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## Esports Games in Elementary School: A Systematic Literature Review

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**Abstract**— Several studies have explored esports games, and few have examined esports games in elementary schools with a systematic literature review. This research explores articles on the concept, features, training, implementation, and impact of esports games in elementary schools. The SLR and PRISMA methods were applied in this research with the stages of identification, screening, eligibility, and inclusion assisted by the *Publish or Perish 7*, *VOS viewer*, and *NVIVO 12 Plus* applications. There were 521 Scopus-indexed articles found. Furthermore, the articles were filtered according to the theme into 50 pieces. The findings of relevant topics are esports, esports games, the concept of esports games, elementary school, etc. The 50 articles were analyzed according to the specified topics through the *NVIVO 12 Plus* application, and the results were described. The findings of this study state that esports games are digital innovations in online video competitions, such as tournaments developing in education. The features of esports games in elementary school are manual sports integrated with digital augmentation, multiplayer and competitive, digitalization of physical sports, new digital-based features, and educational games, such as LoL (MOBA), Battle Royal, FIFA EA Sports, Mobile Legend, WISE game, and others. Training esports games through socialization, education, workshops, GDLC, curriculum development, and multimedia esports games. Implementation of esports games through competition, entertainment, game-based multimedia, SE, and TGFU, has positive and negative impacts. This research has limitations in that it only collects information from current literature, reviews esports at the elementary school level, and is not a field study. Future research needs to examine esports games according to the times in elementary school.

**Keywords**—Esports games; elementary school; a systematic literature review.

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### I. INTRODUCTION

There have been many studies on electronic games, electronic sports (esports) or e-sports games, and cybersports, but there are still few that systematically examine esports games in elementary schools in a systematic literature review [1]–[3] [4]. Over the past five years, research trends have focused on the impact of esports on psychological aspects, eye health hazards, mental health, stress, economics, finance, and gaming patterns in esports in general [5]–[7]. However, research exploring the concepts, features, training, implementation, and impact of esports in elementary schools is still minimal worldwide [8]–[12]. Research that explores

esports training is urgent. This is because there are still few articles that present results on video game usage training, ability to recognize features, how to apply, and how to overcome the impact of esports on students, such as health, impact on sleep quality, and other activities [13]–[16]. Training teachers to use, manage and develop esports in the classroom is key to understanding the concept and features of esports games, and implementing and reducing the adverse impact of esports in primary schools [17]–[20]. The use and popularity of esports continue to grow and are designed to meet the needs of elementary school students in this digital age [21], [22]. This shows that esports in elementary schools are already prevalent [23]. Therefore, teachers must be trained

to be innovative, creative, and adaptive to apply games based on websites, software, the internet, social media, and smartphones in learning [24]–[27]. Esports can cause many problems for teachers and students without teacher training, such as stress, confusion, and disruption of learning concentration in elementary schools [28]–[30]. In education, not all esports are popular and applied in learning. Esports apps popular globally are soccer, billiards, basketball, badminton, skateboarding, golf, and darts. The popularity of esports in the educational and social worlds is determined by the free access (open access) that makes it easy for users to download it on the App Store and Google Play Store [31]. In 2013, 17 million people were using and watching esports games [32]. In 2016, a Spanish study put the profits from esports at over 1.8 trillion euros [33] which is now growing in both users and profits

Including esports in education in elementary, middle, and high schools requires esports scholars, instructors, teachers, curricula, education, and training programs at the higher education level [34]. Sixty-two higher education institutions in Europe and North America provide esports education and training that has produced 80 esports master's degrees and diplomas. In addition to the esports academic curriculum, esports graduates are equipped with management techniques, research, and esports industry jobs [35]. This shows that esports and gaming are becoming a severe concern in education, so systemized, well-managed training is needed [36].

