Leveling Up: The Correlation Between the Professional Development of Soft

Skills and Video Games

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Abstract

Video games are often used as a form of entertainment for their users. Passive advantages that users experience range from improved cognitive function and mental stimulation to better social skills and problem-solving capabilities. Emerging research shows that video games can be used to actively teach and develop soft skills that can be used in academic or professional settings. As technology advances and the workplace shifts to adapt, so do the skills that are in demand. There is an ever-increasing availability of highly technical individuals entering the workforce without the interpersonal skills that are needed to navigate due to the technology available to them. While working to break this vicious cycle I discovered that, when structured in a certain way, specific video games can replicate team structures and situations where these skills can be implemented or improved. My goal is to show how video games can be used to build stronger teams, optimize workflow efficiency, and teach soft skills to a wide array of users. Social cognitive theory will provide the framework of the study while topics such as game-based learning and gamification provide the remainder of the foundational material for this concept. A content analysis of existing research was conducted, in addition to interviews, to provide backing for the study.

Literature Review

Introduction

Video games developed dramatically since their inception in the 1960s. From rudimentary games like Pong, to complexities like Dwarf Fortress, games have diversified to all audiences. As coding and problem-solving grew in complexity, so did the capacity for equally intricate gaming experiences. Almeida & Buzady (2022) states that serious games are applicable to diverse areas such as education or engineering. The foundational skills of coding and problem-solving, cultivated in early video games, have propelled the development of increasingly intricate and sophisticated gaming experiences. This advancement in the industry has led to the emergence of serious games as mechanisms for skill development and enhancing learning or cognitive purposes. Educational institutions and professional environments have slowly begun looking into this field for potential applications due to their profitability and learning capabilities.

This paper aims to strengthen the correlation between gaming environments or gaming concepts and capacities for learning by combining game-based learning, serious games, and soft skills, with Social Cognitive Theory providing the structure upon which this research can be built. The addition this paper makes to existing literature is showing the potential of creating an independent learning structure that can be applied to pre-existing video games as well as future ones, including other serious games. This learning structure can be molded to fit both environment and topic to allow for maximized learning capabilities and engagement.

Social Cognitive Theory describes the motivations and mechanisms of human learning with emphasis placed on core points. Attention, four human capacities for learning (symbolization, self-regulation, self-reflection, and vicarious capability), agency, and observation. This theory can be used to provide a structural framework upon which the research rests. Due to the learning environment being a virtual group setting, learning by observation becomes a key factor used by instructors or activity leaders. Repetition of activities once feedback is given allows the users and subject to take a chance in immediately applying freshly learned skills in the same environment. Motor reproduction is the process that Albert Bandura mentions in Social Cognitive Theory as necessary to translate behavior into action.

Serious Games

According to the Third International Conference of the Serious Games Development and Application (SGDA) serious games are digital programs that use a graphical user interface and a rules-based system to facilitate structured engagement with content aimed at achieving a purpose beyond entertainment (Ma et al., 2012). The origins of serious games can be traced back to the 1970s when American researcher Clark Abt coined the term. Material that can be used for teaching specifically by teachers is what gives these games the 'serious' aspect. Serious games have been used for a variety of purposes since then, including learning skills and gaining knowledge. Hard skills are defined as the knowledge used to carry out the role requirements or specific to a field (Sutil-Martin & Otamendi, 2021). Soft skills are defined as the ones associated

with interpersonal connection, whether professional or personal. Serious games are known to better mediate skill development than a survey or questionnaire.

It is important to note at this point that these concepts and their implementations are not without their drawbacks. A later example will show that these games can be misleading in their ability to capture the subtleties of real-life scenarios. If the focus is more on the mechanics of the game rather than the content, translation into real-world application may prove to be more difficult. Using virtual gaming environments in tandem with traditional learning methods is a more realistic approach to achieve results. Last but not least, if there is no motivation for engagement from the users themselves, all potential benefits are rendered immaterial.

Gamification and Game-Based Learning are the foundational frameworks that serious games use to function. Both differ in their application and goals. Gamification is using gaming elements to enhance non-gaming activities whereas game-based learning creates dedicated games with learning as the end goal. Gamification also requires significantly less resources to implement since game-based learning needs considerable game design and development. The most significant difference would be the learning design method itself. Game-based learning uses the video game itself as the medium through which learning takes place and assessments are made. An example of game-based learning is using a virtual reality simulation to perform a medical procedure or other task like farming. Being awarded for task completion through points, badges, or ranking systems is a common application of gamification.

