer and to know what factors or attitudes contribute to achieving these goals.

Thus, an extensive literature study on computer games and serious games was made, identifying 79 papers, reporting empirical evidence about the enjoyment, factors affecting game enjoyment and how game enjoyment affects student performance and learning outcomes in games. Other additional information was obtained from 51 books, dissertations, conference proceedings papers etc. Several definitions were taken from APA Dictionary of Psychology.

The research questions (RQ) posed are:

RQ1: What are the definitions of enjoyment?

RQ2: What are the theories of enjoyment and what are the factors or attitudes that affect positively or negatively digital game enjoyment?

RQ3: How important is the enjoyment of game play for users?

RQ4: What is the impact of enjoyment on student performance or achievement and learning outcomes in serious/educational games?

In order to answer these research questions, we used the literary method of research by searching and finding many articles, books, dissertations, etc. online, by simply searching Google and Web of Science sites, corresponding to this research. Thus, first of all, we searched for games enjoyment and the definitions of enjoyment by various researchers. Secondly, we searched for the theories of enjoyment and the impact of enjoyment in playing a serious/ educational game. Thirdly, we searched for the positive or negative effects of enjoyment on performance of students in serious/educational games. Examples of searching questions are as follows: "disposition theory + enjoyment + serious + educational + games", "enjoyment + serious + educational + games + performance", "enjoyment + serious + educational + games + learning outcomes". Also, bibliography from the references of the papers, searched through the search engines, was used.

2.1. Enjoyment definitions in Serious/Educational Games

In order to answer the first research question we collected the following definitions as well as we examined the enjoyment of players in serious/educational games.

The modern-day concept of enjoyment was shaped by Greek Philosopher Epicurus (341 – 270 BC), who argued that a happy life could be obtained through seeking pleasure and avoiding pain.[32] defines enjoyment as a positive affective state reflecting feelings such as pleasure, joy, and fun. [33] define enjoyment as a pleasurable reception phenomenon composed of the physical system, personality, emotions and cognition, and the social system. [34] supports that enjoyment is the feeling of pleasure and satisfaction that people have when they do or experience something they like. [35] defines enjoyment generally as the sense of pleasure derived from consuming media products but is careful to note that the exact nature of enjoyment has yet to be fully determined. Moreover, when researchers have made attempts to define the enjoyment construct, they have paid little attention to its functional role. [36] conceptualized enjoyment as attitude and they defined enjoyment it as a general positive disposition toward an entertainment experience, and it is determined by a combination of cognitive, affective, and behavioral information. [37]

define enjoyment as a pleasant experiential state that includes physiological, cognitive, and affective components.[38] define enjoyment of entertainment as the satisfaction of a cluster of connected needs. [39] defines enjoyment as the pleasure of doing something challenging, and doing it to the best of one's ability. [40] suggests that fun and experiencing enjoyment are identified as a proven way to build a socially connected learning environment as well as having fun and enjoying the experience is a strong motivator for most adult learners and impact on their learning outcomes.[25] define enjoyment as the state or process of taking pleasure in something.[24]presented a more advanced definition of enjoyment which is a positive affective state that occurs when a person engages in an experience or activity that satisfies a desire, goal, or need, including but not limited to the need for pleasure, meaning, security, safety, sustenance, esteem, belongingness, or love.

All these definitions provide a basis for the idea that enjoyment aim at the fulfillment of a person's fun, pleasure, satisfaction of psychological needs, security, self-esteem, feelings of competence and self-efficacy, belongingness, happiness and other but so far there is not a universal definition that the entire scientific community agrees with. Self-esteem reflects a person's physical self-image, view of his or her accomplishments and capabilities, and values and perceived success in living up to them, as well as the ways in which others view and respond to that person. Competence is the ability to exert control over one's life, to cope with specific problems effectively, and to make changes to one's behavior and one's environment, as opposed to the mere ability to adjust or adapt to circumstances as they are. Self-efficacy or perceived self-efficacy is an individual's subjective perception of his or her capability to perform in a given setting or to attain desired results. Belonging or belongingness is the feeling of being accepted and approved by a group or by society as a whole.

Education through educational activities known as edutainment (education + entertainment) refers to entertainment games that can educate players. According to [42], educational recreation activities can be organized in the following ways: (1) location-based educational activity - It can be interactive and participatory or non-interactive (for exploration only), (2) purpose-and-content educational activity -give experiences such as simulations for improving control of students' lives and educational skills, (3) educational recreation activity by target group -includes students who have the same interests and age, (4) educational entertainment activity by media type -includes educational television (comic drama, historical drama, sketch comedy, skills, and travel), and (5) computer-aided educational activity -they educate and train through fun (adventure, quiz, role-playing, strategy games, simulation, and experimental drama). [41] suggest that at least one dimension of assessment of game enjoyment may be how far expected achievement or grades are achieved.

Serious Games (SGs) are gaining an ever increasing interest for education and training. [43]define serious games as games that do not have entertainment, enjoyment, or fun as their primary purpose but learning. [44] supports that the ultimate goals of serious games are to facilitate learning and maximize enjoyment during play. According to [43] serious games have the same goals as education through entertainment, but they are expanding far beyond teaching facts and remembering roles, and encompassing all aspects of education, training, and information as well as advertising, or support for social change [45]. [46]found that training with serious games is more effective for developing knowledge, knowledge retention, and cognitive skills than other instructional methods such as lectures, reading, drill, and practice, or hypertext learning environments. The main advantages of serious games are [47]: (a) higher levels of motivation for trainees, (b) increasing student completion rates through engagement and enjoyment, (c) possibility to expand participation, (d) collaborative learning, and (e) effective learning experience.