Elementary learning using digital tools encourages direct student engagement [37]. Using software and Information and communication technologies (ICT) is very effective in learning [38]. As a form of ICT application in elementary school learning, esports has unique characteristics to other games or sports because esports requires a competition that students as gamers must do [39], [40]. Studies in the USA say that in the last 30 years, schools have used ICT in learning, including esports. The application of esports in schools by forming teams trained to compete impacts growth fulfillment and competitive practice. It is applied to support English, Science, Technology, Engineering, and Mathematics (STEM) learning and career education. Studies in the USA say that in the last 30 years, schools have used ICT in learning, including esports. The application of esports in schools by forming teams trained to compete for impacts on growth fulfillment and competitive practice is applied to support English, Science, Technology, Engineering, and Mathematics (STEM) learning and career education [41].

Although it has both positive and negative impacts in schools [42], developing esports as educational games, educational games, educational applications and software, and educational robot cars have become a necessity and not a superstition [43]. In reality, esports gaming is growing in educational institutions and is being implemented to support learning [44], [45]. Studying esports in elementary schools is essential because the inclusion of esports in learning is a form of 21<sup>st</sup>-century educational innovation that requires readiness in the form of education and training. The use of esports is suitable to support students' talents and interests, and they develop basic skills in learning, working, and utilizing electrical technology that must be incorporated into the education curriculum [46]–[48]. Despite this urgency, there is

a lack of research on esports in primary schools that explores its concepts, features, training, implementation, and impact in detail.

Esports games are a form of digital innovation, a new genre, and an area of gaming culture worldwide. Nowadays, esports games are top-rated and very important in this millennial era that millions of people have played, including students in schools [49]–[51]. Esports games are competitive video games that integrate sports, recreation, technology, and digital media that attract academics to study in-depth [52], which is the lifestyle of today's youth [53]. In 2019–2020, recorded global revenue from esports gaming reached US\$1.1 billion, with viewership approaching 453.8 million [54].

The pace of esports development has been incredible. The times have impacted the application of esports in education. Hence the rise of education and training to educate teachers and students to implement esports in schools [55], [56]. Esports in education curriculum and STEM learning and entrepreneurship are also developed in shout casting, websites, and student career preparation [57]. Esports in the USA and several countries are included in the curriculum of English Language Arts (ELA), social-emotional learning (SEL), career technical education (CTE), and systematic training of prospective gamers are carried out [58], and providing insight to students that esports is part of the sports implemented in schools [59]. The implementation of esports in schools is done by incorporating it into the co-curricular program. Students use it to practice sports, compete in their homes, rooms, apartments, and classrooms, and use headsets to avoid disturbing those around them [60].

Several countries have incorporated esports into education and training, such as Germany [6], Elementary schools in Japan [61], schools in Taiwan [62], schools in Brazil [63], education in the USA [55], schools in Bulgaria [64], the countries of Spain and Norway have adopted gaming and esports in the curriculum [65]. This is done because it responds to the changing times, the ease of playing games, the benefits, and the educational value of games [66]. Esports impact students' cognition and collaborative skills [67]. The growing popularity of esports has not received a severe response from academics, and the benefits and positive value of esports have also not been taken seriously. This research suggests that esports has 5Cs of educational value; fostering attitudes of communication skills, cooperativeness, self-confidence, critical thinking, and an attitude of continuous improvement in a three-domain model (cognitive, affective, psychomotor) [68].

From the studies above, esports games are digital sports games that are becoming a new form of innovation, genre, and area in gaming culture. Esports are competitive video games that integrate sports, recreation, technology, and digital media and are now being implemented in schools for learning. While many studies have focused on the negative impacts of esports, many studies focus on the positive effects, such as the improvement of the 5Cs in the application of esports in schools. Based on the background and literature review above, this study aims to explore the description of articles related to esports games in elementary school using the Systematic Literature Review method. The results of this study are expected to produce a report on the concept of esports in elementary school. The researcher asked two

questions: i) what are the pictures and images of esports games in elementary school in the most mentioned articles? ii) how are the training, implementation, and impact of esports games in elementary school?

