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The Context of Electronic Interactive Gaming Transferred into a Social Context: Exploratory Study

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Abstract
With the advent of the "computer" and other technological advancements, online gaming (or other forms of gaming) has a prominent position in the life of most of the population, especially young adults and children. There has been mired of research discussing the benefits and problems associated with the extensive time spent on gaming in which many individuals participate. However, those researches do not have a consistent pattern and framework to be able to completely understand the outcomes associated with this technology. The purpose of this study was to examine the existing research literature and determine if there were any consistent patterns to develop a conceptual framework that may help to be better determine the impacts of gaming to players. A conceptual framework would facilitate quality research including typologies recognition. Furthermore, a conceptual framework was developed to better determine the impact of gaming to players. This framework would help define research efforts using the typologies developed, as well as an analysis and prescribe the effectiveness of gaming.
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1. Introduction

Today, one of the most popular forms of leisure and entertainment is playing video games. In fact, among some of the population segments, it has become an obsessive activity that dominates much of the individual's life (Gilbert, *Number of gamers worldwide 2022/2023: Demographics, statistics, and predictions* 2022). This is a recent phenomenon and competes with the popular leisure-time activity among certain population, especially youth and young adults. The primary question is being raised by many within the society about the impact of games and their influences. In the article "Grow up, Level up, and Game on; Evolving Games Research", Kneel and Jacobs identifies salient perspectives pertaining to video game users' behavioral outcomes and social well-being, the constant rise of the video game industry and the educational value of video games from a philosophical point of view (Kneer & Jacobs, 2018). It is extremely important to be able to identify the impact of gaming (Gamification), as a social influence. Senior staff writer Rebekah Valentine reports from a gaming business online resource, three quarters of all US households include someone who plays video games. It was stated, 214 million people in the US play at least one hour of video games every day (Valentine, 2020).

1.1. Gamification & Gamified Learning

What is gamification? "Gamification is the application of game-design elements and game principles in non-game contexts. It can also be defined as a set of activities and processes to solve problems by using or applying the characteristics of game elements" (Fitz-Walter, n.d.). For instance, video games have recently been studied for their potential behavioral and psychological contributions. As role-playing games (RPGs) have come to dominate the world of online gaming in console usage, the validity of its social context is under examination. Ultimately people may want to know what are outcomes for gaming design patterns and social context value?

Gamification is also described as an "informal umbrella term for the use of video game elements in non-gaming systems to improve user experience (UX) and user engagement" (Deterding, Sicart, Nacke, O'Hara, & Dixon, 2011 et. al). "In the theory of gamified learning, the Bedwell taxonomy proposes two processes affecting learning-related behaviors or attitude" (Landers, 2014, pg.1). This aspect of gamification does not always apply for a serious gaming approach; mainly due to lack of moderation and intended effects of game attribute manipulation.

Video games or online gaming have been studied and identified its potentials to shape the user's behavior and influence the participants' gaming experience. Increasing the online gaming phenomenon, more participants and viewers aim to answer the plausibility of gamification. Research has led to examining the heuristic value of human-computer-interaction (HCI). A growing body of research examines the purpose of "game-play" to solve real-world tasks and/or dilemmas. Studies mainly based on HCI research (fungology, persuasive technology, communities, motivational affordances, game UX, etc.) Deterding, Sicart, Nacke, O'Hara, & Dixon (2011) examines the social-psychological role involved in online video games. The HCI research is used to better understand the blurring of digital life to real life, work and play. This structure provides a framework to better understand the behavioral directions intended by game creators, with strategies to include embedded values and motivational usage.

In the article on the Developing a Theory of Gamified Learning, Lander's propositions/focuses on game characteristics influence changes in behavior/attitude. The study explored the theorized effect on learning behaviors including game characteristics and attitude/behavior. Specifically, with the use of rules and regulations in games, increased efforts for motivational outcomes rely on the gamification of learning. To the degree in which learning is involved, the empirical evidence involving participant engagement has yet to be effectively identified. The study suggested; "by increasing the level of adaptation of a game to learner ability, learner cognitive strategies (a behavior) (Landers, 2014). In the article "(A)morally Demanding Game? An Exploration of Moral Decision-Making in a Purpose-Made Video Game" Hodge, Taylor and McAlaney conducted research examining 115 undergraduate students and the overall moral decisions of in-game moral decision making. The article discovered real life moral salience was not related to in-game decision making but was more connected though pro-social decision making that was aligned to a rational and/or cognitively demanding circumstances (Hodge et al., 2019). The research suggested, moral decision making took between 4-6 seconds while violations for anti-social choices took longer. It is also noted that pro-social choices by participants significantly outweighed the potential choices for anti-social violations. Issues of concern were the validity of accurate data mainly due to research limitations and the option for anti-social violations to be underrepresented.

1.2. Stigmatization of Gamification

Gaming has the utility for users to be able to exercise the ability to select varied choices, for varied possible outcomes. In the case of online gaming, the obvious choices are "win or lose", or in some instances the ability to play again. While the latter choice offers the ability for the game to be over (game-over), it also implies the ability to re-start a new game.

Online gaming has received criticism as well as a lack of clarity on the effects of video game usage. For example, in the near past, two tragic events have been most notable for the stigmatization of video game participants. In 1999, the events involving the Columbine shooting led individuals to believe that online gaming, more specifically first-person shooters or RPGs, caused an increased involvement in violent activities. As recently as 2019, issues concerning video games and gun violence have been under scrutiny for its causal effects. In a news report of the USA Today, Video games were again questioned in a mass shooting weekend in El Paso, Texas, and Dayton, Ohio. Largely to the claim of dehumanizing individuals, Member of the House of Representatives Kevin McCarthy, R-Calif., said "video games would likely contribute to future mass shootings during an interview on Fox News' "Sunday Morning Futures."(Snider, 2019). Author Snider also indicates reports of violence and video games have been rejected from every court which has considered them (Snider, 2019). It is clear that most politicians are on board when addressing the need to understand mental health before stigmatizing video game users.

1.3. Mental Health & Video Game

There has been a continual debate of whether video games produce more aggressive or violent individuals. A primary look at addiction should provide a constructive background to raise validity to the use and development of more advanced interfaces. In its inherent design, video games are designed to be addictive and can pose an issue especially with people with poor impulse control. In the article The Multiple Dimensions of Video Game Effects, Douglas Gentile concludes that video games can be either harmful or beneficial. Gentile examines the dichotomous thinking with a hypothetical situation of a 12-year-old boy playing excessive amounts of Grand Theft Auto. Results indicated:

1. *May perform poorer in school due to excessive amounts of video games.*

2. *May have increased aggression because of violent video game content.*
3. *May enhance or mitigate violence with friends if played online.*
4. *Because of first-person perspective, shooting game may increase visual attention skills.*
5. *The use of a controller may improve hand-eye coordination.*

Online gaming can produce a variety of outcomes that can be very beneficial for individuals that decide to interact in an online game. To examine the educational use of gamification of online gaming, the linkage between research literature and an assessment of key behavioral outcomes is essential.

2. Purpose

The primary focus of this study is the development of a conceptual framework to help understand the educational "value" of gaming and its "application" upon various population segments in society. There is a plethora of applied and theoretical research, but these studies often lack consistency (Bedwell et. al., 2012). There is a need to develop a framework to help understand these results and be able to identify a hierarchical classification typology. This type of classification system will be able to help direct future research efforts and gain deeper understanding of gaming effects.

3. Procedure

A hierarchical qualitative procedure was used for this study. (Appendix A.) This is a procedure consisting of a panel of judges and used to classify the data into categories in relation to one another (Barthélemy & Gusho, 2009) (Bedwell, 2012) (di Paola et al., 2016) (Sherry & Pacheco, 2006). This procedure was used because it provided a process to examine relationships among groupings based upon a comprehensive approach from a gaming viewpoint. This clustering procedure is a deductive process that involves examining not only groupings but the relationship among groupings and the potential ordering of these groupings to establish a system to help apply the concepts of threads identified in the grouping process. The basic element is to identify threads or themes that run through the data to be able to apply these concepts (Sherry; 2006; see also Griffiths; 2002; Bedwell et. al., 2012).

The hierarchical classification procedure used: (Three content experts were used during the 5-step process in the hierarchical clustering, a thurstonian model was used for the classification process.) 1. A review of literature to determine outcomes associated with gaming, 2. An identification of different typologies to classify the outcomes, 3. A selection of typologies that have the ability to help classify the outcomes, 4. The translation of the outcomes into the selected typology as it relates to the consistence of gaming research, (Outcomes reimaged), and 5. The use of the application of the developed framework to help understand different game types as they relate to the competency skills of participants, that is, beginning, intermediate, and advanced.

Significant Research

Applied and theoretical research can be classified into 2 types. Those that identify outcomes associated with gaming and those that have developed a classification system to help in the establishment of relationships, and to understand the consistency of research outcomes.

3.1. Outcomes

A thematic content analysis was conducted upon studies from 2011 to 2021. These years were selected because they represent the evolution of gaming into a major leisure activity. The sources reviewed were studies identified on EBSCO that represented applied and theoretical research, 65 studies were reviewed. The data also included meta-studies and their references. The keywords used in the thematic analysis were gaming and its application to educational situations. The emphasis was on keywords that represented outcomes from an educational perspective. (Appendix B) The first observation from the thematic analysis was the lack of consistency in the studies and contradiction in the results. (Bedwell et. al., 2012) These findings are consistent with the initial intuitive statements provided in the introduction. The content analysis did not try to review these inconsistencies but just select statements about outcomes. Once these findings were identified they were critically reviewed for grouping themes.