[48]give an overview of several strengths of serious games. One of these strengths is the fact that serious games offer covert learning; in combination with an already existing positive attitude towards games, this makes serious games an easier accepted platform for learning. Furthermore, serious games are seen as fun and motivational since players want to achieve goals within the game [49]. Researchers generally agree that serious games can be an effective and powerful tool for learning because of their unique capacity for combining serious subject matter with enjoyment [50] and the positive impact of these games on learning seems to be increasingly promising [12]. According to [51], serious games are generally considered to have positive effects on many aspects of learner engagement as well as on cognitive learning gains and subject-related interest. According to [21], effective serious games try to develop a positive attitude to encourage players to continue playing, leading to increased interest in the game as well as better academic performance. One of the reasons for the effectiveness of serious games may be their influence on students' disposition [52].

Similar to serious games are so-called educational games. Both types of games focus on developing their players' skills and knowledge. The educational content of the educational serious games is tacit in play, rather than an explicit ingredient encountered in educational games [31]. Educational games can increase students' motivation towards a particular task by leveraging the enjoyable and engaging properties of games [53]. When playing an educational game, players' interactions with the game will motivate them and will foster cognitive processing of the game content, thereby improving learning [53]. Educational games can create an attractive learning environment for students, make learning more interesting, and enable students to learn by doing, thus improving students' high-level abilities [54]. Educational games and game-based features (e.g., narratives and incentives) have been proposed as a method for increasing engagement by leveraging the inherent enjoyment of games [55]. According to [56], an advantage of educational games is that they tend to create a much higher level of positive emotional involvement of students, thus making the learning experience more motivating and attractive. Educational games can be used for educational purposes effectively [57] and seem to be an effective way to design instruction for factual knowledge [58].

Research by [59] has shown that the factors influencing fun through educational games are the: (a) general design of the games (i.e., the different game elements, rules, procedures, goals, and ways of working together), (b) visual presentation (i.e., the style and complexity of the graphics), (c) audio presentation (i.e., the quality of the audio components and effects), (d) complexity and diversity (i.e., the number, level, and interface of important actions the player enjoys a game), and (e) Control (i.e., the ease of use and comfortable feel of the game controls).

2.2. Factors or Attitudes Affecting Game Enjoyment in Serious/ Educational Games – Theories of Enjoyment

To answer the second research question, we need to find the factors and attitudes that affect enjoyment of a digital game and particularly a serious/educational game by examining mainly the theories of enjoyment in gameplay. Many different models have been developed to explain and analyze enjoyment of the game, including the attitude theory, mood management theory, disposition-based theories, sensitivity theory, theory of transportation, flow theory, self-determination theory, causal theory, parasocial interaction theory, endogenous motivation theory, suspense theory, social cognitive theory, self-efficacy theory, and savoring theory.

Attitude theory explains that attitudes are formed from emotion and cognition about a stimulus [60]. Attitudes are mental and neural representations organized through experience exerting a directive or dynamic influence on behavior [61] and attitude in learning refers to a tendency of a

person to respond positively or negatively towards an object, situation, concept or another person [62]. According to [10], attitude toward a subject is a good predictor of performance. According to [63], game enjoyment can have a very strong influence on gamers' attitude change that is strong enough to predict consumption behaviors. The game enjoyment can be considered as a predictor of route shift and subsequently attitude and behavior change as well as it creates satisfaction for gamers who find the game entertaining and exciting. Attitude towards learning games has a significant main and (in combination with framing) an interaction effect on enjoyment [64].

Mood management theory refers to the positive or negative attitude towards media characters and ethical considerations of actions that affect our enjoyment [65]. In mood management theory [66], enjoyment is understood as the pleasure resulting from arousal regulation, suggesting that individuals expose themselves to entertainment as a way to control their environment in pursuit of positive mood states. [67] found that perceived autonomy and competence within the game lead to positive psychological outcomes for the player, increasing self-esteem, vitality, and mood. [68] based on mood management theory, concluded that the resultant mood repair was greatest for stressed individuals choosing moderate demand, and bored individuals choosing high demand.

Several disposition theories have been developed to explain enjoyment of different types of content. These theories predict that enjoyment or appreciation of content is based, in part, on individuals' affective dispositions toward characters. In general, disposition theory predicts that morally ambiguous characters will be liked more than purely bad characters, but less than purely good characters. Dispositions are guided by feelings of empathy and depend on moral judgments. Empathy has consistently been found to affect emotional responses toward characters and enjoyment of content [66]. [35] in his disposition-based theory propose that viewers judge the properties and actions of media characters. In crime drama, morality is the primary dimension of these judgments. Concerning characters of game, enjoyment decreases when liked characters experience negative outcomes or when disliked characters experience positive outcomes [66]. [66] in his disposition-based theory, defines enjoyment as pleasure resulting from the reinforcement of basal morality, suggesting that audiences are constantly looking to see the worthy rewarded and the unworthy punished. Thus, negative moods that accompany an undesired state may be improved and repaired. The effect of morally ambiguous characters on enjoyment will be affected by affective dispositions, perceived realism, transportation, suspense, and individual differences [69].

Sensitivity theory [70] holds that people pay attention to stimuli that are relevant to the satisfaction of their most basic motives, and they tend to ignore stimuli that are irrelevant to their basic motives. Sensitivity theory defines enjoyment more explicitly as the satisfaction of different needs. [38], explicitly define enjoyment in part as the satisfaction of autonomy, competence, and relatedness needs by considering evidence consistent with a definition of enjoyment as need satisfaction as well as areas where evidence is lacking. Relatedness expresses the human drive towards forming and maintaining at least a minimum quantity of lasting, positive, and significant interpersonal relationships.

