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ABSTRACT

The availability and affordability of increased internet bandwidth, video memory, and processing speed has enabled electronic sports (eSports) to become a flourishing global sensation, and college students are helping to drive this phenomenon. This mixed-methods study focuses on feedback from 159 college students regarding the eSports phenomenon across both gender and educational classification. Findings from the study include their eSports-related gaming and spending habits and perceptions of personal and academic benefits of playing eSports such as social interaction, teamwork, and critical thinking skills. Included are the perceived risks of playing eSports that encompassed eSports gaming addiction; mental, social, emotional risks; lack of physical activity; and physical disorders associated with playing eSports.

INTRODUCTION

The global electronic sports (eSports) market is predicted to reach 1.79 billion U.S. dollars in 2022. For comparison, the 2018 League of Legends World Championship match attracted 99.6 million unique viewers (Gough, 2019) while Super Bowl LIII drew in 98.2 million. Additionally, in 2022, eSports will become an Olympic game (Graham, 2017). Not only are there millions of viewers and eSports players globally, there are hundreds of colleges and universities who are members of the National Association of Collegiate eSports (NACE, 2020) in the United States. In fact, eSports are one of the fastest growing sports on college campuses as students are both spectators as well as players. According to McGrath (2019), eSports has been a burgeoning "phenomenon over the past

decade with about 1600 eSports clubs across 600 universities, and experts predict these numbers will continue to rise…[and expand] into elementary, middle, and high schools across the nation" (p. 201).

It is essential for universities to remain competitive in the higher education market space. As the popularity of eSports continues to grow, having a thriving eSports presence will also be advantageous for student learning. At the October 2019 Educause conference, McKenzie (2019) remarked that "this is not just about gaming...engaging students in esports can help them build critical thinking skills, encourage teamwork and innovation, and promote self-direct learning" (para. 3). Also, educators are reviewing eSports as a way of recruiting students through competitive video gaming and has become a high priority for higher education administrators leveraging eSports in recruiting efforts (Zalaznick, 2019).

To this end, this article provides insights from college-aged students regarding their eSports habits. Specifically, the research team considered student demographics, types of games watched or played, the amount of time played, grade point averages, risks, and the personal and academic benefits to playing such games.

Background

Historically, before the 1960s, electronic games were primarily used for demonstration as computers were large and too expensive for the common household (Monnens & Goldberg, 2015). By the late seventies and eighties, arcade games utilizing an electronic board, included such popular games as Space Invaders (released in 1979), Pac-Man (in 1980) and Defender (in 1981). These arcade games helped create a culture that defined a generation "where kids and teenagers could hang out, and, with a reasonable amount of money, spend hours without their parents" (June, 2013, para. 18). And, one of the first-generation gaming consoles was Atari, which allowed individuals to play games like Pong (1975), a type of virtual "ping-pong" on their home television sets (June, 2013).

The combination of eSports and gaming competitions within higher education is not new. However, it was not until the early 1970's that video game competitions started to grow. For example, the Space Invaders' Championship, cited as the first "Intergalactic spacewar Olympics" (Brand, 1972, para. 1), was held in 1972 at Stanford University. Twenty-four players participated for the prize of a subscription to the Rolling Stones' magazine. Brand declared that the computer engineers involved in creating the game were "magnificent men with their flying machines, scouting a leading edge of technology" (para. 49). Other companies followed suit. For example, Nintendo hosted the first World Championships, a large eSports tournament, played on a Nintendo Entertainment System using a special gaming cartridge (Cifaldi, 2015).

ESports progressed with the establishment of the internet as competitive gaming became increasingly accessible in households and across college campuses (Marsh, 2020). In fact, Bickman et al. (2021) noted that eSports "represents a growing market while a large number of people invest considerable time playing video games" (p. 1). And, the option of multiplayer video games played over the internet has boosted such competitive gaming (Scholz, 2019). Some of the more recent competitive eSports games include Overwatch and Call of Duty, first-person shooter (FPS) games (Farrell, 2021); League of Legends and Dota II, multiplayer online battle arena (MOBA) games; Fortnite, a free-to-play battle royale game; sporting games such as Madden, FIFA, and Rocket League; card games like Hearthstone, and real-time strategy (RTS) games like Starcraft II (Petrullo, n.d.). Additionally, the ability to live-stream games across internet platforms such as YouTube and Twitch have heightened the popularity of eSports events (Popper, 2013) with companies now distributing millions in prize money and attracting large numbers of both players and spectators.

Defining eSports

The word eSports has numerous spellings and definitions. For example, according to Winer (2019), "Depending on the source, country, and context, it might be written any of the following ways: esports, eSports, Esports, ESports, E-Sports, e-sport, Cybersport, Virtualsports, and more" (para.