3.2. Educational Benefits of Moderated Video Games: Critical Review

There was a critical review of the outcomes identified for consistence of meaning. The basic factor of the review was isolating theoretical groupings for further analysis. These reformatted categories were reflective of the most common and frequent outcomes identified. The essential element of the groupings focused upon outcomes as well as influences that stimulate consequences. One of the elements used for re-formatting was from Griffiths "Educational Benefits of Games". (Griffiths, 2002, p. 50). Its review was completed from a gamer's perspective.

The following are highlighted main threads or themes recognized.

- Educational or therapeutic objective

Professional developers create games with goals in mind. Game objectives should be clear to the teacher or facilitator and player.

- Type of game

Activity content of games varies greatly (ex. puzzles, simulation, mazes), and requires skills such as strategy and physical skill. Some games are based on chance.

- Required level and nature of involvement

Passive or active involvement of the player is determined by the evaluator. In some computer-moderated games, the computer plays the game while the participant observes the outcome. Others provide the player with an environment and require them to respond at certain points in the game.

- Information and rules

Some games require the player to have prior knowledge, others provide minimal information. The player's response to the lack of information is part of the strategy.

- The role of luck

Some games are driven by chance, and it is assumed the greater the chance in the game, the less educational in nature it is. Some players prefer games of chance rather than games of strategy.

- Difficulty

The difficulty level in games can be chosen by the player or adjusted based on player progression. The approach of increased difficulty with increased progression keeps the game interesting.

- Competition

Competition is built into many games and attracts some players. Teachers may tailor games so all can win.

- Duration

Games may be long or short, and creating “user rewards, personal challenges, or changes in color or graphical surroundings to maintain interest some games can hold player interest for long periods of time” (Griffiths, 2002, p. 50).

- Participant age and characteristics

Computer-based games are available for different ages. It is assumed that players can understand the game rules and required motor skills. Some games include modifications of the text to assist vision-impaired players.

- Number of Players

Some games are solitary, and some require participants to play against others or against the computer. For those who have difficulty with group work, solitary games may meet their needs

- Facilitator’s role

Facilitator involvement may be a crucial part of some games. Other formats may only require the facilitator to observe.

- Setting

Game instructors should be prepared to implement games into the curriculum. Without proper acceptance from instructors, games may be treated as a toy rather than as an educational tool.

4. Classification Systems/Typologies

There were eight significant classification systems identified. These systems are the ones that had the greatest application in terms of types of games and users. There were other typologies, but they were more theoretical and provided little relationships amongst the groups identified.

The first system identified dealt with Pokémon and identified categories based upon reality, but the weakness was that the categories were based upon movement and geographic location. (Hamari et al., 2018) This topology did not allow for the complete ordering and understanding of the experience on an ordinal basis. Another weakness was the association with nostalgia and motivational factors of participation not related directly to outcomes.

The second typologies identified was associated with gamified learning (Landers et al., 2015). This provided a very positive perspective relating to the potential processes of games and outcomes. The attributes identified also did not provide for a clear theme for arrangement of categories. It did not provide for game type and segmentation of users.

The third system examined the social, psychological, and cognitive outcomes. (Bourdas et al., 2018) This provided a perspective that is directly related to a consistent framework of reference, that is not biased by factors that are the environmental or conditional basis. This is a very positive framework that is directly related to individual outcomes. The model has limited use because it was based upon role-playing and not the comprehensive experience of gaming.

The fourth system reviewed was based upon skills. It focused upon game types and the specific influences of the game. (Griffiths et al., 2002) It did not relate to the array of outcomes associated with a comprehensive view of gaming. The specific skill and outcome did not provide for the transfer value of the gaming experience. This is a very unique approach and is compatible with a gamer's perspective because it has a practical element of game types and their influences.

The fifth system identified research that was inconsistent and the development of categories (Bedwell et al., 2012). This used a grouping technique similar to the one that was used in this study. The outcomes identified primarily focused upon the cognitive aspect. It does not allow for the amplification of social and motivational factors. The relationship among the categories provided for an outcome perspective but did not consider game types and participation level.

The sixth system examined was based upon Bloom's taxonomy (Sherry & Pacheco, 2006).

It provided for outcomes and the ordering of groups based upon achievement of a specific level. This is the system that had the ability to provide hierarchical groupings among the outcomes. The primary deficiency was that the system did not provide for a gaming perspective. The format provides an ordinal system of classification, but an extensive review of outcomes was needed to provide a gaming perspective. This system did not include the array of affective and psychomotor outcomes.

The seventh system examined were based upon Dave's taxonomy (Atkinson, 2021). The system provided a social context that was utilized based upon the succession of interpersonal skills needed for rescripting personal narratives and transformative behaviors. This system provides a classification system for the ordering and assessment of individualized critical coconscious skills needed for behavioral modification. The classification system was not directly related to online-communication as it relates to normative sociability, but provides the definitions and terms used to describe the advancement of interpersonal relationship and outcomes of relationships and communication of online gaming.

Lastly, the eighth system examined was based upon Bartle's taxonomy (Bartle, 1996). This system provided ordering system for video game usage and classification. The classification system identifies the participants ability to interact with either online players or the created interactive world. The taxonomy provides a framework and definitions for categorizing video game user skill levels.

When the typologies were reviewed, the most credible were Bloom and Bartle's taxonomies. Bloom and Bartle was selected in order to develop the conceptual framework based upon the critical review of outcomes. The primary one of the typologies that fit the outcomes best for the development of a conceptual framework was Bloom. The Bloom taxonomy is primarily concentrated upon cognitive outcomes. The Bartle's taxonomy provided an assessment of gaming categories and classifications of player type. This taxonomy mainly deals with the psychology of video game players. The Dave's interpersonal taxonomy of was also utilized to represent various levels of intended learning outcomes within cultural communication. This taxonomy addresses the social implications of video game culture. There were two other domains that represented other types of gaming outcomes. The two typologies identified were the Krathwohl, which deals with affective outcomes, and the Harrow, which deals with psychomotor outcomes. These two identified typologies have not been used in gaming and will be adapted to develop a conceptual framework.

Conceptual Framework Development

Figure 1.

Outcomes Domains Identified

1. Cognitive/Bloom Taxonomy
2. Affective/Krathwohl Taxonomy
3. Psychomotor/Harrow Taxonomy
4. Interpersonal/Dave's Taxonomy
5. Gamer Classification/Bartle Taxonomy

The critical review of the outcomes of each typology was completed. The typological outcomes were placed at each level of each of the taxonomies. These outcomes were translated into gaming outcomes and were also reimagined to reflect an interpretation of each level on the taxonomy. There were three domains of learning: cognitive, affective, and psychomotor. The 4th domain was utilized to illustrate the social relationship between

interpersonal skills and video game uses. Lastly, the 5th Domain: Bartle Taxonomy, was conceptualized to reflect the type of games and the participation level of the individual.

4.1. Bloom Taxonomy: Cognitive

To better understand the educational value of video games (as toys) and systematic learning. Benjamin Bloom's hierarchical taxonomy provides an assessment of game playing and its educational objectives. The six levels of taxonomy include knowledge, comprehension, application, analysis, synthesis, and evaluation. Each category has been examined interchangeably to describe its validity in literacy. In Literacy Strategies for Grade 4-12, higher order of thinking was assessed to improve thinking skills. Tankersley states "The emphasis is less on the mastery of information measured by a recall-based assessment and more on learning how to use one's mind well, to synthesize and analyze skillfully" (Tankersley, 2005, p.69). For this examination, terms will be re-imagined emphasizing the effectiveness of video game usage as interactive "toys".

Bloom's Taxonomy Defined. ***(****This is the classification used for the cognitive domain****)***
1. ***Knowledge*** - Dramatic Play.
-Recreate real life & work out ideas for the real world.
2. ***Comprehension*** - Manipulative Play.
-Help develop muscle control and hand-eye coordination.
3. ***Application*** - Creative and Expression Play.
-Use of symbols which are vital skills for problem-solving and literacy.
4. ***Analysis*** - Physical Play.
-Encourage decreasing feelings of frustration, assists with building strength and coordination.
5. ***Synthesis*** - Encourage strategy.
-Planning, following the rules, and cooperating with teammates.
6. ***Evaluation*** - Promote language and social skills.
Risk aversion and promotes safe communication.

Blooms Taxonomy Re-imagined
- 1. Toys encourage ***dramatic play*** to recreate "real-life".

(ex. Toy blocks, toy vehicles, toy animals, puppets).
- 2, Toys encourage ***manipulative play*** construction.

(ex. Puzzles, and or toys with interlocking pieces).
- 3. Toys encourage ***creativity and expression***.

(ex. Painting, clay sculptures, stencil or drawing)
- 4. Toys encourage ***physical activity***.

(ex. Bikes, jumping rope, bouncing balls)
- 5. Toys ***encourage strategy***.

(ex. Card games, dominoes, chess, or checkers)
- 6. Toys promote ***language and social skills***.

(ex. Video games and or interface control system)

4.2. Krathwohl Taxonomy: Affective

The different level of skill experienced by video game users are specific to each individual's experience with a variety of games. Collectively there are many different types of games that individuals interact with, as the role of online gaming becomes more competitively popular, the popularity of the first-person video game has also increased in popularity.

Gamers can be described by their time spent introducing themselves to their game of choice. The spectrum of "gamer" has been classified by a variety of aspects of the participants' value in the game. The Krathwohl taxonomy of Affective Domain describes the principles of an individual's internalization. "The taxonomy is ordered according to the principle of internalization. Internalization refers to the process whereby a person's effect toward an object passes from a general awareness level to a point where the affect is 'internalized' and consistently guides or controls the person's behavior (Seels & Glasgow, 1990, p. 28)". Affective domains deal with social/emotional learning and skills. In order for gamers to adapt to gaming platforms, a hierarchy of feelings is adapted, ranging from simple to more complex. The objective is for individuals to evaluate personal views (ex. Defend, adhere, synthesize or formulate) on learning outcomes.