The theory of transportation [71] suggests that the experience of enjoyment is reinforced by immersion in a narrative world, as well as by the consequences of immersion. Transportation is defined as a distinct mental process, an integrative melding of attention, imagery, and feelings and is another factor that may mediate the relationship between moral ambiguity and enjoyment [71]. In addition to the content of the media, social rules and visibility have also been recognized as contributing to the enjoyment of viewers [72]. Finally, knowledge about media enjoyment

involves viewers, making judgments about interests, and intelligence of the characters [36]. The elements of transportation theory focusing on audience–character relationships suggesting media users maintaining a perceived difference between themselves, who are transported into a story, and the characters, which are already in the story [71]. Transportation may help manage moods by disrupting negative cognitions and affective states. This relief from negative cognitions may result in more positive moods and enjoyment

Flow theory [39] is based upon the principle that the elements of enjoyment are universal, providing a general model that summarizes common concepts when experiencing enjoyment (e.g., the ability to concentrate on a task). The general, broad nature of flow theory makes it an ideal base for building an analysis and design tool. The concept of flow ([39] describes an optimal mental state where a person is completely occupied with a task that matches the person's skills, being neither too hard (leading to anxiety) or easy (leading to boredom). A person who is experiencing flow is said to be in a flow state, which is generally considered to be highly beneficial to a wide variety of learning outcomes [73]. According to [39], the flow experiences consist of the following seven traits, the combination of which creates a sense of deep enjoyment: (a) a challenging task or activity that can be completed, (b) the concentration on the task at hand, (c) the task has clear goals and provides immediate feedback, (d) the ability to exercise a sense of control over actions, (e) a deep but effortless involvement that removes awareness of the frustrations of everyday life, (f) the loss of self-consciousness, and (g) the sense of the duration of time is altered (transformation of time). According to [74], enjoyment needs to be central to the characterization of the player experience. She suggests a methodology based on [39] flow theory by using boredom, relaxation, anxiety, and flow that broadens the standard view of enjoyment by accounting for the antagonistic tensions embedded in both the emotions of challenge and concentration. Concerning boredom, it is a state of weariness or ennui resulting from a lack of engagement with stimuli in the environment. Concerning relaxation, it is an abatement of intensity, vigor, energy, or tension, resulting in calmness of mind, body, or both. Concerning anxiety, it is an emotion characterized by apprehension and somatic symptoms of tension in which an individual anticipates impending danger, catastrophe, or misfortune.

Gameflow [75] is a model to identify enjoyment in games and it was developed through the previous work on the flow theory as well as game research. This model changes the focus of flow from general challenging activities to focus more on the very specific aspects of games and consists, like flow theory, of eight core elements: concentration, challenge, skills, control, clear goals, feedback, immersion and social interaction. In order to experience flow, players must be allowed to exercise a sense of control over their actions [75]. Concerning concentration, games should require concentration and the player should be able to concentrate on the game. Concerning challenge, games should be sufficiently challenging and match the player's skill level. Concerning skills, games must support the player skill development and mastery. Concerning control, players should feel a sense of control over their actions in the game. Concerning clear goals, games should provide the player with clear goals at appropriate times. Concerning feedback, players must receive appropriate feedback at appropriate times. Concerning immersion, players should experience deep, but effortless involvement in the game. Concerning social interaction, games should support and create opportunities for social interaction.

The presence of challenge, feedback, and reward contribute so much to the enjoyment of games [76]. According to [75], a sufficient level of challenge, appropriate feedback and even the ability to cooperate and interact with other players should lead to a higher degree of player enjoyment. Self-determination theory [77] is a broad theory which states that human behavior is driven by the need for competence, autonomy, and relatedness and focuses on the degree to which human

behaviors are volitional or self-determined. The theory provides compelling logic to suggest a link between psychological well-being and the enjoyment of entertainment media and games and posits that individuals are motivated to pursue activities that will satisfy basic psychological needs. Thus, intrinsic motivation is essential for enjoyment and fun. Intrinsic motivation is an incentive to engage in a specific activity that derives from pleasure in the activity itself (e.g., a genuine interest in a subject studied) rather than because of any external benefits that might be obtained, while extrinsic motivation is an external incentive to engage in a specific activity, especially motivation arising from the expectation of punishment or reward.

Intrinsic motivation remains an important construct, reflecting the natural human propensity to learn and assimilate. However, extrinsic motivation is argued to vary considerably in its relative autonomy and thus can either reflect external control or true self-regulation. Intrinsic motivation captures the natural inclination towards assimilation, mastery, spontaneous interest, and exploration which are fundamental for cognitive and social development [77]. Autonomous motivation is the desired type of motivation [77], because it is linked to several advantages including better learning outcomes [78]. Games that satisfy autonomy, competence, and relatedness need result in positive player experience outcomes, such as higher levels of enjoyment; immersion, intrinsic motivation, and desire for future play [38].