Regarding their similarities, both share the application methodology of game mechanics as well as ingenious approach to engagement and motivation. The goals of both of these concepts are to use the positives of gaming to provide a new learning environment and approach to improving one's skills. The integration of game mechanics with instructional content gives way

to positively affected learning outcomes. According to Dowdall et al. (2021), students that were intrinsically motivated by the game-based learning approach voluntarily chose harder assignments while delivering above-average results and retaining a larger amount of information. The overall mood of the subjects was noted to be improved as well.

One example of this being done can be seen in the *Leadership Game* (LSG), a multiplayer game designed to help users improve their leadership skills in a safe virtual environment (de Freitas & Routledge, 2013). The multiplayer format creates a system in which individual skills must be applied as a collective, while exploratory learning motivates players to experiment with their surroundings and collect information in order to make informed decisions while remaining anonymous in the group. This deters bias through pre-existing interpersonal relations. The final in-built mechanic is an equal distribution of resources. Resources in this case can be broken down into information, tools, and leadership opportunities. The combination of the above culminates in players discovering their own methodologies as well as their effectiveness. Sara de Freitas, Director of Research and Professor of Virtual Environments at the Serious Games Institute, and Helen Routledge, Instructional Systems Design Manager at Totem Learning UK, spearheaded the research on their e-Leadership and Soft Skills Educational Design Model (ELESS) using the aforementioned Leadership Game.
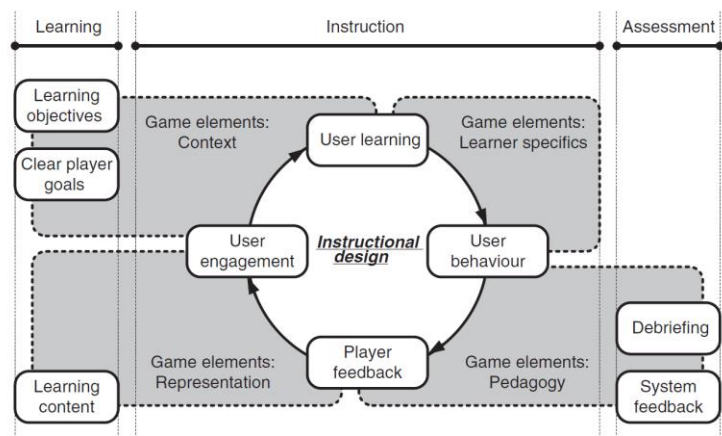

Figure 1: Game-based learning framework. Reproduced from Staalduinen & de Freitas, 2011

The study found that serious games, the ELESS Model, and soft skill improvement, all had positive correlations. It is important to note that the ELESS Model has the capacity to be used in other contexts for teaching soft skills and training. The main catalyst activates by balancing design, cognition, and practice-based implementation elements within the game environment. Design refers to the serious game itself, which is the LSG in this case. Cognition refers to the soft skill and cognitive development. Results showed that using game interactions for practice has a significant value for decision-making through practice as well as helping novice level leaders become more comfortable in these roles. The social aspect of this study brings to light the potential for how soft skills are taught and assessed. Correlating to Social Cognitive Theory, by introducing a novel and exciting method of learning, participants often find themselves willing to replicate methods used by their more successful counterparts. Attention is regarded as the necessary first step in behavior replication. In Albert Bandura's explanation, it is used primarily in the observation of others to repeat behavior. In this context, the other behavior can be a fellow participant in the serious game as well as their own previous behavior as something to avoid or correct. Personal agency shows that the participants are more willing to learn how they themselves can implement other strategies to bring about similar results, if not surpass them. Finally, motivation. The environment provides an optimal setting for motivation to be simultaneously external and intrinsic. Due to other participants being present, this provides social pressure to perform and excel. The desire to learn, reflect, and improve is the intrinsic factor that pushes the participants to engage (Martin-Hernandez et al., 2021).

Similar research has been done on the topic of serious games elsewhere in the world. A comparative study of 103 students in Poland and Romania found that the two demographics have an overall positive disposition towards the potential implementation of serious games in the

discipline of Project Management (Toader et al., 2023). 51 respondents (14 male/37 female) from Bydgoszcz University and Technology in Poland, and 52 respondents (19 male/33 female) from University of Life Sciences Timisoara in Romania. The Project Management class has many different games that are used to target and train specific skills. Two notable ones from the list are the Marshmallow challenge and the 5S Game. Overall, the skills targeted by the study fall into the following categories; Communication, teamwork, critical thinking, and work ethic. The Polish students presented a higher average of responses than the Romanians. This led to the cultural analysis of their differences. It was discovered that in this particular environment, Polish students were found to have more interest in career development due to participation in counseling and extra-curricular activities despite both universities having equal opportunity.