1). Questions also arise as to whether eSports should be described as a sport, a competitive video game, or some combination of the two.

The Oxford English Dictionary defined a sport as "an activity involving physical exertion and skill in which an individual or team competes against another or others for entertainment" (para. 1). Similarly, the National Collegiate Athletic Association (NCAA) (2019) noted "a sport shall be defined as an institutional activity involving physical exertion with the purpose of competition versus other teams or individuals within a collegiate competition structure" (para. 6). Yet, governing bodies like the NCAA have so far failed to recognize eSports as a true competitive sport (Kane & Spradley, 2019).

For others, the definition of an electronic sport or eSport is complex, encompassing sports, culture, technology, and business (Jin, 2010). For example, Hamari and Sjöblom (2017) defined eSports as "a form of sports where the primary aspects of the sport are facilitated by electronic systems; the input of players and teams as well as the output of the eSports system are mediated by human-computer interfaces" (p. 211). Many other researchers have simply described eSports as competitive and/or organized video game play (see Table 1). In fact, according to Engerman and Hein (2017), "The eSports community has advanced in noticeable ways and represents the highest form of online competitive play for digital gaming environments" (p. 62). For the purposes of this paper, the researchers define eSports as a computer-mediated form of competitive gaming within a multiplayer environment.

GAMING AND YOUNG ADULTS

With the development of the internet, video games, once played in front of the television sets on home consoles, have expanded to personal computing devices. And, such video game play has become ubiquitous among young adults in the United States. For example, a 2017 study completed by Pew Research revealed that 72% of male and 49% of female young adults, ages 18 to 29, played video games on a computer, game console, or cellphone (Perrin, 2017). In terms of gender and gaming, Hartmann and Klimmt (2006) indicated that adult men (18-26 years old) preferred playing active and competitive games compared to women who favored skill-based games and those that include social interactions.

According to a Washington Post and UMass Lowell Center for Public Opinion poll, competitive eSports are just as popular as professional football among young adults aged 14-21 (Dyck & Talty, 2017). Forty-seven percent of young adults reported playing games almost every day or every day while 66% played several times per week. Additionally, eighty percent reported they played for entertainment and fun and 54% noted playing to spend time with friends. Additionally, Dyck and Talty (2017) found that almost three-quarters of young adults either play or watch multiplayer online games or competitions. Crawford et al. (2019) suggested that video gaming is becoming "an example of a wider social process whereby social reality is increasingly being encountered (and sold) as a set of designed and curated experiences" (p. 941). And, with Covid-19 concerns like social distancing for traditional sports during uncertain times, eSports has become a popular alternative for many sports enthusiasts (O'shea & Duffy, 2020).

RISKS AND BENEFITS TO GAMING

Over the years, the popular press has not always reported favorable outcomes related to game playing. In fact, psychological research has suggested that gaming has led to an increase in addiction, aggression, and even violence (Anderson et al., 2010). For example, Bányai et al. (2019) reported that playing eSports may be linked to addictive gaming disorders. Relatedly, the American Psychiatric Association (2013) listed Internet Gaming Disorder in the *Diagnostic and Statistical Manual of Mental Disorders* (DSM-5) as a component for future research. Maci and Amari (2019) reported that as eSports have continued to grow, gambling activities such as betting, skin lotteries, and loot box openings are on

Table 1. Selected eSports Definitions by Year

Year	Definition	Citation
2005	"Alternative sport realities, that is, to electronically extended athletes in digitally represented sporting worlds" (p. 199)	Hemphill (2005)
2006	"Playing competitive games according to generally accepted rules of leagues and tournaments on the Internet" (p. 572).	Weiss (2006) cited in Cranmer et al. (2021)
2006	"An area of sport activities in which people develop and train mental or physical abilities in the use of information and communication technologies" (p. 438).	Wagner (2006)
2007	"A sport of wisdom between people with hi-tech software and hardware as sports equipment" (p. 57)	Zang, Wu, and Li (2007)
2010	"A computer game played in professional competitions, especially when it is watched by fans and broadcast on the Internet or on Television" (p. 33).	Jin (2010)
2012	"An organised and competitive approach to playing computer games" (p. 350).	Witkowski (2012) cited in Cranmer et al. (2021)
2013	"An umbrella term used to describe organized, sanctioned video game competitions, most often in the context of video game tournaments" (p. 352).	Whalen (2013) cited in Bányai et al., (2019).
2013	"Competitive computer gaming" (p. 5)	Seo (2013) cited in Cranmer et al. (2021)
2016	"Organized video game competitions" (p. 35)	Jenny et al. (2016)
2016	"The enactment of video games as spectator-driven sport, carried out through promotional activities; broadcasting infrastructures; the socioeconomic organization of teams, tournaments, and leagues; and the embodied performances of players themselves" (p. 41).	Taylor (2016)
2017	"a form of sports where the primary aspects of the sport are facilitated by electronic systems; the input of players and teams as well as the output of the eSports system are mediated by human-computer interfaces" (p. 213)	Hamari & Sjöblom (2017)
2021	"eSports is the direct competition between human players using suitable video and computer games on various devices and on digital platforms under defined rules" (p. 2).	Block, S., & Haack, F. (2021)