Parasocial interaction theory describes and attempts to explain imagined social relationships and interactions with people who are distant from us and who do not reciprocate individual communication or interest [79]. According to [36], para-social interaction occurs when a member of the audience develops a parasocial relationship with a character of the media, speaking to the character, imagining or discussing the character's life. Para-social interaction asserts that media characters present simulations of real-life social interactions to which viewers intuitively respond, as if they are acting within a real social setting and fosters satisfaction and enjoyment, and fulfills the need for belonging [80]. Individuals in gaming environments who develop parasocial relationships satisfy a number of gratifications such as enjoyment and feelings of belonging [37]. A sense of belonging is experienced as an enjoyable state quite different to that of flow [81] and is triggered by positive feedback leading to raised self-esteem both in the instant and over time [82]. Four concepts of pleasure – flow, cessation of anxiety, satisfaction and the security of belonging – may be useful in deciphering what young people experience as enjoyment and why [82].

[83] suggests a causal theory of enjoyment where the essential idea is that an object of enjoyment causes the topic to experience pleasure by causing occurrent beliefs that satisfy desires concerning the experience itself. Pleasure is identified with occurrent happiness, which may be defined in terms of belief, desire, and thought. [8] suggest that difficulty balancing is associated with higher levels of competence, which then predicts higher levels of enjoyment.

Game motivation is the most basic and most operational value, emphasizing the application of games to learning to stimulate students' learning motivation and make the learning process more attractive and interesting. [84] concluded that immersion and flow are both positively affected by motivation, and in turn have a concrete effect on the enjoyment and performance of a given task or activity. Endogenous motivation is another approach to studying the enjoyment of the game. [85] developed a classification of endogenous motivations within the context of educational digital games in four categories: challenge, fantasy, curiosity, and control. Concerning fantasy, the game should allow the player to experience a sense of presence in an enticing environment that goes beyond the player's normal experience. In other words, video games allow players to do things that they normally would not be able to do in real life, such as drive racecars, fly, imaginary creatures, and fictional characters, take on identities and species that are different from

the player own and have abilities that are not found in the real world. Concerning challenge, the video game should require performance at a level that is slighter higher than the prayer's current level of competence, which can be achieved by building progressively more difficult levels into a game. Concerning curiosity, the video game should reveal holes in the player's knowledge in a way that primes the player to want to make sense of the game. Concerning control, the players have more control over the game, such as being able to personalize the game interface, determine the level of difficulty in the game, or even redo a challenging episode. In educational games, the players will harder to learn when they have more control.

[86] advocate six dimensions of enjoyment: arousal, challenge, competition, diversion, fantasy, and social interaction. Concerning arousal, it is a frequently stated reason for playing video games was to stimulate emotions because of fast action and high-quality graphics. Concerning challenge, many respondents enjoy playing video games to push themselves to a better level of skill or personal accomplishment. Some respondents said that the desire to solve the puzzles to get to the next level or beat the game could be addicting. Many of the players like better to play a well-known set of games that they feel confident playing. Concerning competition, it is one of the most frequently cited reasons for playing video games was to prove to other people who have the best skills and can react or think the fastest. In essence, the response to the competition came from male respondents who respond that they fought for pride or money. Concerning diversion, video games are frequently used to avoid stress or responsibilities. Respondents reported playing video games to fill time, relax, shake stress, or because there is nothing else to try to do. Concerning social interaction, it is the most reason many individuals got involved in playing video games as a toddler. Many now use video games to interact with friends and learn about the personalities of others.

[87] created a model of game enjoyment that includes fantasy, exploration, fidelity, companionship, challenge, and competition. Concerning fantasy, it is the enjoyment of games that involve a fantasy world setting, imaginary creatures, and characters that are fictional, take on identities and species that are different from the player's own, and have abilities that are not found in the real world. Concerning companionship, it is the enjoyment of games that involve more than one player, cooperating with other players, socializing with other players, and playing with many people at parties. Concerning competition, it is the enjoyment of video games that involve competing against other players, comparing skills with other players, playing online with others, displaying one's skills in public and public recognition of the very best players. Concerning exploration, it is the enjoyment of video games that involve checking out hidden things, discovering unexpected things, exploring unknown places, experimenting with different strategies of the game, and exploring the inner workings of a game. Concerning fidelity, it is the enjoyment of games that have realistic graphics and sound effects, 3D graphics, and lifelike animations.

The majority of research in terms of games concerns the topics immersion, presence, and flow. According to [88] define immersion because of the experience of losing a way of embodiment within the present whilst concentrating on a mediated environment. Immersion may be a critical factor in-game enjoyment [89]. Losing the sense of awareness and getting drawn into the ideal world presented by a game is usually the optimal experience that every game developer tries to realize. Also, a person could willingly allow themselves to become immersed due to their interest in the game's mechanics or premises. The first level of immersion is engagement that is the lowest level of involvement with a game that a player has to go through before moving to the next level. This level involves the players' preference; that the game is something that the player wants to play, that the game controls and feedback correspond properly. As well as an investment that refers to the time that the player invests in the game, the more immersive the game is the

amount of time, effort and attention that is required from the player increases. When the player becomes more involved in the game he or she becomes engrossed, which leads to the player being emotionally affected by the game and its features. At this level of immersion thanks to emotional investment, the player becomes less self-aware and less conscious of their surroundings. The last level is total immersion where the players are only impacted by the game, cut off from reality. The avatar in game plays an important part in immersion, it's important that the player relates to the avatar and to immerse themselves into the game world where the players become the game character [90]. [91] found that motion-based gaming system improves gamers' perceived reality and enjoyment. Perceived reality is a significant predictor for spatial presence and further game enjoyment, providing a more immersive experience for gamers.

