BEST PRACTICES AND IMPACT OF ESPORTS ON STUDENT OUTCOMES

Introduction

eSports refers to electronic sports, a competitive video gaming practice that normally consists of different leagues.[1] eSports provides organized competitive gameplay between two teams, governed by a strict set of rules and guidelines, like traditional sports.[2]

A Hanover Research (Hanover) partner is considering offering eSports opportunities to students as it aligns with the district's strategic technology initiatives. To support knowledge gathering in this area, the district has partnered with Hanover to better understand the field of eSports, potential impacts, and how they might be implemented.

Key Findings

- **Available literature in K-12 eSports and its impact on student outcomes typically comes from national eSports organizations**. As a result, the research is biased towards the benefits of eSports. For instance, one of the empirical studies was conducted by the Connected Learning Lab at the University of California, Irvine, in collaboration with the North America Scholastic Esports Federation (NASEF). Therefore, conclusions on the benefits of eSports needs to be treated with caution until more research becomes available.

- **eSports advocates highlight the positive impact these programs have on students' skills related to career and STEM readiness and social-emotional learning.** For example, research notes that eSports requires technical skills, tactics, and mental preparedness related to STEM-oriented educational programs. They also help develop communication, teamwork, and problem-solving skills valued by future employers. Further, research notes positive impacts of eSports on students' feelings of school belongingness and self-regulation.

- **Integration of eSports as extra-curricular activities is increasing and often includes district teams participating in national leagues**. In 2019, NASEF reported 260 clubs in US and Canadian schools. For instance, Grapevine Colleyville Independent School District in Texas has established two teams competing in PlayVS eSports league.

- **eSports organizations recommend schools support student's development in education pathways related to eSports.** NASEF notes four occupation pathways related to eSports in addition to players: strategists, content creators, entrepreneurs, and organizers. NASEF created related curricula to integrate eSports education into English Language Arts (ELA), Career and Technical Education (CTE), and middle school programming.

- **Available literature suggests the high interest in video games among students supports inclusion of eSports programs, requiring relatively low initial investment.** Schools can leverage their existing IT infrastructure to start up the program and expand investment as team grows.

Impacts on Student Outcomes

The inclusion of eSports in K-12 is growing, particularly at the high school level. Competitive gaming is a varsity sport in North American high schools. In 2019, the NASEF reported 260 clubs in 27 US states and three Canadian provinces, with more than 3,000 students participating.[3]

Available literature, mostly comprising articles and studies published by national eSports organizations, addresses concerns about the lack of physical exertion in eSports and its categorization as a sport by highlighting how eSports include the same team requirements and are as competitive as traditional sports.[4] Furthermore, literature stresses the positive implications of eSports on students' development of career-ready, STEM-related, and social-emotional learning skills.

Career-Ready Skills

eSports helps develop communication, teamwork, and problem-solving skills valued by future employers. Research notes that employers look for future employees with these soft skills, and universities also value prospective students with strong teamwork experience, which relates to positive academic performance.[5] The table below describes how eSports help students building these soft skills.

Soft Skills-Developed by eSports

SKILL	DESCRIPTION
Communication	Students develop communication skills because of the dependent nature of team members to achieve certain tasks within the game.
Teamwork	Esports games have goals and objectives which can only be achieved by the team.
High-pressure problem solving	Because of the competitive nature of the game, team members must make quick decisions and plan strategies.

Source: Clarity Innovations[6]

A study conducted by Connected Learning Lab at the University of California, Irvine, to assess NASEF's esports model found that NASEF students report a positive increase in social and 21st-century skills. Students self-reported their perspectives on their proficiency over these skills by the time the survey was conducted compared to the beginning of the program.[7] The following table indicates the skills that students reported having a positive change after taking the NASEF program.

SOCIAL SKILLS AND RELATIONSHIPS	21ST CENTURY SKILLS
▪ Cooperation ▪ Communication ▪ Relationships with peers ▪ Relationships with adults	▪ Critical thinking ▪ Mastery orientation

Source: Connected Learning Lab[8]

STEM-Readiness

eSports activity is positively related to students' interest in STEM fields. In general, students involved in gaming are often equally interested in technology. For instance, in 2018, nearly 62 percent of League of Legends players were from STEM majors.[9] Instead of physical skills, eSports requires a different set of skills such as technical skills, tactics, and mental preparedness related to STEM-oriented educational programs.[10] Likewise, secondary literature notes that "video game players have better cognitive skills, especially perception and spatial cognition, than those who do not play or play little."[11]

The Connected Learning Lab study also found that the NASEF program positively impacted students' STEM-related attitudes and knowledge listed in the figure below.