the rise with many of these involving actual exchanges of "real" currencies. For many gamers, the cosmetic look of their weapons and accessories (skins) are vital to making an impression upon other competitors. And, these skins may cost the player hundreds to thousands of dollars (CS:GOPedia, 2021). Wohn (2014) reported that social factors played a role in the amount that gamers spent; more friends correlated to more money spent on such cosmetic items.

Despite the negative portrayal of video games, researchers have also reported benefits. For example, in a study by Riedel (2016), video gaming habits of students were examined in relationship to their grade point average. Results of the study implied that video game play had little to no effect on the academic performance of students. Furthermore, Adachi and Willoughby (2013), suggested strategic video game play improves problem-solving skills over time, leading to better academic grades. Students may also learn leadership and hard and soft skills like: attitude, communication, teamwork, collaboration, creative thinking, work ethic, time management, motivation, flexibility, and conflict resolution (Andrade, 2020) in addition to patience and resilience. A meta-analysis of 111 video game–related studies indicated that students who played first and/or third person shooter games may have an increase in their top-down attention domain and spatial cognition (Bediou al., 2018).

In terms of student success, a collegiate eSports team may raise student enrollment (McAllister, 2018), increase attendance rates and overall grade point averages (GPAs) (Kobek, 2019), improve student retention (Turner, et al., 2018), improve social-emotional learning (World Economic Forum, 2016), teach college readiness skills (Common Sense Education, 2020), attract disengaged students including underrepresented students, encourage co-ed play (Anykey, 2019), and increase science, technology, engineering, and mathematics (STEM) opportunities (NASEF, 2020). Another advantage for adding eSports to a university campus is the exposure students receive to cutting-edge technologies such as augmented and virtual reality, hype wall displays, live streaming, 3D physics engines, high-tech computers and opportunities to learn about game design and visualization. Furthermore, students can be part of the marketing design for the team. All of which may open pathways for future careers, setting students up for success after college.

According to Turner et al. (2018), "Leveraging the use of technology, specifically digital games, increases student retention and decreases the attrition rate resulting in increased graduation rates" (p. 13). In terms of recruitment, when Ashland University announced its eSports program on Good Morning America, approximately 500 interested students' submitted applications to the university (see McAllister, 2018, para. 4). Currently, fifteen states recognize eSports as a high school varsity sport and this trend is expected to rise dramatically in the next two years. ESports was recognized by 28 universities in the United States (Lamb, 2017) and by 2018, the number was 128 institutions (Morrison, 2018). At some campuses, eSports are part of intramural events, student athletics, campus clubs, varsity teams, or even integrated into degrees. For example, at campuses such as The University of Texas at Arlington, students compete for a share of a $10,000 scholarship (Case, 2019) and may earn a degree in eSports (Burton, 2019). UC Irvine offers ten academic scholarships (eCampus News, 2016) while Caldwell University (2019) offers a Bachelor of Science degree in eSports Management to ready students for finance, marketing, gaming, and other industries. Forward-thinking schools which create eSports programs may also draw sponsorships. For instance, a professional League of Legends league has drawn sponsorships from brands such as Geico, State Farm, Nissan and Coca-Cola, distributing more than six million U. S. dollars in total prize money and attracting nearly 100 million viewers (Goslin, 2018).

THEORETICAL UNDERPINNINGS

The framework of self-determination theory (SDT), an existing theory of human motivation, guided this study. Deci and Ryan (2000) suggested that SDT is based on the fulfillment of psychological needs as being the principal motivator for one's behavior. SDT is based upon the relationship between both extrinsic and intrinsic motivations and characterizes three basic psychological needs that promote motivation: autonomy, competence, and relatedness (Deci & Ryan, 2000). Autonomy is the need to feel a sense of self control; relatedness is one's interaction with others, and the third need is the feeling of competence when participating in an activity. SDT has been utilized in recent publications on gaming (i.e. Hulaj et al., 2020; Ozenc, 2020) and is seemingly an appropriate theoretical framework for understanding the motivations of gamers to play eSports. In fact, recent research has shown that the basic innate psychological needs of relatedness, motivation, and satisfaction may be met through participating in eSports activities (Qian, et al., 2020).