Affective Domains Defined**:** ***(****This is the classification used for the affective domain****)***

1. ***Receiving***

Examples include: to differentiate, to accept, to listen (for), to respond to.

- Gaming involves maximum skill level while being able to function multiple complex skills for gaming

context.

2. ***Responding***

Examples are to comply with, to follow, to commend, to volunteer, to spend leisure time in, to acclaim.

- Gaming requires a complex set of rules with the use of specific social networks (Guilds) that foster more synchronous play.

3. ***Valuing***

Examples include: to increase measured proficiency in, to relinquish, to subsidize, to support, to debate.

- Gaming requires a complex set of rules with the ability to socialize with other players (teamwork).

4. ***Organization***

Examples are to discuss, to theorize, to formulate, to balance, to examine.

- Gaming requires more complex objectives with the ability to access leaderboards for point accumulation.

5. ***Characterization by value or value set***

Examples include: to revise, to require, to be rated high in the value, to avoid, to resist, to manage, to resolve.

- Gaming requires a simple set of rules that is focused on achieving a positive outcome

Affective Domains Re-imagined.

The source of affective interaction has been grouped into 3 sections that detail the behavioral outcomes associated with the video games plot, and overall satisfaction from the gameplay experience. In most cases, educational gaming is aimed to influence the subconscious (physiological) acceptance of realistic gaming expectations. Due to the role of the controller and interface interaction involved in online gaming, affective learning can be directly correlated to the emotional arousal user experience to alter the game plot and offer an enhanced experience.

Body Actions: Recognizing of body/actions, including eye-tracking, head pointing and selective attention.

1-2. Affective Domains include: *Receiving* and *Responding*.

Facial Expression: An acceptance and recognition of emotion based on facial expressions. The appearance of the recognizable emotions leads to greater social adaptability and game acceptance.

3-4. Affective Domains include: *Valuing* and *Organizing*.

Vision-Based: An unobtrusive form of learning that allows individuals to act freely while expressing behavioral cues that are easy to obtain.

5. Affective Domains include: *Characterization by value or value set.*

4.3. Harrows Taxonomy: Psychomotor

There are three primary psychomotor domains: Simpson, Harrow, and Dave. Dave was associated with Bloom and his taxonomy and is an outgrowth of this associations. The Simpson and the Harrow taxonomy also have connections to the theoretical positions relating to the Bloom scale. Dave's taxonomy is based upon physical skills. There is a vocational component to this classification system. An important part of this typology is imitation. If the originals skill set is not present, then development is an exercise in free movement. Guided instruction is essential in this learning system. The Simpson typology is based upon manual (mechanical) skills. It includes physical movement, coordination, and use of the motor-skill areas. An important element of this classification system requires the development of skill practice and is measured in terms of speed, precision, distance, procedures, or techniques in execution.

The Harrow classification system is based upon coordination including involuntary responses. It also provides for skills that can be learned. The lower levels are basically flexible responses, and the upper levels are complex neuromuscular movements. Harrow was selected primarily because of its adaptation to the learning capacity, which is essential in gaming. The taxonomy is organized by the coordination of involuntary responses to learned capabilities (Hoque, 2016 et. al).

Harrows Psychomotor Defined (1972).

1. ***Reflex movements*** - Automatic reactions.
2. ***Basic fundamental movement*** - Simple movements that can build into more complex sets of movements.
3. ***Perceptual*** - Environmental cues that allow one to adjust movements.
4. ***Physical activities*** - Things requiring endurance, strength, vigor, and agility.
5. ***Skilled movements*** - Activities where a level of efficiency is achieved.
6. ***Non-discursive communication*** - Body language.

Harrows Psychomotor Reimagined: ***(****This is the classification used for the psychomotor domain****)***

1. ***Reflex Movements***- User has less involvement with the controller and more directly with the interface and game.
2. ***Basic Fundamentals***- User adapts to controller with an interface for a video game.

3. ***Perceptual***- User exemplifies adaptions to multi-platforms for advanced controller usage.
4. ***Physical Activities***- The user has adapted to the controller and interfaces while mastering at least 1 game.
5. ***Skilled Movements***- User operates above standard on most or all platforms, as well as being an expert in at least 1 game.
6. ***Non-discursive***- User exemplifies expert level usage involving complex interface and controller.

4.4. Dave's Taxonomy: Interpersonal

A domain that has not been explored in depth has been the social aspect of *interactive* video games. There are number of definitions and the best way to define the social aspect in the system of measurement. A common system of measurement is the SSI. This is a system that assesses emotional and social communication skills. This system provides a perspective on the context of the social aspect and is not directly related to the more basic skill development (Bamat, Cox, & Foster, *2019).*

A curious approach is the aspect of deficiencies. The basic premise is the absence of certain skills and the ability to limit performance. There were five deficiencies identified: basic communication skills, empathy and rapport, interpersonal skills, problem solving skills, and accountability. These are important to identify the cause in the development of a hierarchical system. The progressive nature of skill development can be limited by these deficiencies (*5 types of social skills deficit* 2021).

A system that has an interpersonal component as a conceptual basis is one by Ramsey and Latting (Ramsey & Latting, *A typology of intergroup competencies* 2005). This system recognizes self, relationships, context, and organizational patterns. The conceptual basis provides for the development of context in relation to the position of each category identified.

The important aspect is skill development that has an outcome related to interpersonal communication. Dave's taxonomy is a system that has context and skills that are compatible with game application. It is a system that allows for not only the diagnostic assessment, but also an active prescriptive outcome. This is especially important in the development of a skill-based program. Additionally, Dr. Paul Atkins interprets Dave's taxonomy (Atkins, 2018b) as the physical progressive skills (dexterity) needed to develop social skills and also for vocational education. The original descriptors were previously modified into active verbs (Atkins, 2018) to meet the need of intended learning outcomes for higher educational programs/programming.

Dave's Interpersonal Taxonomy

1. ***Imitation*** (to imitate)- Ability to copy, replicate the actions of other following observation.
2. ***Manipulation*** (to manipulate)- Ability to repeat or reproduce actions to prescribed standard from memory or instructions
3. ***Precession*** (to perfect)- Ability to perform actions with expertise and without interventions and the ability to demonstrate and explain actions of others.
4. ***Articulation*** (to articulate)- Ability to adapt existing psychomotor skills in a non-standard way, in different contexts, using alternative tools and instruments to satisfy a need.
5. ***Naturalization*** (to embody)- Ability to perform actions in an automatic, intuitive or unconscious way appropriate to the context.

As a final domain, Dave's Taxonomy of interpersonal communication examines the complex levels of interpersonal communication, conflict resolution, collaboration and cross-cultural communication. These four facets of his taxonomy describe the accountable actions individuals must gain to become an accepted and effective member of society. Dave's Taxonomy domain derives 5 levels of assessments (articulate, argue, debate, translate & interpret) that examines interpersonal competence.

Atkins Interpersonal Taxonomy Domain *(This is the classification used for interpersonal domain)*

1. ***Articulate***- The ability to express one's own perspective clarify and distinctly.
2. ***Argue***– The ability to cite evidence to represent a point of view with clarity in counterpoint and exchange with others.
3. ***Debate***- The ability to express in a formal manner a given perspective and recognize other perspective.
4. ***Translate***- The ability to articulate a perspective with reference to alternatives by way of comparison, metaphor or figurative form.
5. ***Interpret***- The ability to explain other perspectives with appropriate respect with reference to evidence and experience.

Dave's taxonomy can serve as an effective tool within online game user. The assessment of each domain has been designed to fit the growing network of online gamers. Due to online gaming existing as a virtual reality, progressively online games have developed nods and links that create a similar reality to a real-world perspective. Modifiers were created and re-imagined as describers and definitions as useful gamer terms to interpret the inter-

related meaning due to language or "*gamer"* language that were previously set-in place.

Atkins Interpersonal Taxonomy Redefined

1. ***RTS*** **(**Real Time Strategy**)-*Articulate*:**

- The ability to have competency to play online games.

"RTS game involves two players starting with a few units and/or structures in different locations on a two-dimensional terrain (map). Nearby resources can be gathered in order to produce additional units and structures and purchase upgrades, thus gaining access to more advanced in-game technology (units, structures, and upgrades)" (Park & Lee, 2017).

2. ***GM*** **(**Game Mode/Mechanic**)-*Argue*:**

- The ability to join other players within gaming construct.

"The formal rules that define the operation of the game world, what the player can do, the challenges the player will face, and the player's goals" (Adam Nelson, Europe office, 2020).

3. ***PVP*** **(**Player vs. Player**)-*Debate*:**

- The ability to compete with other gamers online.

"PvP means player versus player. It refers to games (or modes) where human players compete against each other. This contrasts with PvE (player versus environment) modes, where you play against computer-controlled opponents instead" (Stegner, 2021).

4. ***GG*** **(**Good Game**)-*Translate:***

- The ability to track progress or ranking system while online gaming.

"GG is common gaming lingo online. It's short for "good game" and is usually typed or spoken at the end of a match to show sportsmanship (Stegner, 2021).

5. ***AR*** **(**Augmented Reality**)-*Interpret:***

- The ability to accept visual digital augmentation and consistently interact with game and or opponents/environment.

"Interactive experience of a real-world environment where the objects present in the real world are enhanced by computer-generated perceptual information" (Loureiro, 2020).