STEM-Related Attitudes Positively Impacted by eSports

STEM engagement
STEM career interest
STEM activity participation
STEM career knowledge
STEM identity

Source: Connected Learning Lab[12]

Social-Emotional Learning (SEL)

Research notes a positive impact of eSports on student's development of school belonging feelings and self-regulation. The Connected Learning Lab study further found a positive effect of the NASEF program in students' school affiliation and self-regulation skills listed in the following table.

Soft Skills Positively Impacted by eSports

SEL Skills Positively Impacted by eSports

SCHOOL AFFILIATION	SELF REGULATION
■ School value	■ Emotional regulation
■ School engagement	■ Self-management
■ Sense of belonging	■ Grit
■ Effort in school	■ Perseverance

Source: Connected Learning Lab[13]

Effective eSports Models

Available literature provides information regarding eSports curricular integration in middle and high school programs and program implementation guidelines. Empirical evidence provided by case studies suggests that K-12 institutions include eSports programs as part of their extra-curricular offerings.

Curricular Integration

NASEF developed a curriculum for middle school and high school students to integrate STEM education, connecting esports with content standards. NASEF curriculum foundation lies on the eSport ecosystem framework illustrated in the table below, which provides a comprehensive view of education pathways derived from eSports.

NASEF eSports Ecosystem Framework

GROUP	OCCUPATIONS
Players	--
Strategists	■ Coaches ■ Theory crafters ■ Analysts
Content Creators	■ Software developers ■ Shout casters ■ Streamers ■ Journalists ■ Fandom art and media
Entrepreneurs	■ Web developers ■ Marketing ■ Corporate sponsorship ■ Business developers
Organizers	■ General managers ■ Event organizers ■ IT Support

Source: The North America Scholastic Esports Federation[14]

NASEF curriculum integrates into English Language Arts (ELA), Career and Technical Education (CTE), and middle school programming. NASEF developed these curricula in collaboration with California agencies, including the California State Department and the Orange County

Department of Education. Therefore, it adheres to California standards. The following table illustrates some of the courses available for each program.

NASEF eSports Curriculum

PROGRAM	EXEMPLARY COURSE	DESCRIPTION
ELA	English 9+ Game Design	It aims to help students build a foundational understanding of esports, their history, and their evolution over time through research of multiple genres and methodologies.
CTE	CTE-Entrepreneurs	The course includes business development, marketing, corporate sponsorship, and web developer strands.
Middle School	9-week quarter curriculum	Focuses on esports as a means of facilitating transference of concepts and skills that incorporate California standards.

Source: The North America Scholastic Esports Federation[15]

Likewise, the Varsity eSports Foundation (VEF) and the High School Esports League (HSEL) developed a free textbook titled "Gaming Concepts" as a turn-key curriculum to support gaming teachers build their own lessons.[16] The textbook builds upon the following content standards.

Content Standards of Gaming Concepts Curriculum

STANDARD	DESCRIPTION
Gaming Appreciation	The student values gaming for health, enjoyment, challenge, self-expression, and/or social interaction.
Motor Skills	The student demonstrates competency in motor skills and movement patterns needed to perform a variety of physical activities.
Learning Concepts	The student demonstrates understanding of movement concepts, principles, strategies, and tactics as they apply to the learning and performance of specific games.
Health Promotion and Preventative Care for Gamers	The student will comprehend concepts related to health promotion and preventative care in gamers (i.e., nutrition, injury prevention, personal health).
Access Health Information, Products, and Services	The student will demonstrate the ability to access valid health information and health-promoting products and services.
Self-Management	The student will demonstrate the ability to maintain health-enhancing behaviors and reduce health risks.

STANDARD	DESCRIPTION
Interpersonal Communication	The student will demonstrate the ability to use interpersonal communication skills that respects self and others in online gaming settings.
Influence of Culture, Media, and Technology	The student will analyze the reciprocal influence of eSports, culture, media, technology, and other factors.
Goal-Setting and Decision-Making Skills	The student will demonstrate the ability to use goal-setting and decision-making skills to enhance gaming success.
Active Participation	The student participates regularly in gaming activities.
Advocating for eSports	The student will demonstrate the ability to advocate for scholastic acceptance of e-sports.

Source: Varsity eSports Foundation and High School Esports League[17]

Extra-Curricular Programs

Available literature does not provide information regarding best practices for eSports programs as extra-curricular activities. Hanover, therefore, identified two school districts in Texas and California to analyze their eSports programming.

Grapevine Colleyville Independent School District (GCISD)

GCISD (TX) esports currently has over 160 athletes competing in league competitions. The program is part of the districts' Technology Services, overseen by the District's Chief Technology Officer, and has three campus coaches.[18] The following table summarizes the main characteristics of GCISD's eSports program.