## II. MATERIALS AND METHOD

### A. Research Design

The research design that uses the Systematic Literature Review (SLR) method here is generally to systematically review current articles on esports games in elementary school [69]–[71]. The research began with identifying articles relevant to esports in elementary school on the Scopus database. SLR in this article refers to the Preferred Reporting Items for Systematic Reviews and Meta-Analysis (PRISMA) technique. PRISMA, in this research, is a reference for identifying, filtering, and testing eligibility, including data, to be analyzed and presented [72]–[76]. This study identified esports in elementary schools in recent articles in the Scopus databases. The four stages conducted by the researcher were identification, screening, eligibility, and inclusion objectively according to the data findings in the current literature reviewed [77]–[80].

### B. Inclusion and exclusion criteria for selection of publications

In this inclusion and exclusion stage, the researchers determined the number of criteria. First, the literature is only scientific articles, not conference proceedings, book chapters, dissertations, theses, etc. Second, the papers were published in Scopus-indexed journals. Third, the search for articles in the Scopus database is assisted by the Publish or Perish 7 application by entering the API Key. Fourth, the articles searched were tailored to the place and topic of esports in elementary schools. Fifth, articles searched are only in English and other languages published in Scopus indexed journals. Sixth, reports are limited to publication in periodicals in 2018-2022.

### C. Screening and eligibility assessment for data analysis

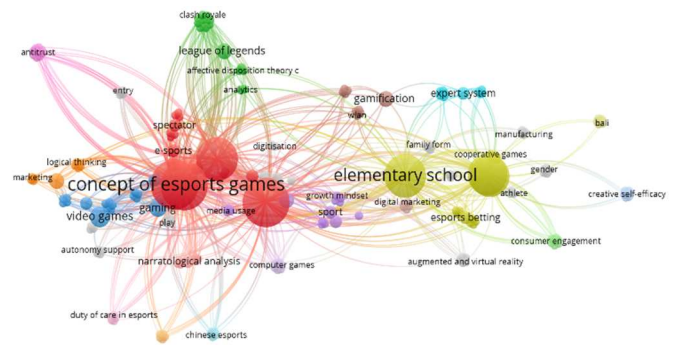
At this stage, researchers screened articles found from the Scopus database as needed on June 17, 2022. Article screening is adjusted to the title, abstract, and keywords. From the article findings on the Scopus database, there are 521 articles according to keywords which can be seen in Table 1 below.

TABLE I  
FINDINGS OF ARTICLES ACCORDING TO KEYWORDS

No	Keyword	Paper Quantity
1	Esports Games	200
2	Electronic games	86
3	Electronic games in elementary school	27
4	Electronic Sport	200
5	Electronic Sport in Elementary School	8
Total		521

By the 521 articles found, the same articles were not used, then 50 papers were selected and entered into *Mendeley* and saved in RIS format. Furthermore, the RIS file was entered into the *VOS viewer* application to map the initial network of theme relevance. The step of entering into *VOS viewer* starts

with (1) creating a map based on bibliographic data; (2) reading data from a reference manager file, (3) selecting a file from the folder, and (4) choosing the type of analysis and counting method type of analysis: co-occurrence, unit of analysis: keywords, dan counting method: complete counting, (5) verify selected keyword, and (6) finish. The preliminary analysis of thematic associations results in Fig. 1 shows that esports games in elementary school have very complex association patterns, as shown in Fig. 2 below.



VOSviewer

Fig. 1 Initial network visualization in *VOS viewer* application.

The distribution of articles based on keywords is presented in Fig. 2.