In the social context, individuals that participate in video games or on online multiplayer game platforms, there is a disadvantage to applying the usefulness of online gaming and sociability.

The interactions between player to player infers the ability to communicate through a digital communication line. The typology further explains the critical skills needed to be-able to have the ability to join other gamers with different skill levels. Skill levels are an acquisition of an individual's ability to continue with the enjoyment of playing video games and the transfer of adaptable skills for group interaction.

Cox at al. did a review of 16 social emotional instruments. The review was basically on the reliability and validity of the instruments. 11 of the instruments were research-based and five were formative. Formative instruments may be more useful because of the diagnostic basis of the assessment. The Most important element of diagnostics is the basic dimension of interpersonal outcomes. These are the primary outcomes that are important to game application. The instruments identified were nonspecific in relation to these interpersonal outcomes. (Bamat, Cox, & Foster, *A Review of Instruments for Measuring Social and Emotional Learning Skills among Secondary School Students 2019)* (Ramsey & Latting, *A typology of intergroup competencies* 2005).

The skills typology also serves as a useful descriptor detailing the continual pattern of transferable interpersonal skills utilized in a digital context. These patterns represent the utility and functional usability for video game users in social context (Figure. *Typology of Digital Intergroup Communication Continuum).* The exemplification/illustration of the skill typology allows for a learned interpersonal educational component to be applied for its usefulness upon completion. Both categories "focus & approach" represents a concept of algorithmic learning applied by video game users as the individual enters and exits a video game experience. As an individual succeeds through each trial game, attributes (reflection & action) are contributed to the systematic learning while participating in a video game experience. As individuals proceed to either continue or end a video game trial, a set of intergroup skills is learned and experienced as an outcome of Dave's initial taxonomy of interpersonal skills development.

Skills Typology

To clarify the meaning of inter-group competencies, the acquisitions of transferable skills should be closer examined to determine the usefulness of online gaming as a mode of education. The importance of creating a typology of intergroup competencies reveals the causal association & distinct patterns. Rather than focusing on

the skills gap as a means to examine cultural differences, video game users can be examined as a self-contained group that is associated to a larger and growing field of digital transformative entrepreneurs (4th industrial revolution).

Jean Ramsey the author of "A Typology of Intergroup Competencies" identified 14 skills that indicate successful relationship development between cross-cultural social groups. This system exchange encourages a critical self-examination while encouraging multicultural competence and consciousness awareness. Focus and Approach are the two central dimensions that categories the 14 skills that aim to complete transformative competence.

The Focus:

Self-related skills: include individual's understanding one's own cultural value and assumptions, skills desired for creating and reframing mental models which include processing emotions and personal change.

Relationship skills: include individuals understanding and empathizing with multiple perspectives, development of openness while engaging and recognizing impact of responsible input and feedback.

Contextual skills/critical consciousness include individual skills connecting to multiple cultural/societal perspectives and addressing formal group dynamics.

Organizational skills: include individuals recognizing systematic patterns, addresses undesirable systematic patterns, and also advocating or engaging in personal change and systematic change.

The Approach: Two dimensions identifies the individual's cultural competency; *reflection*: entails an individual's reflection about a situation, *action*; entails the induvial ecological perspective of either "self" or context of desired relationships.

14 Skills of Transformative Competence:

Self: Rescripting Our Individual Story

Intergroup Competence Skill 1: Becoming Aware of Own Cultural Values/Assumptions.

The context of information from this section contains an individual becoming aware of cultural assumptions. An individual's discomforts can be examined to uncover irrational prejudices. By an individual recognizing internal bias, the individual can control the effects of assuming to be correct but ensuing personal growth for cultural change.

Intergroup Competence Skill 2: Committing to Personal Change**.**

The context of the information for this section contains an individual's ability to adjust maladaptive social behaviors such as "blaming others" and commit to personal change. The individual become aware of anxieties and adjust behavior for sustained results.

Intergroup Competence Skill 3: Processing Emotions.

The context of the information from this section contains an individual's ability to recognize strong emotional reactions and begins to self-monitor emotional reactions. If strong internal emotions persist, individual may consequently experience short-term memory, processing performance and the ability to empathize with others.

Intergroup Competence Skill 4: Reframing Mental Models

The context of the information from this section contains an individual's ability to cognitively reconstruct mental imagery and gain intergroup competency. Both have been shown to be very powerful for maladaptive behaviors. Rehearsal of mental imagery and cognitive reconstruction can replace mental modeling that allows the individual to focus on negative stereotypes.

Relationships: Revealing Each Other's Stories

Intergroup Competence Skill 5: Empathizing with Multiple Perspectives

The context of the information from this section contains an individual's ability to recognize the bias of ignoring cultural differences. Individuals that ignore the experience of another's can trivialize the relationship and experience of nondominant group members. The development of empathy is understood though perspective taking and or sympathy/compassion. When the individual has taken on the perspective, the individuals self-concept leads to positive self-efficacy and less stereo typing.

Intergroup Competence Skill 6: Differentiating Intent from Impact

The context of the information from this section contains an individual's ability to successful manage intergroup relationships. The individual develops the ability to differentiate and become aware of the verbal and non-verbal ques that are related to consequential behavior. The opportunity to challenge this behavior raises the individual's awareness of the reflective actions of others.

Intergroup Competence Skill 7: Engaging in Inquiry and Openness

The context of the information from this section contains an individual's ability to practice openness by challenging our assumptions and engaging in inquiry of others life experience. For more dominant individuals, being more inviting rather than demanding will help to avoid being intrusive entitled or patronizing.

Intergroup Competence Skill 8: Engaging in Responsible Feedback

The context of the information from this section contains an individual's ability develop the exchange of mutual feedback. In the context of cultural differences, both dominant and non-dominants have difficulty withing the exchanging of feedback. 4 principles are used to guide concerns and hesitation into corrective and critical feedback. 1. Choice, 2. Future oriented, 3. Self-correcting or self-reinforcing, & Reinforcement.

Context: Building Critical Consciousness

Intergroup Competence Skill 9: Connecting the Personal to the Cultural and Societal

The context of the information from this section contains an individual's ability to move beyond interpersonal conflicts. The development of a critical consciousness allows individuals to better understand and operate simultaneously withing interpersonal and societal/cultural context.

Intergroup Competence Skill 10: Addressing Dominant/Nondominant Group Dynamics

The context of the information from this section contains an individual's ability to understand the dominant and non-dominant group dynamics. In some instances, non-dominant individuals find it hard to interpret the actions of dominant members in group dynamics. These group dynamic roles often produce patterns that may appear insensitive, uncaring or prejudiced.

Organization: Repatterning Systems

Intergroup Competence Skill 11: Identifying Systemic Processes and Patterns

The context of the information from this section contains an individual's ability to identify invisible systematic patterns. Group socialization is important to achieve to mitigate unintended effects. Three types of systematic architypes were identified that are common among cross-cultural social groups (Fix that fail, shifting the burden, and success to the successful).

Intergroup Competence Skill 12: Identifying Own Role in Perpetuating Patterns

The context of the information from this section contains an individual's ability to uncover personal role within the "groups" systematic patterns. To reduce dissonance, and individual must identify the systemic patterns within the larger group in order to achieve and understanding of cultural rule sets. This concept was accredited to the parallel process theory.

Intergroup Competence Skill 13: Surfacing Undiscussables

The context of the information from this section contains an individual's ability to become open about managing the undesirable and undiscussable viewpoints from a non-dominant perspective. There are three courses of action that will surface undiscussable details. 1. Maintain open and "truthful" manner, 2. Avoid violent expressionism, 3. Persist with surfacing undiscussable details. By surfacing undiscussables, an individual allows for a discerning of situational context, selecting approximate name for context and exposing gap between consigned reality.

Intergroup Competence Skill 14: Advocating and Engaging in Systemic Change

The context of the information from this section contains an individual's ability to initiate a small change that will spread throughout the network of the group dynamics. In opposition to change, it is recognized that change will be resisted due to incompetency and or an attempt to abandon change. When an individual does not resist change, psychological effects such as cognitive dissonance is lessened, and change can occur over time. Through the efforts of analyzing visible and non-visible systemic patents, the individual can create a personal environment that exchanges ideas with others, and a quality of steadfastness based upon consistency of values.

The Social Context Translated.

In-terms of the interpersonal skills, an adaptive nature of role-playing through avatars or simulated characters creates sociability amongst online gamers. The working terms and definitions used by gamers are primarily used as "*slang"* terminologies when "gamers" are involved in an interactive video game. There is an inter-connectedness between individuals on-line that promotes communication and conflict resolution. The cross-cultural capabilities of online gaming or connected video gamers creates similar learning objectives consistent of Dave's taxonomy, and the skills needed for societal integration in a digital context. As most online games and game developers rely on the component of teamwork as a way to increase the specific games enjoyment, the governed online modes of communication allow for interpersonal skills to be created based on game difficulty and individual reason for deciding to play an online game.

In the article *Unraveling Ancient Mysteries: Reimagining the Past Using Evolutionary Computation in a Complex Gaming Environment*, Robert Reynolds examines the use of a cultural algorithm framework to modify a gaming applications design based upon principles of game theory, computer gaming and evolutionary computation to discover the archeological past of the pre-Hispanic Pueblo Anasazi. The research detailed the cultural cooperation needed to successfully produce population structure. Agents were given three choices (defect, trust, inspect) as possible simulation strategies (defector, inspector, trustor). Reynolds states that the cultural algorithm framework is based upon an individual's experiences and their success and failure. The culture algorithm provides a framework that: "accumulate and communicate knowledge to allow adaptation in both the population and the belief space [21]– [24]." (Reynolds et al., 2005, p. 709). The cultural algorithm leads

itself to support educational learning such as, space learning, decision tree induction and ensemble learning (see figure.).