This comparative study added to the growing body of research, once again highlighting the potential of serious games in education. These findings align with the concept of serious games as purpose-driven and intentional tools for learning or skill development. It also underscores the need for engagement, challenges, and effective feedback mechanisms for maximum impact, in addition to aligning game use with course content. Without an opportunity to apply concepts learned in-game, the practicality becomes drastically ineffective. However, the study also underscores the significance of cultural nuances and individual differences when designing these games and implementing them in both a pedagogical and professional context.

Obstacles

A recurring thread in this nascent field of research is the lack of available and completed research. Referring back to the ELESS Model, Sara de Freitas and Helen Routledge place a heavy emphasis on this in the conclusion of the Leadership Game case study. A similar study from McGowan et al. (2023) of the serious game *Compete!* presents a variety of social sustainability challenges requiring the application of soft skills identified as key competencies across several countries across Europe as essential. The bibliometric analysis that was done found less than 25 publications going as far back as 1993 with 15 of them being published
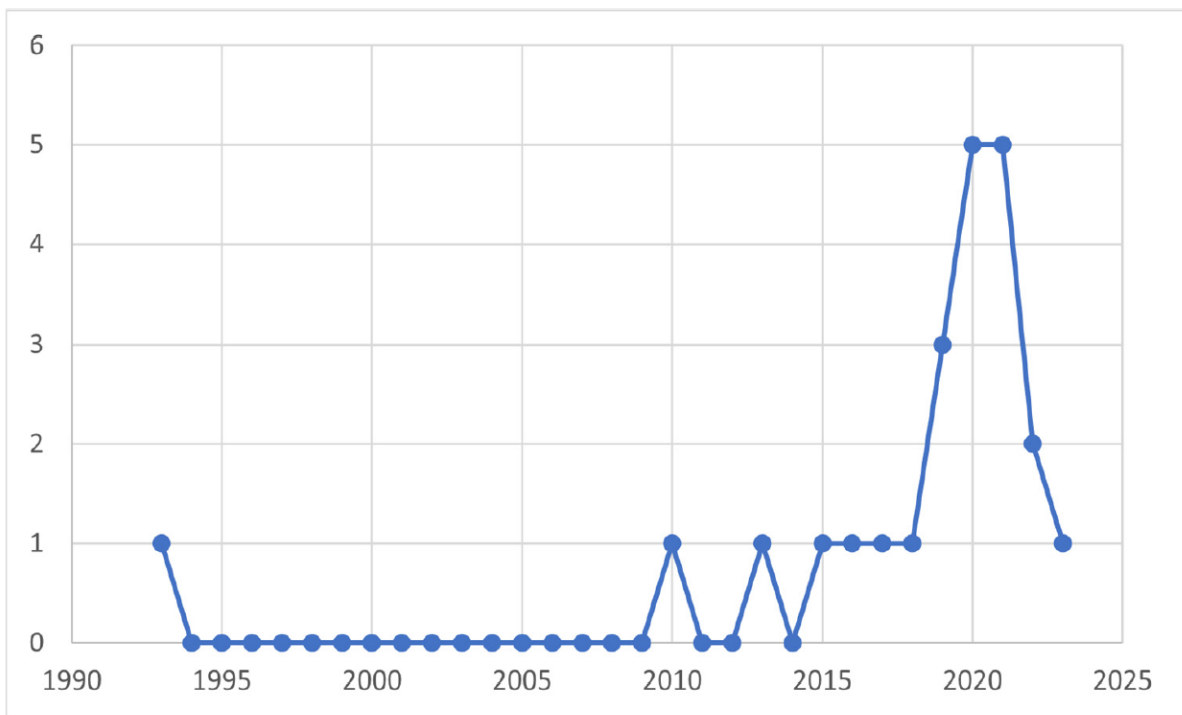
Figure 2. Articles per year.

between 2019 and 2022.