[92] defines suspense as uncertainty about how the story will develop, linking its resolution with some degree of surprise. Suspense is a key narrative issue in terms of emotional gratifications. Reactions in response to this type of entertainment are positively related to enjoyment; having a significant impact on the audience's immersion and suspension of disbelief, as well as an adequate management of suspense in video-games directly affect the amusement of either players or spectators [93]. Although suspense is expected to predict enjoyment overall, it is important to note that individuals may differ in how they respond to feeling of suspense and to morally ambiguous characters in general [69].

Game players can and must interact with the game to resolve suspenseful situations; they can attribute positive episode outcomes to themselves. Suspense experiences that arise from uncertainty about the further progress of the narrated events and the desire for a specific type of progress typically come along with corresponding relief experiences [66].

The outcome emotions and the suspense felt prior to the outcome are both proposed to influence game enjoyment [94]. According to [94], suspense positively influences game enjoyment and that suspense consists of hope, fear, and uncertainty. [95] explains that social cognitive theory can be used in media in order to influence behavior change. Thus, social cognitive theory has been used successfully to create video games that produce positive behavior outcomes. Cognitive behavioral game design is a new framework that incorporates social cognitive theory, the theory of Gardner's theory of multiple intelligences (1983), and game design elements into a unified model that guides designers through a process to create games for learning and behavioral change that is, engaging, immersive learning experiences which increase student interest, performance and retention [96]. According to [97] self-efficacy theory an efficacy expectation is the subjective belief that one can successfully execute the behavior required to produce certain outcomes. Also, [97] postulated that individuals with higher perceived self-efficacy are more active and persistent in their efforts in a given activity. Feelings of game competence can influence intrinsic motivation and judgments of autonomy. The experience of self-efficacy remains a fundamental aspect of game enjoyment [9]. Self-efficacy and task value are considered important predictors of enjoyment [20]. [98] found that horror self-efficacy interacts with fear to affect game enjoyment only among high-arousal participants. Among high-fear participants, higher horror self-efficacy leads to significantly greater game enjoyment than lower horror self-efficacy. Perceived self-efficacy has a direct influence on the choice of activities, the amount of effort people will expend, and how long they will persist in the face of obstacles and aversive experiences. The experience of self-efficacy remains a fundamental aspect of game enjoyment [9].

According to [99], both perceived competence and self-efficacy lead to goal pursuit and promote learning, behavioral engagement, and skills and they are more concerned with one's ability to coordinate a set of skills in challenging and changing situations [100]. This ability to make an

impact in the virtual environment, in addition to the element of interactivity, can give players a sense of power, control, and self-efficacy [101].

Savoring theory provides a new theoretical model for conceptualizing and understanding the psychology of enjoyment and the processes through which people manage positive emotions [102]. Savoring refers to an individual's capacity to realize and appreciate enjoyable life experiences and being a beneficial practice in later life to increase levels of happiness and life satisfaction, while lowering levels of depression [103]. Savoring is a meta-cognitive process in which people regulate their reactions to positive experience through specific thoughts and behaviors that influence the intensity and duration of enjoyment [24]. Savoring is distinct from happiness and enjoyment [104]. [102] proposed a four-factor model of perceived control that individuals distinguish between their ability to (a) avoid negative experiences, (b) cope with negative experiences, (c) obtain positive experiences, and (d) savor positive experiences.

[60] showed that the presence of an anthropomorphized helper reduces game enjoyment. Anti-enjoyment factors include the experiential states of apathy and anxiety, negative social interactions, real-world contextual factors, and technical difficulties. Apathy occurs when skills and challenges are both below the subjective mean, while anxiety sets in when the challenges presented are too difficult for the gamers to deal with [105].

2.3. The Importance of Enjoyment in Serious/Educational Games

To answer the third research question, we need to support how important is the enjoyment of a digital game and particularly a serious/educational game for the user.

Player enjoyment is the single most important goal in computer games. If players do not enjoy the game, they are going to not to play the game [75]. Enjoyment is an important aspect of the game experience, as it is one of the factors, mostly contributing to motivating users to play.[37] consider the game enjoyment as the most basic experience of entertainment. People, in general, organize their lives to maximize the experience of enjoyments, but actually, in large part they cannot affect what will happen and what feelings it will cause. This is extremely important because being in harmony means feeling safe, feeling valued and a necessary part a group of a learning community. Thus, enjoyment creates a community, but it also evokes positive memories and make them stronger enjoyment positively influences the didactic process, increases the satisfaction of participants and can positively affect memorizing of information [25].

[106] found that people, in a positive-affect condition, enhance their enjoyment of the interesting activity and their intrinsically motivated behavior. Enjoyment requires low levels of frustration and boredom. Frustration is experienced when the goal is impossible and boredom is experienced when all goals do not provide the challenge [107]. The role that enjoyment plays in endogenous motivation in education is twofold. Incentives promote the desire to repeat the experience. Fun can also motivate learners to engage in activities with little or no prior experience [108]. Enjoyment is greatly enhanced when the game provides opportunities for pleasurable social interactions like grouping and socializing, leading to the formation of social ties [105]. Enjoyment may come from unpleasant entertainment experiences, such as anxiety, but more often than pleasant ones, such as sensory pleasures, emotions, and cognitive and social effects [37].

Game enjoyment describes a positive cognitive and emotional appraisal of the game experience may be partly related to support players' needs, and values. Enjoyment is at the heart of the entertainment experience and depends on the player's willingness and ability to inhibit distrust, empathize with the characters of the game and engage in social interactions and relationships

with people [109]. One player may feel entertained due to the game content fits his skill, while another player may feel enjoyment when the game content choice is more difficult to play for his/her skill [44].