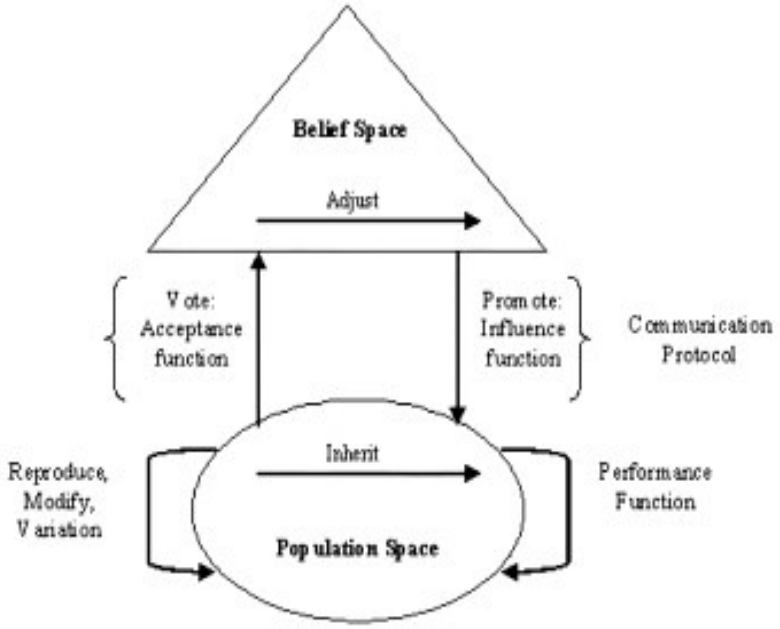


Fig. 2. Cultural algorithm framework.

Figure. Note: Cultural Algorithm Framework. Reprinted from *Unraveling Ancient Mysteries: Reimagining the Past Using Evolutionary Computation in a Complex Gaming Environment* (p. 709), by Reynolds, 2005, IEEE Press. Copyright 2005 by IEEE.

The Typologies of intergroup competencies have been modified with the addition of Dave's Taxonomy re-imagined creating a funnel and continuum of educational outcomes and interpersonal group related competences. Each category of Dave's taxonomy represents an entry point of a revolving succession. As a representation of a re-imagined model, the "coin slot" was utilized for its nostalgic purposes based upon video game arcades and the cabinets they were originally intended for. Individuals can use one "token" to play one "game" of gameplay (the coin slot). In terms of coin operated video games, the mechanism that operate vending machines as well as traditional arcade cabinet video games has been recognized for its automation. The mechanism used to describe the modern online game operations and subset expressions of algorithms that represent continues play are described as NFA (Nondeterministic finite automation) or, DFA (Deterministic finite automation) (see figure.) The expression of the funnel/continuum (typology of digital intergroup communication continuum indicates a relational aspect of learning between game intensity levels and skills correlating with each intergroup category. The approach represents the continuum as it relates to the ease of access for online game users to begin access self-scripting narratives for proficient intergroup communication.

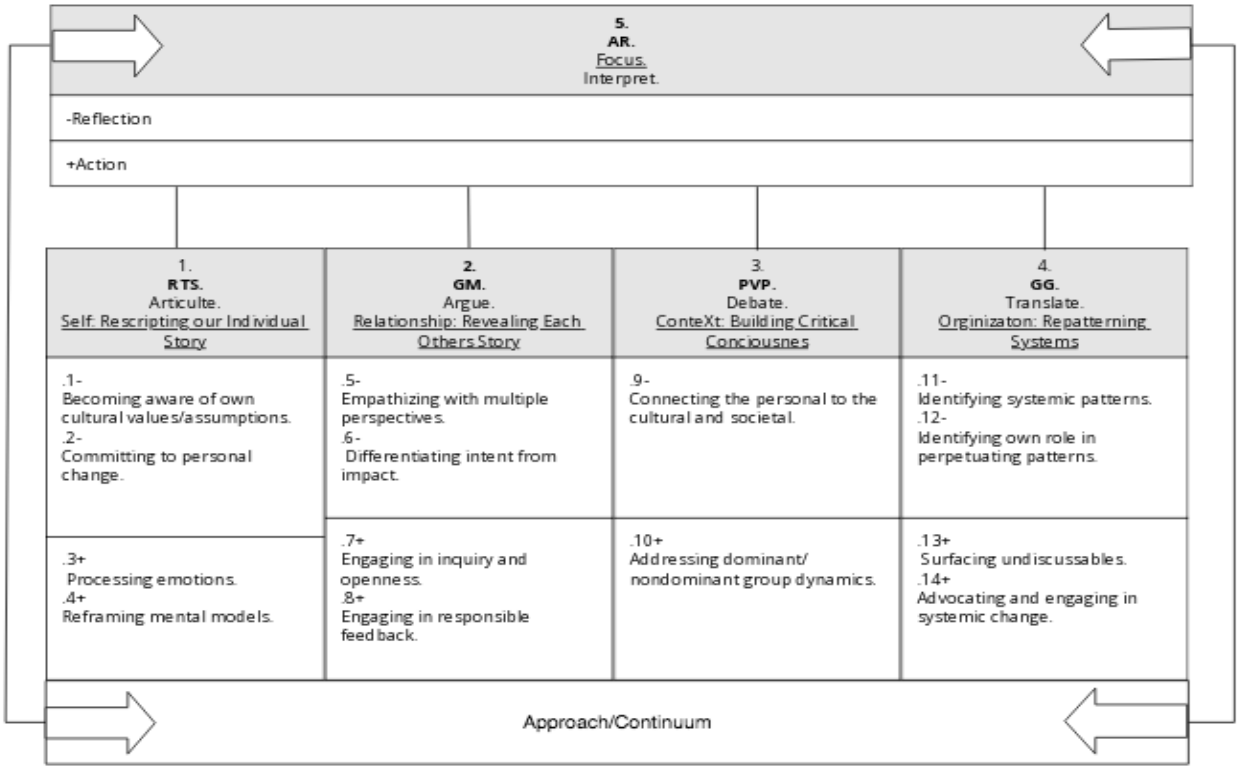


Figure. (*Typology of Digital Intergroup Communication Continuum.)*

4.5. Bartle Taxonomy: Player Type

The Bartle Taxonomy of player type classifieds gamers based on their preferred activities while playing the game. The taxonomy includes achiever, explorer, socializer and killer. This framework outlines the correlation of all 4 types of gamers, as well as the different interactions and the motivation while individuals are gaming. The congruency signifies the level of skill needed to adapt for various levels of gaming. In the case of this study, a key focus on dexterity in the form of controller usage is examined to detail the level of skill acquired while playing video games. The Bartle Taxonomy was chosen due to its ability to be classified into a linear hierarchy when describing the level of competence while selecting the game type. While the Bartle Taxonomy does not intently develop a hierarchy for complexity, the taxonomy serves as a useful tool to rate beginner skill levels to more experienced skill levels. This taxonomy was also chosen because of its uniqueness and its ability to stand alone as there are no other taxonomies that are similar. The Bartle Taxonomy (Bartle, 1996, p. 7) (Figure 2.) works on XY axes, the axes answer the two following questions: 1. Does the individual focus on the game world or interacting with other players? 2. Does the individual focus more on acting or about interacting? The graph represents the source of interest for a gamer. The x-axis describes an emphasis of player to the left and environment to the right. The y-axis describes a player's preference to either "act" (top) or "interact" (bottom) with the desired game. The four corners of the graph describe the preference associated with playing video games. In order to access the functionality of the graph, it is recommended: "consider each of the four styles in detail" (Bartle, 1996, p. 7).

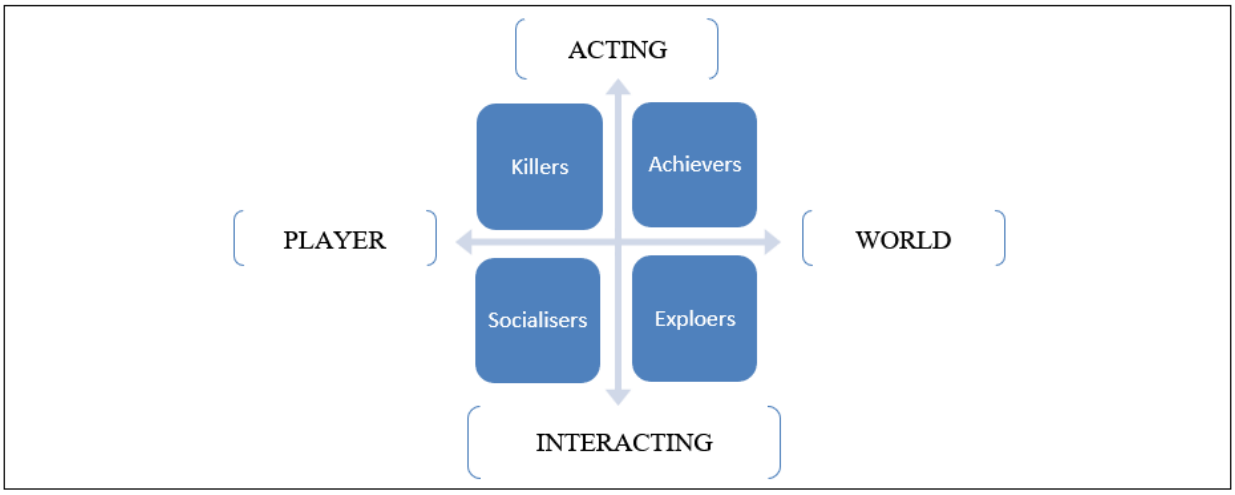


Figure 2. (Bartle, 1996, p.7)
Note from. Bartle, R. (1996). HEARTS, CLUBS, DIAMONDS, SPADES: PLAYERS WHO SUIT MUDS. https://doi.org/https://mud.co.uk/richard/hcds.htm.