A significant obstacle is the increasing demand for soft skills in the job market with very little emphasis being placed on them in educational environments. Most universities place a much heavier focus on traditional academic subjects that grow technical knowledge and hard skills. They continue to receive higher levels of prioritization which makes it increasingly difficult for alternate subjects and learning methods such as soft skill development and game-based learning. Other limitations include the necessary level of financial and chronological investment, availability and cost of technical experts, as well as the quantifiability of soft skills themselves. Game making technologies can become costly and may at times require extensive technical skills to ensure the successful development and launch of a video game. It is likely this cost and requirement for industry expertise that dissuades the use of bespoke video games in higher education contexts. The complexity of soft skills makes their definition, measurement, and assessment difficult. Going into the game files to extract logs, values and other data risks becoming highly resource-intensive. Even if all three aspects of the targeted soft skills would be given a measurement, correlating the extracted game data with soft skill metrics would need a model of its own that has viability in the long-term.

Solutions

Solutions, both pre-existing and potential, have applications despite what appears to be insurmountable odds. Serious games continue to create a growing interest due to the ever-increasing popularity and ability to be an innovative tool across a range of domains. Surprisingly, according to a survey done by the SGDA, 40% of the participating companies were ready to risk

unprofitability or uncertainty due to the projections and theoretical being promising. According to the SGDA, upcoming research should focus on the criteria and requirements necessary for serious games to be considered by these same companies. To solidify further findings, using managers at companies that have previously experienced working with serious games as case studies.

Future study is needed in specific areas as highlighted by existing research. The exact cognitive processes through which players in game environments acquire soft skills remain elusive. Neuroscientists have studied the variability of the brain's activity during active cognitive processes, quantifying brain signals by analyzing its frequencies (GomezRomero-Borquez et al., 2024). This is done through the understanding of spectral entropy. By calculating it, how the brain responds to cognitive demands or stimuli, and the mechanisms of mental information processing, are uncovered. Having concrete and reliable methods to measure learning outcomes would make strides in assessing the effectiveness and validity of video game inclusion for soft skill development in such an environment. Just as essential as all the above, validity of skill transferability is still being verified.

The SGDA also theorized on using the adaptation of Commercial-Off-The-Shelf (COTS) Games in education as well as the Constructionist approach. Constructionist learning dictates that students learn better through project-based or experiential learning, creating mental models that facilitate understanding of the world around them (Iriondo et al., 2019). These COTS games can be used in technical knowledge aspects such as history, business, science or literature.

An example of one such game that has taken this adaptability into their business model is *Minecraft*. By launching their Education Edition, *Minecraft*'s creator Mojang Studios, gave the software a more essential use. Much of this paper's new research will focus on this game using a

similar pedagogic model to ELESS. Minecraft is best described as a sandbox-style non-linear survival adventure game. There are two bosses in the game that the players can challenge. Bosses are powerful non-playable characters that can be defeated to progress or complete the game. Other than this, there are no objectives set for the player to follow. This versatility allows players to create their own end goals or projects. To begin playing the game, the user must generate a world from the main menu and progress from there. Players can explore, collect resources, or build as they see fit.

The method in which *Minecraft* players obtain, retain, and share information is unique in the sense that there is no instruction given to the user whatsoever. Any and all information gathered in the early days of Minecraft was done via trial and error, developer notes, or extracted in-game through critical thinking and creative problem-solving. This has spawned a player-to-player network such as discussion groups. forums, and video content. The information network of Minecraft and its evolution is complex, and intricate yet intuitive to those that stayed connected to it. A significant addition to the Minecraft community is 'modders'. These are the people that create their own plugins and additions that can affect the game in a variety of ways. Mods can be integrated into the base game to enhance the existing game or change it completely. They can add new content to the game, enhance existing gameplay or optimize performance.

Personal Research

Video games can be used in the development of a variety of individuals and their professional skills. In this study, the professional setting in question is a standard or traditional corporate structure that can be seen across most industries. To define said structure, it starts at the bottom with entry-level employees that are non-managerial. One level up are the first-line managers that the entry-level employees report into. A team is a group of entry-level employees that work together and report into a single first-line manager. The first-line managers are entry-level managers that report into middle management and are responsible for ensuring the team works in unison to deliver objectives set by their own managers. Middle management refers to the intermediate level of management positioned below executive management. This level is tasked with overseeing and guiding the "team-leading" or "specialist" line managers. Through line management, middle managers are indirectly responsible for the performance and productivity of junior staff. This level reports into the final level of organization management. Top managers, such as the CEO and related roles, represent the highest leadership level within an organization. These managers are responsible for setting the company's strategic direction, establishing long-term goals and policies, as well as ensuring overall organizational health and future growth. Their roles also involve engaging with external stakeholders such as investors or regulatory bodies. Many of the skills required across the various levels of employment and management described above can be developed in a virtual environment such as video games to ensure improvement for the participants. To gain further insight into this possibility, in-depth interviews were conducted to obtain data for this study. Interviewees came from diverse

backgrounds in order to ensure a variety of responses and multi-faceted perspectives. Each subject was chosen intentionally to represent differing levels of skill in specific categories.