There is currently a dearth of research on eSports since there was some opposition to gaming on campuses previously. However, "much of the resistance in bringing eSports teams to education is due to the lack of awareness and understanding of how a video game competition can foster the skills desired in tomorrow¢s society" (Rothwell & Shaffer, 2019, section 8). Reitman et al. (2020) reviewed available published literature and noted that "eSports research has developed from nonexistent to a field of study spread across seven academic disciplines" (p. 1) including business, sports science, cognitive science, informatics, law, media studies, and sociology and is not confined to only a few

localities but reported that the internationality of eSports is now a reality. Further, Lokhman et al. (2018) argued that eSports is a current phenomenon that deserves more empirical work.

The purpose of this study was to consider the overall eSports habits of college students. Specifically, the personal and academic benefits and the risks of playing eSports was examined. The research questions included:

RQ1. What are the **personal benefits** for college students playing eSports?
RQ2. What are the **academic benefits** for college students playing eSports?
RQ3. What are the **risks** associated with college students playing eSports?

Methodology

This mixed-methods study used a convergent design to integrate both quantitative and qualitative data into a single investigation (Wisdom & Creswell, 2013). Closed-ended and open-ended questions were gathered on the same survey to better understand the college students' attraction to playing eSports using an anonymous, online Qualtrics (Qualtrics.com) survey, which contained nineteen questions. Of these, demographic questions such as age, gender, ethnicity, college classification, major, type of university, and whether students had an eSports program and/or scholarships accounted for seven of the survey questions. The survey also included nine multiple choice and three open-ended questions aimed at gauging students' experiences and perceptions of the benefits and risks to playing eSports. The study's target population was college students who were over the age of 18. An invitation to participate was posted within online communities such as eSports social media groups (e.g. Twitter, Facebook) and sent to college eSports listservs using an approved university Institutional Review Board (IRB) script and survey link. Although the initial recruitment occurred through a convenience sample utilizing social media and listserv postings, the research also used snowball sampling as those who viewed the posting were encouraged to share it with other college students allowing the research team to reach a more heterogenous sample of participants.

Participants

One hundred fifty-nine students (71 male/88 female) from the United States participated in this study. Of those, 103 (65%) were Caucasian, 24 (15%) were Hispanic, 15 (9%) were Black, 13 (8%) were Asian or Pacific Islander, 2 (1%) were Native American, and 2 (1%) reported other. The responses indicated that 135 (85%) of the students attended a public four-year university, 16 (10%) attended a private four-year university, 6 (4%) attended a public two-year university, 1 (1%) attended a private two-year university, and one (1%) reported other. Forty-eight (30%) of the students were in graduate school; 38 (24%) were undergraduate seniors, 36 (23%) were juniors, 17 (11%) were sophomores, and 20 (13%) were freshman. Students represented a variety of majors such as human resource development, education, psychology, criminal justice to undecided. Most of the students (101/64%) were unsure if their college had an eSports program on campus. Forty (25%) of the students reported having an eSports program on their campus and 18 (11%) noted they did not. Interestingly, only 10 (6%) of the students stated their campuses had scholarships available for eSports whereas 37 (23%) reported no and 112 (70%) of the students were unsure.

Analysis of the Data

For purposes of this study, the analyses were focused on examining both the benefits and risks to college students who play eSports. The data analysis proceeded in two directions: statistical analyses and an additional exploration of the qualitative responses. Quantitative data analysis was completed using Qualtrics Stats IQ and Excel. The data were analyzed using descriptive statistics to examine differences in students' eSports habits and the potential benefits and risks playing such games might have on academics across gender and education classification. Descriptive statistics can be used

to show a visual of the data and describe the central tendencies (McEvoy, 2018). An Analysis of Variance (ANOVA) was used to test for an overall relationship between two variables to see if one group tended to have higher values than another. When determining whether measurements from smaller sampled groups were independent, the data analysis required nonparametric chi-squared ($\chi 2$ test) and Fisher's exact tests. Furthermore, an ordinary least squares (OLS) regression was utilized to investigate the relationships among additional variables of interest.

For analyzing the opened-ended comments collected in the survey, one of the members of the research team created typed transcripts in Qualtrics through the data formatting feature. Subsequently, three open-ended questions in the survey were systematically and independently analyzed by two of the researchers on the team by first separately reviewing the transcript and developing an initial list of themes (Merriam & Tisdell, 2016); then, the researchers created a coding document and met until they achieved *intercoder agreement* (MacQueen et al., 1998, p. 35). Also, a third researcher on the team who was experienced in eSports reviewed the coding document for "peer examination" (see Merriam & Tisdell, 2016, p. 249) to enhance the confidence in the findings of the study.