Bartle Domain Defined:
1. ***Achievers*** "Achievers: win, challenge, create, show off, compare." (Denny, 2018)
2. ***Explorers*** "Explorers: explore, rate, review, vote, curate". (Denny, 2018)
3. ***Socializers*** "Socializers: help, share, comment, gift, greet". (Denny, 2018)
4. ***Killers*** "Killers: harass, hack, cheat, heckle, troll". (Denny, 2018)

Bartle Domain Defined & Re-Imagined:
The Bartle Domain was re-imagined (Figure 3.) bringing more usefulness to the meaning of the definitions as develop describers. The descriptions provide a more relevant interpretation of gaming/gamers and the psychomotor skills involved in order to advance in more complex video game usage. The modifications made were specifically unto the four corners. The x/y axis was utilized to enhance the meaning of an individual's interaction while playing video games.

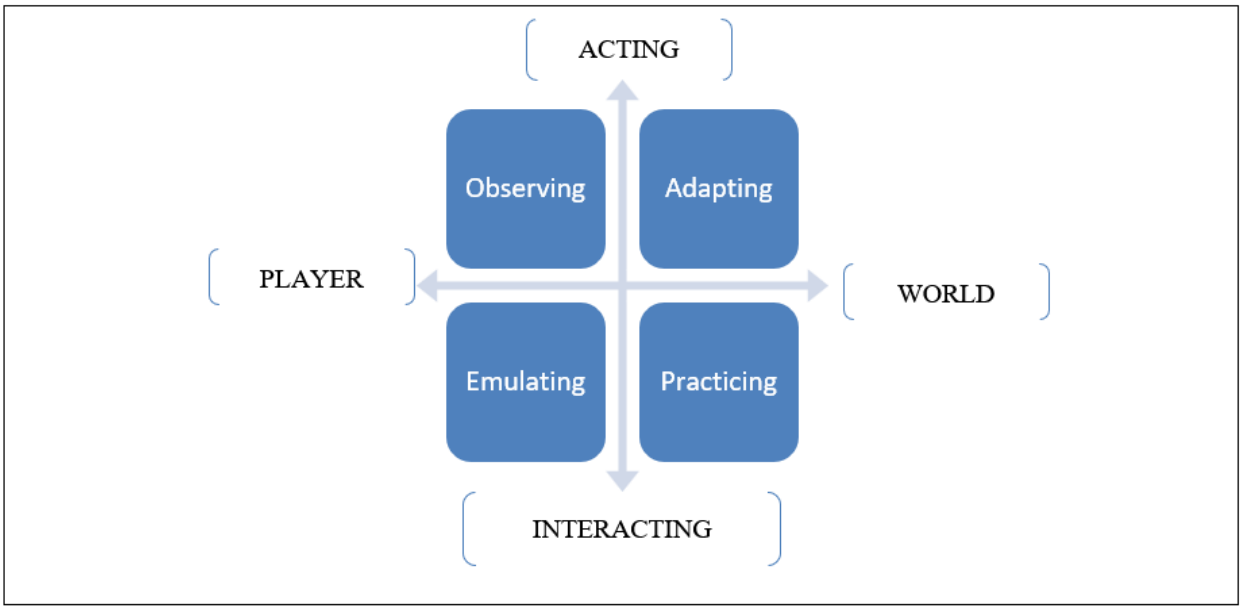


Figure 3. (Re-Imagined Bartle Domain)

1. ***Adapting-*** Game players have the ability to gain and collect and display rewards (ex. badges). This aspect allows individuals to adapt to micro-learning.

Complexity Level: 1

2. ***Practicing***- Explorative games involve the narrative of the game mixed with the game context and content. The mixture of context and content for gameplay reinforces the meaning behind the gamer's accomplishment.

Complexity Level: 2

3. ***Emulating*** **-** While socializers are mainly interactive while exploring, the aspect of multi-player games allows gamers to communicate to achieve desired objectives through the multiplayer platform.

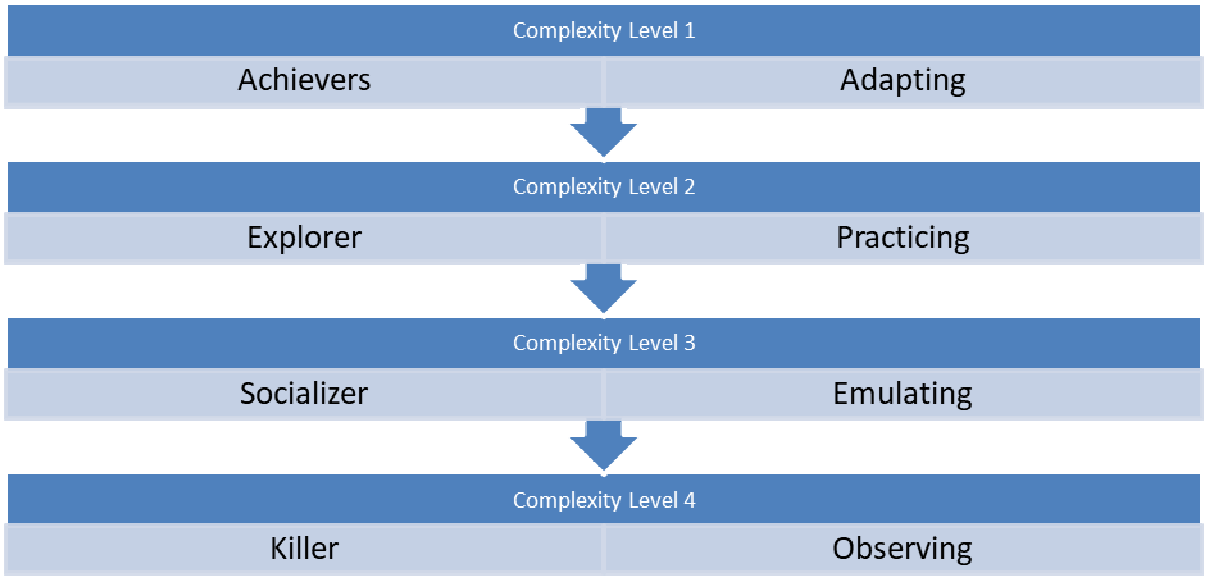
Complexity Level: 3

4. ***Observing-***_Refers to the aspect of gaming that is most linked to the desire to win. Though the name takes a dark undertone, this type of gamer is typically looking for a competitive edge to rank higher on gaming leaderboards.

Complexity Level: 4

Gaming Complexity Level Hierarchy

Four classifications for games exemplify the domains of game usage. It is understood, gaming has increased in popularity since its origins. As gamers are becoming more recognized, individuals can classify their usage of video games based on the designed typologies. In order to have an element of the application, each of these typologies was utilized to develop a model based upon the game type and level of competency.



(Figure 4. Gaming complexity level hierarchy)

For children's development, toys are mainly attractive for intrinsic reasons. Toys for children help children learn to use their imagination, explore and share. Toys can also hold value to enhance children's skills needed for adulthood.

- There are a variety of toys.
- Choice of toy varies in degrees of enjoyment & difficulty, also with the complication of increased frustration.

5. Different Types of Video Games

For this review, eight types of video games entail the most popular games categorized by their gameplay. Many genres of video games consist of subgenres that include the underlying objective. The different types of games related to the skill levels associated with the Bartle Domain. The assorted video game selection (www.igdb.com/advanced_search, 2021) were randomly selected based on its popularity from the "IGDB" video game database. IGDB video game web database has been designed to gather all relevant video game information in one place, a "one-stop-info-spot". IGDB aims to create unbiased data & a community-focused website gaming experience. The database was completely developed by an online community base and administratively screened for manipulation. IGDB is one of the largest collections of video games compared to other video game databases.

1. Action games

On this platform, gamers are mainly able to operate through a first-person perspective while completing objectives that contain physical challenges for earning rewards.

- Spider-Man. (Complexity level- 3)
- Grand Theft Auto V. (Complexity level- 4)
- Red Dead Redemption II. (Complexity level- 4)
- Fortnite. (Complexity level- 3)
- Rocket League. (Complexity level- 3)
- Call of Duty: Black Ops IIII. (Complexity level- 4)
- Call of Duty: Black Ops II. (Complexity level- 4)
- Tom Clancy's Rainbow Six Siege. (Complexity level- 4)

2. Adventure games

On this platform, video game players are often guided in an interactive story with the results of exploration and or puzzle solving. Games include:

- Stories Untold. (Complexity level- 3)
- Life is Strange. (Complexity level- 3)
- Soma. (Complexity level- 2)
- Her Story. (Complexity level- 2)
- To the Moon. (Complexity level- 3)
- Firewatch. (Complexity level- 3)
- Gone Home. (Complexity level- 3)
- Spycraft: The Great Game. (Complexity level- 4)

3. Role-playing games

On this platform, video game players are engaged in a first-person narrative with a quest as its context. Games include:

- Minecraft. (Complexity level- 3)
- Rocket League. (Complexity level- 3)
- Portal. (Complexity level- 3)
- Half-Life 2. (Complexity level- 3)
- Halo. (Complexity level- 4)
- Resident Evil. (Complexity level- 4)
- God of War. (Complexity level- 4)
- Red Dead Redemption. (Complexity level- 3)

4. Simulation games

On this platform, the game is designed to imitate real-life events in the form of simulation with the purpose of training or predicting outcomes. There are no specific set outcomes, games include:

- The Sims. (Complexity level- 3)
- Cities Skylines. (Complexity level- 3)
- Stardew Valley. (Complexity level- 3)
- Euro Truck Simulator. (Complexity level- 3)
- Planet Coaster. (Complexity level- 3)
- Tropico. (Complexity level- 3)
- Railway Empire.
- Assetto Corsa. (Complexity level- 3)

5. Strategy games

On this platform, the game outcome is designed by autonomous decision-making.