GCISD eSports Characteristics

CATEGORY	DESCRIPTION
Teams	■ Two teams from GCISD high schools. ■ Open to any student in Grades 9-12 at Grapevine and Colleyville Heritage High School with plans to expand to other high schools.
Games	■ Rocket League, League of Legends, and Smash Brothers Ultimate. ■ "First Person Shooting" games or games associated with high levels of violence are not allowed.
League	PlayVS

Source: Grapevine Colleyville Independent School District[19]

Fresno Unified School District (FUSD)

FUSD (CA) created its own eSports league, the Fresno Unified eSports League (FUeL), to allow the district's high

school students to compete. The program includes 12 teams and focuses on two games: League of Legends and Rocket League. FUeL establishes specific eligibility criteria, rules for each league, and a code of conduct.[20] The following figure shows a sample of the FUeL program eligibility criteria.

Sample FUeL Eligibility Requirements

- Eligibility is determined each quarter and is made official by the Athletic Director only.
- Fall sports eligibility is based on 4th quarter grades from previous school year and 1st quarter of current school year.
- Student athletes must be enrolled in 5 classes and passing at least 4 classes each quarter.
- Minimum GPA is 2.0
- Eligibility takes effect 10 days after the end of the quarter. No exceptions.

Source: Fresno Unified School District[21]

FUSD also engages stakeholders in better understanding eSports dynamics by publishing recommendations for students, parents, and coaches. The table below provides links to these resources.

FUeL Resources for Stakeholders

RESOURCE	LINK
Tips for Becoming a Better Player	
Tips for Becoming a Better Coach	
Tips for Parents	

Program Implementation

Available literature suggests that including an eSports program in schools is a relatively straightforward process due to the high interest in video games among young students. The school should start by securing stakeholder buy-in, organizing the school approach, and establishing an eSports team, as described in the following figure.[22]

Steps to Implement an eSports Team in Schools

STEP	DESCRIPTION
Phase 1: Securing Stakeholder Buy-in	
Establish a shared definition	Establish a shared definition of eSports with stakeholders.
Address common concerns	Educate stakeholders on the value of eSports.
Phase 2: Organizing School Approach	

STEP	DESCRIPTION
Select an advisor	An eSports coach or advisor who is passionate and believes in the legitimacy of eSports.
Establish a space	eSports team players can meet online in their own homes at a coordinated time. Schools can also invest in creating a space where the team can meet (i.e., computer lab).
Phase 3: Establishing the Team	
Gather student interest	The coach or advisor should have an Interest Meeting to assess students' potential participation.
Join a league	Join a league for full-scale involvement in regional, national, and international competitions—for instance, NASEF, HSEL, and the Electronic Gaming Federation (EGF).
Maintain a team	Create and maintain a healthy culture that helps ensure their continued presence in their school.
Consider funding	The start-up costs of an esports team are low, and every purchase can be phased in as the team grows.

Source: Clarity Innovations[23]

CONSIDERATION	DESCRIPTION
Flexible spaces	Build a space that is flexible and can be used for other purposes when not being used by an esports team. This approach maximizes every dollar of investment.
Wired connections	Games do not require high amounts of bandwidth, but having wired connections is a must, as even a slight Wi-Fi lag is a competitive disadvantage.
Display monitors	Displays make a difference. Pros use monitors with a 144- or 240-hertz refresh rate, whereas most monitors in use today are 60- or 75-hertz.
Wired mice	eSports players prefer wired mice, not wireless, and want them to be highly customizable with extra buttons so they can map to specific in-game actions.
Ergonomics matter	Players sometimes practice for hours at a time, and a space designed to minimize fatigue is better for the students.

Source: Forbes[26]

Secondary literature also notes that starting eSports teams requires a relatively low investment.[24] Schools can leverage existing IT investments to support esports programs. Students can play on the computers available in the school through the existing internet access points. Districts may have to invest in game licenses, additional memory, and better video card purchases.[25] Forbes notes the considerations summarized in the table below for building esports infrastructure in schools.

Considerations for Building eSports Infrastructures

Endnotes

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[11] Shum, Lee, and Cheung, Op. cit., p. 62.

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[22] "Leagues of Learning. The Rising Tide of Esports in Education," Op. cit., p. 18.

[23] Table content adapted and quoted nearly verbatim from: Ibid., pp. 18–25.

[24] "How to Start a Big High School Esports Team." District Administration, December 6, 2019. https://districtadministration.com/how-to-make-start-a-high-school-esports-team/

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