RESEARCH FINDINGS

Esports Related Habits

In our initial study of 159 US students, 54.7% reported playing eSports; 45.3% did not. Greater percentages of male (84.5%) than female (30.7%) reported that they watched, played, or competed in eSports resulting in a strong statistically significant relationship X^2 (1, N = 159) = 45.9, p = .00001, chi-square test). Additionally, the data also supports a difference between the year of study (education classification) students were in and whether they watched, played, or competed in eSports (P=.00466, Fisher's exact test). In terms of classification, graduate students (33%) watched, played, or competed more than other classifications (seniors, 23%; sophomores, 13%; juniors, 13%; freshman, 18%). In a typical day, students also stated they watched an average of 3.64 hours per day, played an average of 3.71 hours and competed just 1.05 hours per day. Males reported watching (M=2.89), playing (M= 3.86), and competing (M= 1.33) hours per day. Interestingly, females reported watching eSports more than males (M=5.09) but playing (M=3.41) and competing less (.51). Freshman reported playing an average of six hours a day (M=6.33), followed by juniors (M=4.13), sophomores (M=3.44), graduate students (M=3.38), and seniors (M=2.13). And, when students were asked what they watched, played, or competed in, they listed a broad range of games (see Table 2). Most students watched (14.36%) League of Legends (10.38%), played League of Legends or Overwatch (10.38%), and/or competed in Overwatch (20.69%) tournaments.

When students were asked whether watching, playing, or competing in eSports took time away from other activities they were engaged in, a ranked ANOVA was used due to the small sample size. No significant association was found for *Completing Homework for School*, *Watching Television,* or *Writing, Socializing (In Person) With Friends and Family, or Social Networking, Emailing, or Internet Based Communication.* One student noted that eSports interfered with "arriving on time when I have a meeting." Overall, students perceived that eSports did not take time away from their other activities. (See Table 3).

Additionally, when students were asked if they used real-world money to purchase game items, most students reported spending money on cosmetic items (18.2%) and loot boxes (17.6%). However, 17.6% reported not spending any actual money on gaming. When analyzed by education classification, graduate students reported spending more on betting (80%), functional items (39.29%), and tournament fees (33.33%). In fact, graduate students reported spending money on tournaments ($400), cosmetic items ($4000), and on game betting ($1200) while seniors spent more money on upgrades and coins (40%); sophomores spent more on other items (50%), and freshman spent more on upgrades (40%). One freshman student reported, "I do not wish to know how much I have wasted" while another stated

Table 2. Games Students Watched, Played, or Competed In

Question	Watch	*N	Play	*N	Compete	*N
MOBA						
League of Legends	14.36%	28	10.38%	19	6.90%	2
Defense of the Ancients/DOTA	1.03%	2	1.09%	2	3.45%	1
Smite, Battleground of the Gods	1.03%	2	1.64%	3	6.90%	2
Multiplayer FPS						
Overwatch	10.77%	21	10.38%	19	20.69%	6
Counterstrike	5.64%	11	2.73%	5	6.90%	2
Call of Duty	7.18%	14	9.29%	17	3.45%	1
Paladins: Champions of the Realm	0.51%	1	0.55%	1	3.45%	1
Battle Royal						
Fortnite	5.13%	10	9.84%	18	6.90%	2
Apex Legends	7.18%	14	7.65%	14	3.45%	1
PlayerUnknown's Battlegrounds	3.59%	7	2.73%	5	0.00%	0
Sports Games						
FIFA	2.56%	5	3.28%	6	0.00%	0
NBA 2k	2.05%	4	3.83%	7	0.00%	0
Madden	2.56%	5	2.73%	5	0.00%	0
Rocket League	4.62%	9	4.92%	9	3.45%	1
Tactical Shooter						
Rainbow Six Siege	6.15%	12	8.20%	15	10.34%	3
MMORPG						
World of Warcraft	3.59%	7	2.19%	4	0.00%	0
RuneScape	1.03%	2	1.64%	3	3.45%	1
Card Game						
Hearthstone	3.59%	7	1.64%	3	3.45%	1
Real Time Strategy (RTS)						
Starcraft II	2.56%	5	1.09%	2	6.90%	2
Fighting Game						
Super Smash Bros.	9.23%	18	8.20%	15	3.45%	1
Street Fighter	2.56%	5	1.09%	2	0.00%	0
Mortal Kombat	1.54%	3	3.28%	6	3.45%	1
Other	1.54%	3	1.64%	3	3.45%	1
Total	Total	195	Total	183	Total	29

*N=number of participants included in the data analysis

Table 3. Does Watching, Playing, or Competing in eSports Take Time from Other Activities?