Age was the first category that was considered in order to place the subjects in chronological correlation to the technological advancement of video games. The second was gaming experience, or GXP, used to relatively scale the frequency with which subjects interacted with the medium. GXP was measured on a standard one to ten scale. One means barely any experience or interaction with video games and ten being high frequency of exposure to, and level of interaction with, video games as a medium. The third category was work experience, or WXP, which relatively scales the level of experience the subject has in a professional setting. One means little to no experience in a business organization and ten represents a high level of work experience in a business organization.

To maintain a level of anonymity to the study, subjects were represented as S1 through S7. The measurements were tabulated with the rankings of each subject as seen below.

	AGE	GXP	WXP
S1	18	10	3
S2	31	8	8
S3	17	7	2
S4	21	5	4
S5	49	2	10
S6	23	4	4
S7	27	4	7

Each category has a wide range allowing for each of the to coordinate with each other and provide insights as to how they do so. The range for category one, age, has a low end of 17 and a high end of 49. Category two or GXP has a minimum score of 2 and a maximum score of 10. WXP as category three has similar results as category two with the lowest score being 2 and the highest score being 10.

Such a range can offer perspectives as to what the background of the subjects are and their resulting personal conclusions. In category one, the subjects on the lower end expressed a generally higher level of gravitation towards video games as a medium with the enthusiasm diminishing as the age increases. This can be attributed to the fact that younger audiences have less work experience and have more to gain from using video games as a developmental tool whereas the older interviewees already have significant work experience and consequently higher amounts of experience in management. Adding category two shows an inverse correlation between video game usage and age of the interviewees. Subjects showed a higher amount of GXP that decreased as the age increased. A possible factor for this occurrence is the amount of time available to the subjects due to assigned responsibilities. Older subjects have an increased number of responsibilities both personal and professional, while younger subjects have fewer personal responsibilities, little to no professional responsibilities, and a large amount of focus placed on educational responsibilities. Category three provided the final measure with differing correlations to the other two categories. WXP negatively correlated with GXP while positively correlating with age. This finding can be explained rather simply as this is the expected progression set by societal norms. As people age, they spend more time working and will consequently spend less time on other endeavors. All of these factors played a significant role in

how the interviews progressed, the answers given, and the resulting conclusions. The interview itself was composed of 7 main questions (Q1 - Q7) that tie together the concepts of video games, soft skills, and educational/professional development.

Question 1: How often do you play video games?

The average response for the enthusiasts was anywhere between 2-3 hours daily while the more casual participants estimated between 1-2 hours daily. The daily average was based on the phases in which subjects were playing video games. For the players with higher GXP, consistency was also higher, while lower scoring players tended to have sporadic phases in which they would play video games for the previously mentioned duration. Consistency also depended on external factors. Academic obligations in the form of exams, assignments, or related activities were common deterrents for video game usage in younger subjects. Professional obligations were deterrents for the middle to older participants that may have both academic and professional commitments. With the previous academic factors still in play, part-time or full-time employment becoming an additional responsibility resulted in decreased usage of video games. All age ranges also attributed less video game usage to social engagements. Connecting with friends, family members, or colleagues, more often than not meant that time spent in virtual gaming environments experienced a decline.

Question 2: What video games do you gravitate towards?

All subjects expressed interest in a variety of game genres. The most consistently picked genre tended to be shooter games, followed closely by adventure games. Some genres were unique to the individual, such as S5 having a preference for racing games or S7 choosing primarily life simulation games. A subset of the shooter game enthusiasts enjoyed them due to

their multiplayer format. The appeal that was made apparent was the ability to engage and compete with other players of various levels with all having the common goal of achieving victory, either as an individual or as a team. For team-based games, an additional competitive aspect was having the highest score on the team allowing for multiple objectives that can be achieved by the player.

Question 3: What skills do you primarily employ when engaged in gaming?