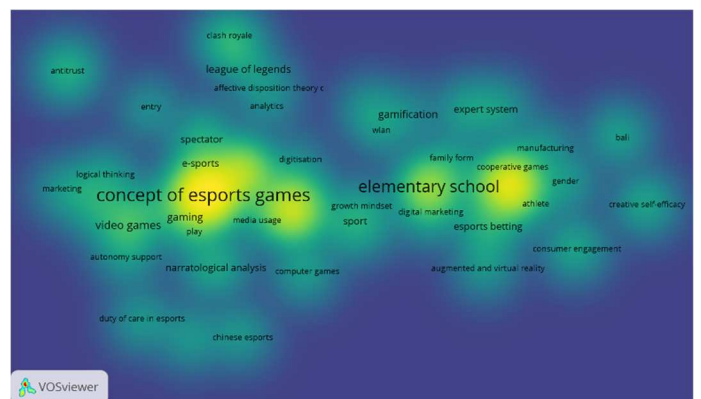


Fig. 2 Visualize article distribution based on keywords in the *VOSviewer* application.

Figure 1 and Figure 2 show that discussions and studies related to esports games in elementary school are very close to several other study themes such as *esports*, *esports games*, *the concept of esports games*, and *elementary school*. However, the aspects of esports, video games, and gaming are distantly related to the theme of the study of esports games in elementary schools, such as themes of *sport*, *esports betting*, *video games*, *digitization*, *autonomy support*, *the duty of care in esports*, *Chinese esports*, *critical thinking*, *gambling*, *gamification*, *athlete*, *computer games*, *league of legend*, *competitive video games*, *physical education*, etc.

### D. PRISMA Flow Diagram

The search process with the PRISMA flowchart can be seen in Fig. 3 below.

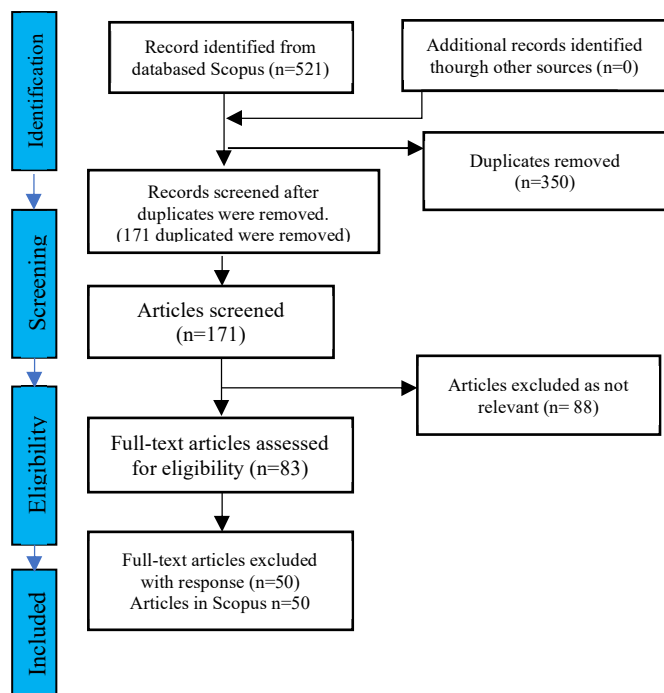


Fig. 3 PRISMA Flow Diagram for Systematic Review [81] [82]

In Fig. 3 above, the paper findings in the Scopus database totaled 521. Then checked the same based on keywords and only 171 papers. The similarity of articles is not based on databases because this study only uses the Scopus database, so the similarity is seen from the keywords used. The total number of similar papers was 350. Of the 171 papers, 88 irrelevant pieces were discarded. Then 83 full-text articles were selected again. Finally, 50 papers were chosen according to the research question regarding title, abstract, keywords, and the paper's substance. From the screening and eligibility stage, selected papers were found, then read from the title, abstract, and keywords to the conclusion. The next stage is to enter the RIS file from Mendeley into the *NVIVO 12 Plus* application to be analyzed, and reviewed, and the results presented according to the two research questions.

### III. RESULT AND DISCUSSION

Before presenting the results and discussion qualitatively according to the research questions from the analysis through the *NVIVO 12 Plus* application, it is necessary first to explain the article findings based on journals (journal name, volume, edition, year), author, country, methodology, and relevance to the research question (RQ) which can be seen in Table 2 below.

TABLE II  
FINDINGS OF SCOPUS INDEXED ARTICLES FROM 2018-2022.