[110] wrote that nine user-experience variables (focused attention, challenge, interactivity, telepresence, time distortion, enjoyment, performance, clear goals, and game controls) are significantly and positively correlated with mood following game play. Concerning telepresence, it is the sense of being at a remote site when provided with sensory information (e.g., sights, sounds, textures) from that distant place using modern communications technology. Concerning time distortion, it is a type of perceptual transformation, sometimes experienced in altered states of consciousness, in which time appears to pass either with great rapidity or with extreme slowness. Perception of past and future may also be transformed.

According to [25], enjoyment positively affects information retention. [111] suggest that the knowledge of player motivations is critical in accurately predicting player enjoyment. [112] revealed that players with high levels of game enjoyment are more likely to re-use the game. Moreover, they identify that challenge and competition were positively associated with in-game purchases, while the intention to re-use the game was associated with challenge but not with competition. According to [101], enjoyment seems to be driven by quick success that is, a high number of explicit positive feedbacks fuels game enjoyment, and game events and knowledge-based interpretation of performance jointly render moderately difficult tasks more enjoyable and create the circumstances of less enjoyment for too easy and too difficult game tasks.

For players who are at the beginning of using a new game, however, the pattern of game difficulty and enjoyment seems to be driven by the explicit feedback given by the game, no matter players' internal evaluations of difficulty levels. According to [113], the concepts of experience, engagement, and enjoyment are important to both players and developers. Players need a fun experience that is a short-lived distraction, transporting them to a special world, or simply helps them wait within the grocery queue. To the game developer, the players' enjoyment is tied directly to the success of the game. Although even the failures in a game are enjoyed by the players [113].

[39] sees the flow experience as a subset of enjoyment and also as a certain type of enjoyment. Game enjoyment in serious games has been shown to be an essential factor in the learning process [114]. According to [115], crucial factors that increase enjoyment levels of students include focusing on implementing learning resources in teaching and encouraging students who have low achievement levels in the activities. According to [8], enjoyment and fun as part of the learning process are important when learning new tools inasmuch the learner is relaxed, motivated, and therefore more willing to learn.

Students' enjoyment concerning their education, learning, and most specifically, their use of learning strategies show that it has clear linkages to learning behavior including self-regulated learning and creative problem solving [20]. Children's enjoyment of a learning game has an impact on their gains in motivation to continue engaging with the subject being taught [51]. According to [73], lack of enjoyment can be linked to disengagement and failure in learning. In contrast, enjoying the learning game does not automatically mean learning success [51]. Concerning characters of game, enjoyment decreases when liked characters experience negative outcomes or when disliked characters experience positive outcomes [66]. Many features like the enjoyment and relaxation gained from gaming, having no constraints in games like in one may have in the real world, the artistry of the game, and the interactivity and competitiveness of a game [116].

Three factors that least affect gaming enjoyment are fantasy (i.e., a fantastic experience that is usually impossible in reality), presence (i.e., the player's sense of the virtual world, produced by their media technologies) and interactivity (i.e., the continuous loops of action and reaction between players and the game world). In fact, these factors are unique characteristics of digital games [7] and they are also critical factors that offer players an emotionally engaging play experience, which is at the heart of game enjoyment [101].

2.4. The Impact of Enjoyment on Student Performance in Serious/ Educational Games

The crucial question raised by [105] is whether educational game designers can succeed in linking game enjoyment in the learning process. Many pieces of research are presented answering to the fourth research question : what is the impact of enjoyment on student performance or achievement and learning outcomes in serious/educational games?

Performance or achievement is the extent to which a student, teacher or institution has attained their short or long-term educational goals. Learning outcomes are statements that describe the knowledge or skills students should acquire by the end of a particular assignment, class, course, or program, and help students understand why that knowledge and those skills will be useful to them.

[2] points out that fun has both positive (enjoyment, pleasure) and negative (ridicule) effects on the player, and argues that this dichotomy is at the root of resistance for new learning approaches based on fun. He also argues that fun in the learning process creates relaxation and motivation. Relaxation allows students to make things easier. Their motivation enables them to make an effort without expressing discontent. Enjoyment, as part of the learning process, is vital when learning new tools, because the learner relaxes and is motivated, and is, therefore, more willing to learn. Teachers are sometimes reluctant to understand that an educational game is important in learning. Research by [117] has shown that teachers need to provide a learning environment where enjoyment is supported and encouraged in order to facilitate successful learning by playing a game.

[118]support that enjoyment can be derived from learning, as learning satisfies a number of human needs, but it needs to be learning that is accompanied by positive affect. Several types of learning do not fit with learning for enjoyment. They arise when extrinsic motivation occurs, such as when learning for material gain. [65] proposed and tested a model of factors that impact suspense and enjoyment and found that enjoyment significantly influenced the game outcome.

The most frequently occurring outcomes and impacts were knowledge acquisition/content understanding and affective and motivational outcomes. According to [52], effective serious/educational games try to develop a positive attitude to encourage players to continue playing, leading to increased interest in the game as well as better academic performance. Games for learning are often designed intentionally in ways that require players to engage in specific activities that will provide information about the learner's knowledge or skills [119] and mostly emphasize that it is a type of game play with defined learning outcomes [7].

According to [51] self-reported cognitive learning gains and increases in interest are both positively correlated with deep thinking and enjoyment. Learning with serious games does not always lead to the expected increases in all aspects of engagement and learning outcomes. The improvement in learning outcomes is associated with a better learning experience in educational games [116]. From the interaction between enjoyment, immersion and good learning, it is likely

the game needs to be enjoyable or pleasurable to the person playing it in order for the learning outcomes to be high [120]. [121] proposed that online games and video games can engage users' activities and retain their concentration on tasks to learn some complex information.