Other Activities	Total Percent
Yes (Completing my homework for school)	32.8%
No (Completing my homework for school)	58.2%
Unsure (Completing my homework for school)	9.0%
Yes (Watching TV/videos)	38.8%
No (Watching TV/videos)	59.7%
Unsure (Watching TV/videos)	1.5%
Yes (Writing)	20.9%
No (Writing)	73.1%
Unsure (Writing)	6.0%
Yes (Socializing in person with friends or family)	22.4%
No (Socializing in person with friends or family)	71.6%
Unsure (Socializing in person with friends or family)	6.0%
Yes (Social networking, email, or other internet-based communication)	20.9%
No (Social networking, email, or other internet-based communication)	76.1%
Unsure (Social networking, email, or other internet-based communication)	3.0%

spending "at least $1000 across 11 years of eSports." Also, men tended to spend greater percentages of money than women on all items (see Table 4).

Personal Benefits of Playing eSports

When examining the responses to the question, "Do you see any personal benefits to playing eSports?", 92 (71.3%) of the students reported "yes" while only 37 (28.7%) individuals reported perceiving no benefit. However, perceiving the presence of benefits did differ significantly between genders (p= 0.00001, Fisher's exact test) but not college classification. Significantly more males (94.34%) than females (55%) reported personal benefits to playing eSports.

The top five themes that emerged from the data are included in Table 5. The most cited response was related to spending time with friends and social interactions. This response is counter to the gamer stereotype of an isolated individual spending hours alone in their parent's basement living on soda and junk food, and never going outside for physical activity (PaaBen et al., 2017) and best illustrated in the following survey response: "All of the associated benefits of comradery from physical sports, community building, and interpersonal relationships that may form from the experience."

Video games have increasingly moved from single player experiences to multiplayer games where teams of four to six (or more) compete. *Teamwork* was the second most frequently identified benefit. Most students only said "Teamwork" or "Teambuilding"; however, the following response elaborates on that point: "…I believe that eSports is perfect, and it really teaches team members how to communicate and work with one another." The following quote is an example of the theme

Table 4. Esports Spending Habits of Students

Percentage of Money Spent	All Students	Male/Fem	Freshman	Sophomore	Junior	Senior	Graduate School
Betting on games/ matches	3.1%	4.2%/2.3%	20.00%	0.00%	0.00%	0.00%	80.00%
Coins	6.3%	12.7%/1.7%	10.00%	10.00%	20.00%	40.00%	20.00%
Cosmetic items (Attire, Skins)	18.2%	32.4%/6.8%	20.69%	6.90%	17.24%	31.03%	24.14%
Functional items (Weapons)	3.8%	8.5%/0%	0.00%	16.67%	16.67%	16.67%	50.00%
Have not purchased anything	17.6%	19.7%/15.9%	17.86%	7.14%	14.29%	21.43%	39.29%
Loot Boxes	10.7%	21.1%/2.3%	17.65%	11.76%	11.76%	35.29%	23.53%
Other	2.5%	4.2%/1.1%	25.00%	50.00%	0.00%	25.00%	0.00%
Tournament Fees	5.7%	9.9%/2.3%	22.22%	22.22%	11.11%	11.11%	33.33%
Upgrades	3.1%	5.6%/1.1%	40.00%	0.00%	0.00%	40.00%	20.00%

Table 5. Top Five Personal Themes of Playing eSports

Frequency	Themes	Representative Quotes
27	Spending time with friends/ Social Interactions	"ESports, when played with others in an online community, can provide social interaction with like-minded individuals. It is another way to build bonds and develop relationships too, which can blossom in other ways (extended friendships, business, etc.)."
16	Teamwork	"Many eSports require teamwork and communication to win a game."
10	Critical Thinking/ Problem solving	"Problem solving and thinking outside of the box makes me more apt to think of complex ways to approach things."
10	Entertainment	"Just like how others read books, watch television, go outdoors, and so on just for entertainment and to occupy oneself, playing eSports has a similar effect."
9	Relaxing, Disconnecting, and Managing Stress	"I see it as a relaxing hobby." "It (eSports) is the best way I've found to disconnect from what stresses me and reset my mind." "It's nice to take off some stress by playing a round or two of League!"

Critical Thinking/Problem Solving: "Increases cognitive abilities such as reaction time and quick problem analysis/solving."

Society now places a great value on *Entertainment* and as such it is not surprising that it makes this list. For example, a student wrote: "I think eSports is like another part of the entertainment industry." Finally, *Relaxing, Disconnecting and Stress Management* were also frequently cited personal benefits of playing eSports. The following quote illustrated this benefit: "I lead a stressful life and playing games is a great stress buster. It has also helped me [in] becoming more focused." Other cited personal benefits of playing eSports (after the Top 5) included: Communication, competition, hand/ eye coordination, time management, and money.