No	Journals	Country	Method	RQ
1	British Journal of Educational Technology 2018	Athens	Research & Development [83]	2
2	International Journal of Electrical and Computer Engineering Vol. 8 No. 5 2018	Indonesia	Game Development Life Cycle (GDLC) [84]	2
3	International Journal of Environmental Research and Public Health Vol. 15 No. 2850 2018	Asian	Quantitative Method [85]	2
4	Sport Marketing Quarterly 27 (2) 2018	South Korea	Quantitative Method [86]	1
5	Columbia Journal of Law & Social Problems 52 (2), 2018	South Korea	Content analysis [87]	1
6	Acta Tropica 199 (2019)	Indonesia	Quantitative Method [88]	2
7	International Journal of Electrical and Computer Engineering Vol 9 No. 6 2019	India	Quantitative and qualitative [89]	2
8	Thinking Skills and Creativity 33 (2019)	United States	Qualitative [90]	1
9	Journal of Sports Economics 2019	USA	User experience (UX) research [91]	1
10	Physical Culture and Sport Studies and Research 83 2019	Poland	Quantitative [92]	1
11	Journal of Robotics and Mechatronics Vol.31 No.3, 2019	Tokyo	Qualitative [93]	2
12	Frontiers in Psychology Vol 10 No. 156 2019	Australia	Research and development [94]	1
13	Leisure Studies Vol. 38 No. 6 2019	Florida	A Narratological Study and Analysis [95]	1
14	Journal of Gambling Studies Vol.35 No. 2 2019	Hungary	A Systematic Literature Review [96]	1
15	International Journal of Cognitive Research in Science, Engineering and Education Vol. 7 No. 2 2019	Russian Federation	Methods of mathematical and statistical analysis [97]	2
16	BMJ Open Sport & Exercise Medicine Vol. 5 No. 1 2019	USA and Canada	Quantitative and qualitative [98]	1
17	European Physical Education Review Vol. 27 No. 2 2020	Spain	Quasi-experimental research[99]	2
18	PLoS ONE 15 (6) 2020	Brazil	Natural experimental study [100]	2
19	International Journal of Communication Vol. 14 No. 1 2020	USA	Experimental Research [101]	2
20	PLoS ONE Vol. 15 No.12 2020	Germany	Quasi-experimental study [102]	2
21	Educational Technology Research and Development Vol. 68 No.6 2020	Taiwan	Quantitative Method [103]	2
22	Eastern-European Journal of Enterprise Technologies Vol.6 No. 1 2020	Indonesia	Literature and field studies [104]	1
23	Frontiers in Psychology Vol. 11 May 2020	United States	Quantitative [105]	1
24	Public Health Reports Vol. 135 (3) 2020	Thailand	Qualitative [106]	1
25	International Review of Sport and Exercise Psychology Vol. 13 (3) 2020	Several Country	a systematic review [107]	1
26	Games and Culture Vol 15 (1) 2020	English	Comparative Analysis [108]	1
27	Journal of Product & Brand Management Vol. 30 (8) 2020	Pakistan	Quantitative [109]	2
28	Sport, Ethics and Philosophy Vol. 16 (1) 2020	Denmark	Qualitative and quantitative [110]	1