According to [122], enjoyment is suffering from motivation and perceptions of team members' contributions, with the implication that students who perceive that the team interactions are adding value to their education can better enjoy learning and experience higher-level learning outcomes. According to [2], digital educational games achieve learners' engagement in learning processes through an interactive entertainment and enjoyment environment. According to [52], effective serious/educational games give better academic performance. Students' enjoyment of the game has a significant relationship with their performance and is the most important goal in the serious/educational game [117].

[101] showed that game play enjoyment is highly positively correlated with performance, focused attention, and interactivity, and is also significantly correlated with telepresence, time distortion, and challenge. According to [123], game-related self-efficacy experience significantly mediates the relationship between player performance and game enjoyment. Students' enjoyment is found to be correlated with effort and performance [124]. Game content and rules can provide a positive emotional experience and many players enjoy it when engaging in-game learning [44]. To achieve an optimal learning effect, the fun of the game needs to be closely linked to the learning process [51]. [125], found that augmenting a variable-ratio schedule with a player-centered design is able to elicit high levels of enjoyment and performance from participants, and therefore could be a viable reward scheduling method in serious/educational games.

Learning satisfaction is strongly correlated with student motivation and attitude towards game-based learning before the game, with actual enjoyment and effort during the game, as well as with the quality of the teacher/facilitator [126]. According to [127], educational recreation activity is defined as an application combined with educational goals and metrics and provides learners with meaning, using resources and methods for creativity and experiences. Game enjoyment plays an essential role in achievement as it can lead players to learn and master the game [128]. Students' positive emotions, such as enjoyment, are an important part of the school experience and influence learning and achievement [129]. Moreover, students' enjoyment of learning was observed to be correlated positively with their academic achievement [74].

The use of team-based learning however difficult to set up and moderate may indeed yield longer-term positive results, at least in terms of higher enjoyment of the learning experience. Enjoyment is affected by motivation and perceptions of team members' contributions, with the implication that students who perceive that the team interactions are adding value to their education will better enjoy learning and will experience higher level learning outcomes [122]. [2] explored motivation, engagement, interactivity, and active participation as components of a highly effective learning game. He concluded that high motivation and engagement are linked to student success.

Other factors like explicit learning tasks, instruction, and support inherent within the game or supplemented by teachers, could also be more decisive than the experience of fun during the game as well as the students' willingness to learn through serious/educational games is related to their utility and ease of use rather than enjoyment.

3. RESULTS AND SUGGESTIONS

Taking into account the extensive literature review mentioned above, the following results and conclusions have been drawn.

RESULTS OF RQ1: Concerning the first research question (what are the definitions of enjoyment?), the following have emerged: There are various definitions of enjoyment that provide a basis for the idea that enjoyment aims at the fulfillment of a person's fun, pleasure, satisfaction of psychological needs, security, self-esteem, feelings of competence and self-efficacy, belongingness, happiness and other but so far there is not a universal definition that the entire scientific community agrees with.

RESULTS OF RQ2: Concerning the second research question (what are the theories of enjoyment and what are the factors or attitudes that affect positively or negatively digital game enjoyment?), the following have emerged : In this research, we found and examined the following theories of enjoyment: attitude theory, mood management theory, disposition-based theories, sensitivity theory, theory of transportation, flow theory, self-determination theory, causal theory, parasocial interaction theory, endogenous motivation theory, suspense theory, social cognitive theory, self-efficacy theory, and savoring theory.

Many pieces of research showed that the key factors affecting positively the enjoyment of the player in games are as follows: Challenge, imagination, curiosity, competition, exploration and perceived exploration, fidelity, companionship, social interaction, diversion, concentration, skills, control, clear goals, rules, procedures, the way pupils work, the style and complexity of graphics, self-efficacy, the complexity, diversity, feedback, immersion, inter-social interaction, character intelligence, suspense, arousal, preparedness, focused attention, effort, interactivity, telepresence, time distortion, motivation, perceptions of team members' contributions, attitude, quality of the teacher/facilitator, positive feedbacks, player's willingness, ability to inhibit distrust, empathize with the characters of the game, social interactions, fidelity, reward, affective dispositions, perceived realism, transportation, suspense, individual differences, empathy, moral judgments, perceived autonomy and flow experiences according to [39].

Moreover, difficulty balancing is associated with higher levels of competence, which then predicts higher levels of enjoyment. Moreover, challenge and competition are positively associated with in-game purchases, while the intention to re-use the game is associated with challenge but not with competition. Key factors that least influence game enjoyment are fantasy, presence, and interactivity. In fact, these factors are unique characteristics of digital games, and they are also critical factors that offer players an emotionally engaging play experience, which is at the heart of game enjoyment. Many pieces of research showed that the key factors affecting negatively the enjoyment (anti-enjoyment factors) of the player in games are experiential states of apathy and anxiety, negative social interactions, real-world contextual factors, and technical difficulties. The presence of an anthropomorphized helper reduces game enjoyment.

Other researchers showed that: (a) enjoyment seems to be driven by 'quick success' that is, a high number of explicit positive feedbacks fuels game enjoyment, (b) game events and knowledge-based interpretation of performance jointly render moderately difficult tasks more enjoyable and make circumstances of less enjoyment for too easy and too difficult game tasks, and (c) students' willingness to learn through serious/educational games is related to their utility and ease of use rather than the enjoyment they offer.