Table 6. Five Academic Benefits of Playing eSports

Frequency	Themes	Representative Quotes
14	Social Interactions/ Teamwork	"It gives people who don't play sports or do any other things on campus a place and that helps them fit in more and reach out for other's help." "Individual[s] that are introvert[s] and are not good with people may have depression or don't have a lot of people to interact with, this is a great form to not feel lonely and is like a community with individual that can bond over something."
8	Real-World Connections	"People who play could be computer processors or engineers especially with technology always advancing in different career fields." "When real world theories are applied in a game, whether the player realizes it or not, they tend to learn concepts that are applicable in the real world." "Esports also requires a lot of leadership skills that could definitely be useful in other areas of your life."
16	Critical Thinking/ Problem solving	"I think that it likely will also build numerical skills, creative thinking, computational thinking, and "what if" scenarios." "When your brain is being actively challenged and stimulated, academic benefits occur." "There could be a lot of math behind the way you play."
13	Scholarships	"There could be a possibility of scholarships and creating connections doing eSports." "For the students that do participate can receive scholarships."
16	Relaxation, Focus, and Managing Stress	"It could possibly help someone relax and allow for a small escape from the pressures of studying. This would allow a student to possibly release some stress and be able to focus more when they do study." "It relieves stress, so if I'm burnt out and I take a break to play for an hour or two, I feel ready to get after it again."

Among those who answered "No" to the question, "Do you see any personal benefits to playing eSports?", individuals most frequently responded that they didn't know what eSports are. Other responses include: "just a hobby/time killer", "It would take time away from family"; "I think it is very bad for your brain to play eSports. It is overstimulated if done for long periods of time."

Esports and Academics

When students were asked "Do you see any academic benefits to playing eSports?", 74 (56.1%) reported yes, while 58 (43.9%) stated no. Primary outcome results indicated a significance between gender and the perceived academic benefits to playing eSports (p=.0206, Fisher's exact test). Men (68.52%) reported higher perceived academic benefits than women (47.44%). All students perceived some academic benefits to playing eSports (Freshman, 66.7%; Sophomores, 60%; Juniors, 48.5%; Seniors, 56.3%; Graduate Students, 56.8%).

When students were asked specifically what they felt the academic benefits of playing eSports were, five primary themes surfaced from their open-ended responses: *Social Interactions/Teamwork, Real-World Connections, Critical Thinking/ Problem solving, Scholarships, Relaxing, Focus, and Managing Stress* (See Table 6). Those who felt there were no academic benefits to playing eSports generally fell into two camps, those who did not know what eSports is, therefore, did not know the benefits and those who simply stated that there were no benefits. For example, one student wrote, "I'm not sure what all counts as esports."

One academic outcome found was based off the results of an OLS Regression, that checked for significant differences and revealed that there was a strong significant difference and weak predictive value in student classification and *Grade Point Average* ($R^2 = 0.306$, p<.00001) in those who played eSports. Freshman had much lower grade point averages than other student classifications. Means and standard deviations for each variable are presented below as Table 5. However, there were no significant differences between gender and GPA (p.< 0.114) in those who played eSports. Male players averaged a GPA of 3.33 while female averages were only slightly higher (M = 3.46). Means and standard deviations for each variable are presented below (see Table 7).

Table 7. Grade Point Averages by College Classification

Classification	Average	Median	Sum	Sample Size	Confidence Interval of Average	Standard Deviation
Freshman	2.75	2.7	41	15	2.32 to 3.19	0.79
Sophomore	3.35	3.4	50	15	3.13 to 3.56	0.39
Junior	3.41	3.3	113	33	3.28 to 3.55	0.38
Senior	3.37	3.4	108	32	3.21 to 3.52	0.42
Graduate School	3.73	3.8	138	37	3.64 to 3.83	0.28

Interestingly enough, one student remarked, "I bet specific gamers who play games like Starcraft or other hardcore strategy games outscore (gpa wise or whatever) the average student. Not to say that gaming makes you smarter but smart people lean towards specific game types." Another student reported that gaming, "makes you want to maintain good grades."

Risks of Playing eSports

When participants were asked the question, "Do you see any risks (i.e. dangers) to playing eSports?", both males (57.4%) and females (52.6%) perceived some risks. Their perceiving of the presence of risks did not differ significantly between genders (p=.599, Fisher's exact test). Additionally, there was no statistical significance related to risks and the level of a students' education ($\chi 2$ (4, $N = 132$) = 7.65, $p = .105$, $V = .241$). However, freshman (73.3%) reported more perceived risks than other classifications.