29	PLoS ONE Vol. 15 (8) 2020	Germany	Content Analysis [17]	2
30	Journal of Cultural Economy Vol. 14 (3) 2020	China	Multiple methods [111]	1
31	New Media & Society Vol. 23 (6) 2021	Germany	Involvement model [112]	1
32	Journal of Behavioral Addictions Vol. 10 (3) 2021	Canada	Quantitative [113]	2
33	Quest Vol. 73 (1) 2021	Northern Ireland	Qualitative and quantitative [114]	1
34	Retos Vol. 41 2021	Finlandia	Qualitative [115]	2
35	Journal of Physical Education and Sport Vol. 21 (6) 2021	Several Country	Bibliometric research analyzed [116]	2
36	Computers in Human Behavior Vol. 117 April 2021	Several Country	Qualitative methodology [117]	1
37	Sustainability Vol. 13 No. 18 2021	Several Country	A Bibliometric and Visualized Analysis [118]	2
38	Journal of Gambling Studies Vol. 37 No. 4 2021	Poland	Quantitative [119]	2
39	J. Quant. Anal. Sports Vol. 17 (1) 2021	USA	Data extraction-collection & general analytics [120]	2
40	Nutrients Vol. 13 No. 8 2021	Several Country	A Scoping Review [121]	2
41	Indonesian Journal of Electrical Engineering and Computer Science Vol. 23 No. 3 2021	Philippines	Evaluation Research [122]	1
42	Media, Culture & Society Vol. 43 No. 8 2021	US and Europe	Mixed methods [123]	2
43	Technology, Knowledge and Learning Vol. 27 No. 1 2021	Turkey	Qualitative approach [124]	2
44	Front. Psychol Vol 12 2022	Australia	Quantitative [125]	2
45	Communication & Sports Vol. 10 No. 2 2022	North American	Narrative and Narratological Methods [126]	2
46	Journal of Retailing and Consumer Services Vol. 65 2022	Several Country	A Cross-sectional survey research [127]	2
47	Journal of Business Strategy Vol. 43 No. 2 2022	USA	Qualitative [128]	2
48	International Journal of Sports Science & Coaching Vol. 17 No. 1 2022	California	Review article [129]	2
49	European Sport Management Quarterly 2022	18 countries	Exploratory studies [130]	2
50	Frontiers in Sports and Active Living Vol. 4 February 2022	Germany	Quantitative [131]	2

#### A. Concept and Features of Esports Games in Elementary School

Esports are video game competitions that are systemized online, can be a tournament system, and rival traditional sports. Esports games are proliferating, are very popular [107], and most are professionally institutionalized [108]. Esports platforms range from personal computers to game consoles, and genres include sports-themed games, such as FIFA Online 3, and real-time strategy (RTS) games, such as StarCraft II. In South Korea, esports is professionally developed through industry, marketed, developed, and complement traditional sports [86]. Esports gaming is the current entertainment industry StarCraft, League of Legends, Overwatch, etc. Esports content consists of audiovisual footage of competitive play, interspersed with player footage and pre-and post-game interviews, and is now being developed in education as multimedia and e-learning [87].

Studies in the USA say the concept of game development in education originated from technology integration, and education originated from the theory of situated learning in the form of situated mobile games. The situated mobile game feature is applied to exercise creativity and challenge-solving skills. When playing the game, students are instructed to record solutions to challenges through videos, audio, photos, and visual images. After that, they are invited to evaluate through multimedia posters [90]. Historically, esports emerged from the development of video games around 1970 as coin-operated machines in arcades where only one player competed against a pre-set algorithm. Esports is a game that refers to a professional-level competitive game that develops from traditional sports with digital for competition, recreation, and education with little physical activity [91].

Esports is an electronic sport in the form of competition between players (gamers) through video games. Professional and amateur gamers conduct the competition in esports in video games. Besides being used in education, the development of esports has led to the professionalization of virtual sports competitions between players, such as FIFA football games [92]. Esports is electronic gaming that involves individual players or teams competing over video games through human-computer interaction. As of 2019, there were 100 million esports players worldwide [94], attractively designed, systemized, and organized [105], that played competitively, spectacularly, and commercially [95].

Esports is a sport facilitated by electronic systems. In esports games, players and teams interact and perform activities through human and computer interfaces. Esports has many features and designs, the most common of which are similar to regular sports, with referees, players, spectators, leagues, agents, sponsors, tournaments, and a culture of professional and amateur play [106]. In several countries in the West, Asia, and especially in South Korea, many eSport features such as Massively Multiplayer Online Role-Playing Games (MMORPG), First Person Shooter (FPS) games, Real-Time Strategy (RTS) games, Multiplayer Online Battle Arena (MOBA) are developed [96], Counter-Strike: Global Offensive (CS: GO), StarCraft 2 (SC2), Clash Royale (CR), and online battle arenas (MOBA) such as Defense of the Ancients 2 (DOTA2), League of Legends (LoL), etc [110].