- Crusader Kings III. (Complexity level- 3)
- Offworld Trading Company. (Complexity level- 4)
- XCOM 2. (Complexity level- 3)
- Homeworld: Deserts of Kharak. (Complexity level- 3)
- Total War: Warhammer II. (Complexity level- 4)
- Civilization VI. (Complexity level- 3)
- Company of Heroes 2: Ardennes Assault. (Complexity level- 3)
- Command & Conquer: Red Alert 2. (Complexity level- 4)

6. Sports games

On this platform, video games are designed to simulate the practice of sports. Sports include extreme sports, track and field, football, soccer, basketball, etc.

- Madden. (Complexity level- 3 or 4)
- Rocket League. (Complexity level- 3 or 4)
- NBA 2K21. (Complexity level- 3 or 4)
- FIFA 2K21. (Complexity level- 3 or 4)
- Super Mega Baseball. (Complexity level- 3 or 4)

- Tony Hawk. (Complexity level- 3 or 4)
- EA Sports UFC. (Complexity level- 3or 4)
- NHL 21. (Complexity level- 3 or 4)

7. Puzzle games

On this platform, the primary objective is on solving puzzles. Each player attempts to use problem-solving skills (sequence solving) to complete objectives.

- Tetris. (Complexity level- 2)
- The Witness. (Complexity level- 2 or 3)
- Portal. (Complexity level- 3)
- Braid. (Complexity level- 3)
- The Talos Principle. (Complexity level- 3)
- Baba is You. (Complexity level- 2)
- The Room. (Complexity level- 2)
- Monument Valley. (Complexity level- 2)

8. Idle games/Clicker games

On this platform, the game is designed to provide continuous play with repetitive actions of clicking. The clicking can yield game currency for game rewards. These types of games have become increasingly popular for cellphone usage.

- Adventure Capitalist. (Complexity level- 2)
- Crusaders of the Lost Idols. (Complexity level- 2)
- Realm Grinder. (Complexity level- 2)
- Cookie Clicker. (Complexity level- 1 or 2)
- Clicker Heroes. (Complexity level- 1 or 2)
- Candy Crush. (Complexity level- 1 or 2)
- Time Clickers. (Complexity level- 1 or 2)
- Plantera. (Complexity level- 1 or 2)

5.1. Skill Levels

In this study, three skill levels are being reviewed. It is being identified that these categories are a continuum of succession. Each of the game types has three skill levels that are being reviewed within the study: beginner (Newbie), low skill amateur (Casual), and high skill amateur (Hardcore). It is recognized that these are basically categories and that skill level is a continuum of integrated skill levels.

Gamer Classifications.

Beginner/New Gamer (Newbie)

As a simple definition, the newbie is someone that has little to no knowledge about video games. This gamer would be new to the activity and with learning the game format with no experience. (Khromov, et al., 2019)

Low skill amateur/Casual Gamer

The casual gamer consists of games with reasonable to less difficulty. Casual gamers tend to prefer a “pick up” and “play” style game. The gaming experience can last substantial amounts of time while gaining more experience. (Khromov, et al., 2019)

High skill amateur/ Hardcore Gamer

The hardcore gamer spends the most time (more than 1hr) on a gaming device. Gamers are proficient with controller and interface usage. Hardcore gamers attempt to master game missions and game rules on any gaming device. Hardcore gamers also have the ability to compete on a professional eSport level. (Khromov, et al., 2019)

6. Conceptual Framework.

Figure 5. Operationalization of Conceptual Framework.

Game Type (Game Complexity)	Cognitive Domain	Affective Domain	Psychomotor Domain	Interpersonal Domain
Newbie Gamer 1-2 scores on all domains				
Casual Gamer 3-4 scores on all domains				
Hardcore Gamer 5 scores on all domains				

*A developed matrix to analyze gamer profile and usage. *

This framework is composed of 5 domains cognitive, affective, psychomotor, interpersonal and Bartle (Types of games and participant skill levels). Each of the domains was developed into a matrix. (Figure 5.) The domains have an ordinal grouping that gives equal relative position of one group to another. This matrix has the

potential to be both diagnostic and prescriptive.

The assessment begins with the type of game in terms of its complexity and the participant's skill level. Each of these games has a different complexity based on the inherent nature according to video game design. The games have been defined by complexity level, including the intricacy and complication of the game in the above chart (Figure 5.). The skill level of the participant is directly related to their ability to be successful when playing the game. Three skill levels were used to illustrate the matrix: beginning, intermediate, and advanced. It is recognized that there are more skill levels, but for the simplicity of the explanation of the matrix only these three will be used.

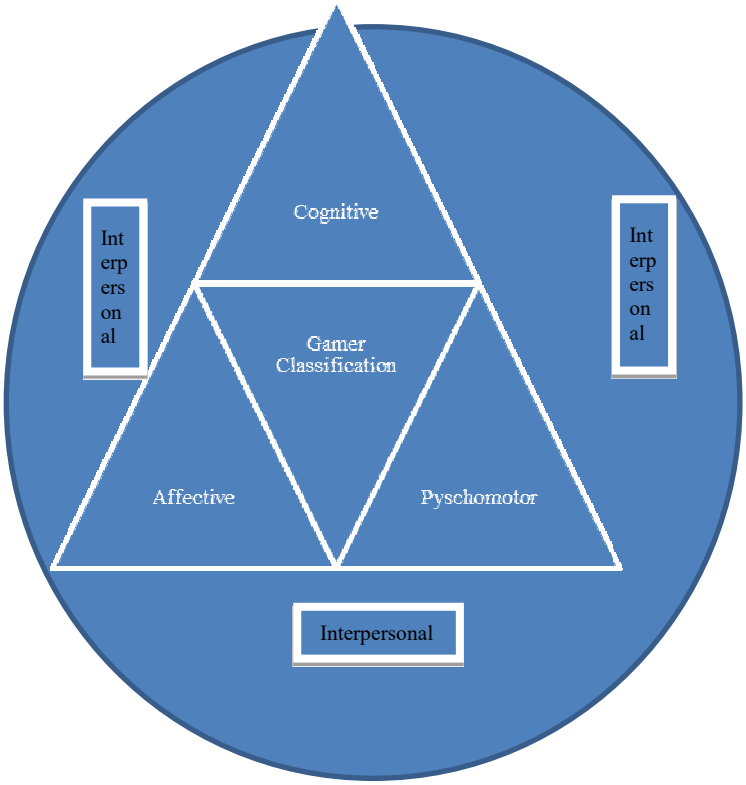
The cognitive, affective, psychomotor and interpersonal domains that have been reimagined in terms of the Bloom, Krathwohl, Harrow and Dave's domains are listed above. Each of the domains has a 5-point ordinal scale & Bloom and Harrow both have 6-point ordinal scales. Each of these points has been developed to reflect gaming outcomes. A detailed understanding of the framework is best obtained through application and by use of example.

Examples were provided in order to provide a more complete understanding of the matrix. Evaluations were completed using an open-ended interview. Since this is a new framework, this approach had to be used until a more diagnostic approach could be developed. Interviews were conducted by individuals who had an expertise in gaming and the use of the domains. It is realized that this assessment process is still in a developmental phase and has many problems. In regard to the analysis, 3 different approaches were used. The matrix was used to do an individual assessment regarding a game and the outcomes associated with the cognitive, affective, and psychomotor skills. The next assessment was based upon groups and their positions upon a mean ranking. The third analysis was an assessment of game interactions by multiple participants.

The assessment was completed by an expert gamer who has the skill on a specific game type. Once the assessment was completed the results were interpreted and a prescriptive plan established to achieve the desired educational goals.

The following examples are provided to better describe the matrix and its application. It must be noted that this is an exploratory study, there will be a need to conduct additional studies to determine the practicality and applicability of the developed matrix. An interesting part of conceptualization has been outlined by Simon Paul Atkinson. He contends that the different domains are in the related and he visualizes the inner relationships in a circular format that pieces the structure and function by an overlapping process (Atkinson, *Taxonomy Circles: Visualizing the possibilities of intended learning outcomes* 2013).

Figure 6. Social in Model



Example 1.

Individual Assessment, Prescription, Interpretation

Example 1.

Game Type Total War: Warhammer II. (Strategy Game) (Complexity-2)	Cognitive Domain	Affective Domain	Psychomotor Domain	Interpersonal Domain
John Doe 1 (Beginner-1)	2 Comprehension	3 Valuing	2 Basic Fundamental	4 Translate

Interpretation: The participant likes the videogame; the participant also doesn't know much about it. Participant needs to increase in-game skilled challenges. The interpersonal connection with game and outcomes is beyond the individual's ability to control and functional use.
Prescription: Participant has an interest in the game, in order for him to be successful. The participant would need to increase the psychomotor and cognitive domains. Lastly, the participant needs to find a game with a lower complexity level that would allow for progression to the skill level of the current game.

Example 2.

Group Assessment Interpretation and Prescription

Example 2.