Open-ended responses were categorized into four different themes: *Addiction to eSports Gaming*, *Mental, Social, or Emotional Risks*, the *Lack of Physical Activity,* and *Physical Disorders* (See Table 8). Discussing addiction as a risk, one participant summed it up this way: "Just like traditional sports, eSports have risks and dangers. Addiction is one of them, leading to lack of control and management of time; sleep deprivation." The second most frequently cited risk of playing eSports was the lack of physical activity. There is a great deal of research showing benefits of physical activity (Malm et al., 2019) and the following quote demonstrates how harmful eSports can be if taken too far: "Games are usually played while sitting down and sitting down for long periods of time is actually detrimental to their health." The third most mentioned risk was Carpal tunnel injuries. One participant explained it this way: "Hand based injuries due to very few differences in movements over long periods of time if proper stretching methods aren't taken into consideration."

Conclusion

In terms of academics, this study revealed an important finding in that freshman (75% male, 25% female) reported playing more during the day, over 6 hours a day, and noted having lower grade point

Table 8. Risks of Playing eSports

Frequency	Themes	Representative Quotes
12	Addiction to eSports Gaming	"People I know flunked out of college or delayed their education because they got addicted." "It can be addicting. Many play/watch for hours and hours"
7	Lack of Physical Activity	"It can replace healthy habits like physical exercise." "Overweight due to too sedentary of a life style."
7	Physical Disorders	"One's posture can be impacted (neck, back, wrists, hands, or fingers); carpal tunnel syndrome…eye-problems (strain)… "Vision problems could occur due to the blue light."
6	Mental, Social, or Emotional Risks	"Emotional risks include anger/frustration, isolation, and a constant feeling of being compared." "There's also long periods of isolation when one is preparing for a competition, so it could also be detrimental to your social life if not done in moderation."

averages (2.75). According to Goleman (2013), college students' attention is already divided by an "explosion of news streams, e-mails, phone calls, tweets, blogs, charts, reflections about opinions about opinions that we expose our cognitive processors to daily" (p. 56); perhaps, limiting their ability to concentrate. However, freshman students in this study also reported they compete more in major tournaments than other classifications and perceived that playing games was not a hindrance to doing their homework. Researchers have reported that, in general, students mature intellectually and socially as they progress through college (McWhorter & Delello, 2016). This may also be an indication of why student GPAs were higher with increased education levels.

Many students perceived that eSports were both personally and academically beneficial (e.g. managing stress, critical thinking, problem solving, entertainment, teamwork, social interaction, learned skills and focus). In reality, for many students, eSports allow them to experience aspects of SDT such as autonomy (sense of agency and control), competence, the need for challenge, and the promotion of social connectedness or relatedness with others (see Deci & Ryan, 2000). However, some students also reported there were risks to playing eSports including vision, back, neck, and hand problems and weight gain. Psychological, mental health was affected as many gaming communities were reported as "toxic" and socialization was limited with others outside the game. Some students even reported their addiction limited their motivation to do anything else. Additionally, 82% of the students reported spending real-world money on gaming items. Men specifically reported spending money on loot boxes, where players essentially wager real money or in-game credits. A recent study of over 7,000 gamers suggested that loot box purchases provokes a similar level of excitement and compulsive behavior as that of problematic gambling behaviors (Zendle & Cairns, 2018). And, Zendle (2019) noted that that loot boxes "may act as a gateway to engagement with gambling amongst gamers" (para. 7). According to the Gambling Health Alliance (n.d.), loot boxes can become addicting, influencing a player's mental health. Students in this study reported playing games such as League of Legends, Overwatch, and FIFA, which contain loot boxes allowing for other forms of monetary exchange.

These findings have important implications for understanding the habits of eSports players on college campuses especially as colleges look to eSports as a method for recruiting and retaining students. However, this study is not without limitations. For example, eSports has a multiplicity of meanings and was not operationally defined for the participants in this study allowing for potential ambiguity. Also, this study was based upon perceived data which may introduce some bias into the study as the sample size was small and not all students answered every question. Some students were recruited through listservs that were eSports related, which may have led to a more self-selected

sample. Additionally, while trends may be present, regression methods may perform quite differently in different data sets. For example, in this study, the predictive value of a student's GPA to their education level may not be generalizable to all college eSports gamers. Further research is needed to demonstrate a correlation between eSports and lower GPAs. Do those students who are part of a team and not just independently playing have better personal (e.g. sleep, exercise, spending) and academic habits (e.g. GPA, time spent studying)?

As eSports becomes more prevalent on college campuses, it will be important that policies regarding academic success and game play be established. For example, UC Berkeley Recreational Sports (2021) published their Esports policies on their university page so that all stakeholders understand the expectations and responsibilities of those wanting to use their eSports facilities. These policies include inclusivity policies to thwart discrimination in its many forms, online content/ computer use, appropriate and additional use policies, reservation polices, and data collection policies, among others.

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