When presented with a list of soft skills required for gaming, consistent answers were presented across the board. The majority of participants tended to list adaptability, critical thinking, teamwork, and problem-solving as the skills most commonly employed. This commonality can be attributed to the main foundational requirements of playing a video game. Quick reflexes are needed in order to respond to fast-paced action or situations, the ability to approach a situation from multiple angles in order to outsmart opponents is essential in most video games, and clear communication is vital to ensure that the team succeeds and common objectives are established.

Question 4: How do you prefer to seek knowledge when exploring a game in further depth?

When presented with the options of video content, literary articles, or in-person observation and repetition, the majority of participants chose video content as their preferred source of information while underlining an important distinction. Participants pointed out the context through which information was presented depended entirely on the type of game and the information being sought out. Some examples were given to further explain this process. Many adventure games have hidden bonuses that players can find to enhance their gaming experiences, some players prefer to use an article as they can more easily navigate it to find their desired

information. Players that enjoy more mechanic focused games prefer to use video game content to observe the mechanic taking place and follow it step by step to ensure replay ability. This method closely resembles the process outlined in social cognitive theory.

Question 5: Do you believe that video games, as a medium, can be used as an educational/professional tool to help you?

The younger participants stated that they do see a high level of personal benefit from such experiences along with some of the older participants, albeit for different reasons. The oldest participant said they do not see any personal benefit at their current point in their career. The difference in reasoning can be found in the correlation between their age and WXP. The younger subjects are at the beginning of their professional journey and have a significantly higher level of potential which means there are many ways in which they can obtain usable information and experiences. Older participants have more WXP and will therefore be able to use video games for professional development more intentionally, such as to grow specific skills. The oldest participants have already gained large amounts of experience from professional sources, meaning they will not be able to glean a large amount of new information or experiences.

Question 6: If yes, why? If no, why not?

Younger subjects had less WXP thus said they could benefit further from having access to any professional/educational tools that can enable them to succeed in the future. Subjects with moderate amounts of WXP explained that video games could be used to enhance entry-level managerial training for themselves, show their direct reports how project workflow takes place, and build interpersonal relationships as a team. S5 proved to be a unique perspective. They

expressed the fact that at senior levels of management, the returns of using such a concept would be outweighed by factors such as the financial cost of such an endeavor as well as the time being used. S5 also presented the fact that the learning potential and takeaways would be better sought in other mediums and contexts. Video games specifically do not, at least for the time being, show any possible advantages to top managers.

Question 7: What do you think would be the drawbacks of a game-based approach?

There were several obstacles listed as to the potential downsides of such an approach. The first and most common one was social stigma. All participants expressed a level of concern for this challenge from different perspectives. Younger participants shared common experiences of being subject to various levels of ridicule at some point in time for playing video games. These would come more often from older adults or people that disapproved of the activity. Often times, they were told that it was a waste of time and it provides no benefit to the player. Older participants reinforced this by focusing on the opportunity cost that video games can have by playing them instead of spending time on more fruitful endeavors. As an example, S5 explained how playing video games was viewed by their generation or older ones, and the expected success of someone who spends the majority of their time playing video games. The perpetuation of this stigma encouraged them to prevent their children from playing video games or extensively regulating the allowed time their children had. Another mentioned obstacle was cost. The required investment for innovative approaches and new tools is often high initially. Such an investment in a controversial medium with a risk of unprofitability would discourage its adaptation in professional or educational contexts, despite attitudes changing.

Conclusion

Video games, while not without their drawbacks and challenges, show incredible promise in their applicability. A diverse medium that can blend technical expertise with creative potential, this form of entertainment has uses that could benefit society in numerous ways. As per any approach, it is dependent on the intentionality behind it. This study was conducted to show the current landscape and a direction that can be taken. There is still a great dearth of literature that contributes to the field of video games being a slowly developing field. However, the industry of video games continues to remain a mainstay in the world of entertainment, making enormous profits and blending in with other mediums. Television and film adaptations of popular game titles continue to release, corporate sponsorships are becoming increasingly common, and specialized fields have already begun using a combination of virtual reality and gaming to train professionals. Creating a video game in and of itself requires a vast range of resources and skills to come to fruition. Video game development is a field that has proven consistently profitable with some games being run by corporations that span entire industries. Sony Interactive Entertainment ranks #1 with a net worth of approximately $156 billion. The quality of games being produced has never been higher, and as an unintended consequence, the level of intricacy has risen with it. The skills needed to conceptualize, produce, and play a video game are as diverse as the video games themselves. The results of this study show that players around the world can be instructed and shown how the skills they have harnessed and sharpened can be used to grow their professional skill set.

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