Game Type Spycraft: The Great Game (Adventure) (Complexity-4)	Cognitive Domain	Affective Domain	Psychomotor Domain	Interpersonal Domain
(Group A) 10 Sample size. *(Beginner-2)*	Mean score = 2 Comprehension	Mean score = 4 Organization	Mean Score = 1 Reflex Movement	Mean Score = 2 Argue

Interpretation: This group (Group A) has a high level of interest in the video game, but a low cognitive knowledge and psychomotor skill. The game has the ability to create modes of communication between players involved.
Prescription: Due to the high affective domain, game players can monitor timed play for increased psychomotor adaption. Game players can increase communication with increased proficiency of game use.

Example 3.

Interactional Assessment through Game involving Multiple Active Participants, Interpretation and Prescription.

Example 3.

Game Type *NHL 2K21* (Sports Game) (Complexity Level 4)	Cognitive Domain	Affective Domain	Psychomotor Domain	Interpersonal Domain
John Doe 1 *(Intermediate-3)*	3 Application	3 Valuing	3 Perceptual	1 Articulate
John Doe 2 *(Intermediate-4)*	4 Analysis	4 Organization	4 Physical Activity	2 Argue

John Doe 1
Interpretation:_The participant is complacent with playing a videogame. The participant may not be very successful in advancing all four domains. The complexity of the game provides a low level of communication for the participant.
The prescription: The participant needs to compete with someone with less skill levels or challenge succession of game skills in more competitive play. Participant should seek to either practice in game or develop a game with those that are of equal experience.
John Doe 2
Interpretation: The participant is playing against those with lower skill and motivation. The participant will be limited to get better. The participant could take an interest in developing skills to match the level of high

frequency of gaming. The participant has limited ability for increased score across all domains.
Prescription: The participant could assist other gamers/players with developing gaming skills, as well as compete at a higher level of competition.

7. Conclusion

In our ever-changing global cultures, video games have gained an immense amount of attention, and most recently due to Covid-19, the increase of online communication has dramatically changed the way we consider as a normal communication. Though video games and online gaming has yet to be identified as an important tool to develop cognitive learning, the illustration of this research paper entails the ability to identify the educational value of online gaming for both children and adults. Online video games provide a structure that allows for an understanding of a governed online gaming communities and its affective ability to keep individuals engaged and thriving as successive profiles. The aim of the research was to explore the context of online gaming in a social context. There were three main typologies discussed (Bloom, Krathwohl & Harrow) that further explained consistency patterns relating to the educational outcomes of gaming. Bloom expresses the cognitive domain, Krathwohl express the affective domain, and the Harrow express the psychomotor domain. Lastly the Bartle taxonomy was used as a classification and ordinal system. The results of the study were a development of a complex matrix and an operational framework. The illustrations given are designed to exemplify the impact that video game use has had on society, the real-world social context of online gaming, and the future potential of gamified learning. Overall, this research offers individuals a broad understanding of video game culture and the educational outcomes for its use. The overall outcome is focused on the development of the diagnosis and prescription for educational instruction. This type of framework can provide for a better understanding of video game functionality. In the past it has been understood as intuitive, the latter offers a more systemic viewpoint on gaming development.

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Appendix A

Definitions

Taxonomy: the branch of science concerned with classification, especially of organisms; systematics.
Typology: a classification according to general type, especially in archaeology, psychology, or the social sciences.
Hierarchical Classification: Hierarchical Classification is a system of grouping things according to a hierarchy, or levels and orders. A hierarchy can be seen in positions of authority in which people are ranked in an unwavering order of authority, with a "boss" at the top and "entry-level" employees at the bottom.

Outcomes Identified- Appendix B

The outcomes identify were bases upon their importance and frequency.

Positive Outcomes

- Enhancing social interactions.
- Enhanced problem solving and logic.
- Enhanced Hand-eye coordination, fine motor, and spatial skills.
- Enhanced Planning, resource management, and logistics.
- Multitasking, simultaneous tracking of many shifting variables, and managing multiple objectives.
- Quick thinking, making fast analysis and decisions.
- Accuracy.
- Enhanced strategy and anticipation.
- Situational awareness.
- Developing reading and math skills.
- Perseverance.
- Pattern recognition.
- Estimating skills.
- Inductive reasoning and hypothesis testing.
- Mapping.
- Memory.
- Concentration.
- Improved ability to rapidly and accurately recognize visual information.
- Reasoned judgments.
- Taking risks.
- How to respond to challenges.
- How to respond to frustrations.
- How to explore and rethink goals.
- Teamwork and cooperation when played with others.
- Management.
- Simulation, real-world skills.
- Child adapt and be comfortable with the concepts of computing.
- Child to play together and can be a good bonding activity
- Video games make learning fun.
- Video games can make your child creative.
- Provides young people with a route/reading skill, encourages their creativity through writing, supports positive communication between family and friends, increases empathy, and supports mental wellbeing.
- Video games can improve your child's decision-making speed.
- Action video game players have an increased ability to be mentally flexible.
- Video games increase your child's self-confidence and self-esteem as he masters games.
- Video games give your child a feeling of happiness or well-being/relates to others in a meaningful way.
- Multiple players encourage your child to work cooperatively to achieve.
- Video games that require your child to be active, such as Dance Dance Revolution and Nintendo Wii Boxing.
- Video games make players' visions more sensitive to slightly different shades of color; help improves

eyesight by teaching the brain to spot small details, allocating brain resources between visual stimuli that compete for attention.

- Video games help children with dyslexia read faster and with better accuracy.
- "benefit on high cognitive abilities" including focusing for long periods and multi-tasking
- The opportunity to develop and master skills and have the freedom to make choices in the game universe.
- Believe that parents playing video games with their kids can boost better communication between them.
- Playing video games is safer than having your teens do drugs, alcohol, and street racing in the real world.
- Playing online games does not replace offline social lives but is expanding it.
- Striking is that those who enjoyed playing the game has a more pronounced gain in gray matter volume.
- Playing action video games and increased gray matter volume in the brain.
- The benefits of improving memory.
- Playing video games changes the structure of the brain.
- More gray matter and better integration of brain networks associated with attention and sensorimotor function.
- "gamification of learning can reduce the activity of a particular brain network which is responsible for mind wandering show that video gamers have an advantage at learning compared to non-gamers gamers are better in analyzing a situation quickly, to generate new knowledge and to categorize facts — especially in situations with high uncertainties."
- "video game use is not associated with an increased risk of mental health problems.

Data presented here suggest that video games are a protective factor, especially regarding peer relationship problems. Cognitive skills affected by poverty like focus, self-control, and memory.

Kids with combined-type ADHD, or who have difficulty staying focused or paying attention, and the prescription can be covered with insurance. Our findings show video games aren't necessarily bad for your health; there are other psychological factors which have a significant effect on a person's well-being.

- Can stimulate your child's interest in technology
- Video games may actually help your child find a job in the future.
- Gamers actually tend to be more social, more successful, and more educated than people who make fun of them.

Negative Outcomes

- Blamed on the violence they contain.
- Increased aggressive thoughts, feelings, and behaviors, and decreased prosocial helping
- who watch a lot of simulated violence, such as those in video games, can become immune to it, more inclined to act violently themselves.
- Less likely to behave emphatically.
- Lower empathy, but emotional callousness as well.
- Politicians oftentimes declare video games as a cause of gun violence.
- "consistent correlation" between violent game use and aggression but finds insufficient evidence to link violent video play to criminal violence.
- Decreased rate of juvenile crime which coincides with the popularity of games such as Death Race, Mortal Kombat, Doom, and Grand Theft auto.
- Were more likely to exhibit behavior such as being sent to the principal's office for fighting or hitting a non-family member.
- Suggests players may also practice riskier behaviors such as reckless driving, binge drinking, smoking, and unsafe sex.
- Video games have a connection to aggressive thoughts and behavior.
- The child is in control of the violence and experiences the violence in his own eyes (killings, kicking, stabbing, and shooting). This active participation, repetition, and reward are effective tools for learning behavior.
- Kids can be addicted to video gaming.
- Kids' addiction to video games increases their depression and anxiety levels. Addicted kids also exhibit social phobias
- Kids addicted to video games see their school performance suffer.
- Addictive video games can have a similar effect on kids' brains as drugs and alcohol.
- Heavy game players between 13 and 15 whose self-control system is not yet well-developed can have

increased susceptibility to other forms of addiction and can be more predisposed to impulsive and risky behaviors later in life.

- Relying on navigational "habit" instead of active learning
- Playing makes your kid socially isolated
- Teach kids the wrong values.
- Games can confuse reality and fantasy.
- Academic achievement may be negatively related.
- Video game addicts argue a lot with their teachers, fight a lot with their friends, and score lower grades.
- Game players routinely skip their homework to play games.
- Have found that games can hurt and help children's attention issues — improving the ability to concentrate in short bursts but damaging long-term concentration.
- Who plays more than one hour of console or Internet video games may have more or more intense symptoms of ADHD or inattention than those who do not.
- Effects on some children's health, including obesity, video-induced seizures. and postural, muscular, and skeletal disorders, such as tendonitis, nerve compression, carpal tunnel syndrome.
- Effects on some children's health, including obesity, video-induced seizures. and postural, muscular, and skeletal disorders, such as tendonitis, nerve compression, carpal tunnel syndrome.
- Playing online, your kid can pick up bad language and behavior from other people
- Kids vulnerable to online dangers. Often posing as children, sexual predators and other bad actors are meeting kids online through multiplayer video games and chat apps.
- Video games may exhibit impulsive behavior and have attention problems.
- Attention problems were defined as difficulty engaging in or sustaining behavior to reach a goal.

The Big Disconnect: Protecting Childhood and Family Relationship in the Digital Age"
Candy Crush" on the way to school, the trip will be quiet, but it's not what kids need. "They need time to daydream, deal with anxieties, process their thoughts, and share them with parents, who can provide.