Researchers and educational game designers for games continuous improvement should seriously take all of the above factors and propositions that positively affect player enjoyment into account, while those that negatively affect player enjoyment suggested to be avoided.

RESULTS OF RQ3: Concerning the third research question (how important is the enjoyment of game play for users?), the following have emerged : The primary outcome of enjoyment is positive effect, such as pleasure, satisfaction, gratification, fulfillment, awe, pride, or gratitude, (b) enjoyment is one of the factors, mostly contributing to motivating users to play. If players do not enjoy the game, they are going to not to play the game, (c) enjoyment is considered the most basic experience of entertainment and the most appropriate motivation because enjoyment measures how the game helps achieve goals,(d) enjoyment has been found to affect extrinsic motivation, such as perceived usefulness and requires low levels of frustration and boredom, (e) players' enjoyment is tied directly to the success of the game, (f) most researchers have identified some features of fun that are usually associated with positive terms, such as pleasure and enjoyment, (g) the ultimate goals of serious/educational games are to facilitate learning and maximize enjoyment during play, (h) the game's content and rules can provide a positive emotional experience and many players enjoy it when engaging in-game learning, (i) fun in the learning process creates relaxation and motivation and has both positive (enjoyment, pleasure) and negative (ridicule) effects on the player. Immersion is a critical factor in game enjoyment, (j) at the core of the entertainment experience, enjoyment is a pleasant experiential state we call pleasure, which includes physiological, cognitive, and emotional components, (k) games that satisfy autonomy, competence, and relatedness need end in positive player experience outcomes, like higher levels of enjoyment, immersion, intrinsic motivation, and desire for future play, (l) enjoyment significantly influenced the game outcome and decreases when liked characters experience negative outcomes or when disliked characters experience positive outcomes, (m) children's enjoyment of a learning game has an impact on their gains in motivation to continue engaging with the subject being taught, (n) enjoyment evokes positive memories and make them stronger enjoyment positively influences the didactic process, increases the satisfaction of participants and can positively affect memorizing of information. All the above argue that enjoyment is very important for educational game players and all this research should be taken into account by researchers and educational game designers to improve them.

RESULTS OF RQ4

Concerning the fourth research question, the following have emerged: (a) the improvement in learning outcomes is associated with a better learning experience in educational games, (b) from the interaction between enjoyment, immersion and good learning, it is likely the game needs to be enjoyable or pleasurable to the person playing it in order for the learning outcomes to be high, (c) game needs to be enjoyable or pleasurable to the person playing it in order for the learning outcomes to be high, (d) attitude toward a subject is a good predictor of performance, (e) effective serious/educational games try to develop a positive attitude to encourage players to continue playing, leading to increased interest in the game as well as better academic performance, (g) students' game enjoyment has a significant relationship with their performance and is the most important goal in the serious/educational game as well as positively affects information retention, (h) the ultimate goals of serious/educational games are to facilitate learning and maximize enjoyment during play, (i) digital educational games achieve learners' engagement in learning processes through an interactive entertainment and enjoyment environment, (j) enjoyment and fun as part of the learning process are important when learning new tools, insomuch the learner is relaxed, motivated, and thus more willing to learn, (k) teachers need to provide a learning environment where enjoyment is supported and encouraged to facilitate successful learning through playing a game, (l) lack of enjoyment and boredom can be linked to disengagement and failure in learning, (m) players with high levels of game enjoyment are more

likely to re-use the game, (n) enjoying the learning game does not automatically mean learning success, and (o) the educational benefits of game-based learning are particularly apparent in subjects over which students report greater anxiety, where it is often be proven that increased enjoyment levels correlate positively with improvements in deep learning and higher-order thinking, (p) game-related self-efficacy experience significantly mediates the relationship between player performance and game enjoyment, (q) people, in a positive-affect condition, enhance their enjoyment of the interesting activity and their intrinsically motivated behavior, (r) the experience of self-efficacy remains a fundamental aspect of game enjoyment, (s) horror self-efficacy interacts with fear to affect game enjoyment only among high-arousal participants, (t) enjoyment is considered the most appropriate motivation because it measures how the game helps achieve goals, (v) game enjoyment in serious games has been shown to be an essential factor in the learning process, (u) high motivation and engagement of a highly effective learning game are linked to student success, (w) game play enjoyment is highly correlated with performance, focused attention, effort, and interactivity, and is also significantly correlated with telepresence, time distortion, and challenge, (x) augmenting a variable-ratio schedule with a player-centered design is able to elicit high levels of enjoyment and performance from participants, and therefore could be a viable reward scheduling method in serious/educational games, (w) game enjoyment plays an essential role in achievement as it can lead players to learn and master the game, and (z) students' positive emotions, such as enjoyment, are an important part of the school experience and influence learning and achievement. Moreover, students' enjoyment of learning is observed to be positively correlated with their academic achievement.

All of the above argue that enjoyment is an important factor in improving the performance or achievement of learners and better learning outcomes through educational games and taking into account all this research is recommend to be taken into account by educational game designers to improve them.

4. CONCLUSIONS

This should clearly explain the main conclusions of the article, highlighting its importance and relevance. Various definitions have been developed from various theorists for the game enjoyment. The various theories about the game enjoyment take into account various factors that positively or negatively affect the enjoyment of the game. Enjoying the educational game plays an important role in student performance and learning outcomes. Future studies with an, as far as possible, complete definition of enjoyment should further explore how enjoyment influence learning, and learning outcomes specifically in serious/educational games. The results can then contribute to the establishment of design principles for the highest enjoyment, learning outcomes and student performance or achievement in serious/educational games.

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