Researchers debate the features of esports. In one study, 4 parts of esports were mentioned. First, esports incorporate existing sports, player rules, and settings through digital augmentation (digitally enhanced sports). Second, esports is a traditional (diverse player) gaming experience (competitive multiplayer computer games). Third, esports represent current physical sports (digitization of marks). Fourth, new-style

esports integrates new technologies such as virtual and augmented reality (immersive reality sports) [117].

Esports features are diverse; most are played for competition, structured, and have rules like manual sports such as tournaments, leagues, and ladders. While different kinds of esports, such as Multiplayer Online Arena Battle, for example, LOL, Battle Royal like Fortnite, a strategy like StarCraft, First-Person-Shooter like Call of Duty, sports like FIFA EA Sports, etc. [98]. One of the developments in esports is 3D, starting from the game's design, manufacturing, and finalization. This 3D game feature uses addictive manufacturing technology, virtual 3D, multi-color, attractively designed, lightweight, strong, and suitable for early childhood and elementary school practiced through matching, puzzle, and pasting games on the object chosen by the teacher [104].

In the Chinese study, esports concepts and features were determined by capitalism and platform governance, such as the example of the Tencent platform, which synergized with the government to develop a dedicated platform through commercialization and professionalization [111]. The features of esports vary according to their utilization. Esports are generally used for regular gaming, sports, and gambling. However, esports platforms and components suitable for education are those for sports and educational games [112]. The features of good esports games refer to four aspects. First is the quality of competition, which is based on the perceived quality of the esports game. Second is the quality of interaction between spectators. Third, the physical environment is based on the production and distribution of esports games. Fourth is the quality of execution, which refers to the organizer's peripheral services and management system [114].

Elementary school children use LoL esports (MOBA gendered game). It has several features like esports in general. However, three features that are different from Mobile Legend are the Last Hit feature (gold reward for killing creeps), Ward (to see the position of enemy players), and Permanent Buff (steps to increase the hero's movement speed, attack, and defense hero) [120]. A study in the Philippines calls wireless, interactive, educational (WISE) games suitable for elementary school students. The WISE game feature is used by students through wirelessly connected smartphones using scripting languages such as JavaScript and PHP [122].

### *B. Training, Implementation, and Impact of Esports Games in Elementary School*

The study in Athens calls for the training of electronic games through socialization, education, and guided workshops as entertainment through e-learning for inclusive primary school students who are predominantly visually impaired. This electronic game's development impacts the development of educational games in primary schools and assists in learning [83]. For teachers to maximize the implementation of electronic games in primary school learning in Indonesia, they are trained with the Game Development Life Cycle (GDLC) approach to make it easier for students to learn math. This game is a multimedia innovation combining animation, text, sound, animation, hyperlinks, etc., requiring teacher skills [84].

Esports training through competitive video games makes it easy for users (teachers and students) to apply it in the classroom, at home, and play anywhere. The application of esports invites students as gamers to compete and practice movement skills for entertainment [128]. Training teachers, instructors, or students in esports has been widely conducted to improve movement and motor skills, regulate psychology, engage students in virtual sports, and be competitive [129]. Few teachers can guarantee students' welfare, physical and mental health, and career quality in playing esports. Esports training teachers to students to exercise digitally must be done consistently [130].

Esports training and computer-based and mobile games have become necessary in elementary schools, and its implementation requires excellent and systematic planning and training, control, and an elementary curriculum that explicitly regulates the implementation of esports in elementary school learning [93]. In the Russian Federation study, it was mentioned that in addition to the performance of esports games, teachers should be trained to study the cognitive psychology of students in schools. Through esports, children have detected their playing patterns, activities, and professional level or amateur level how to play. Students who play esports for more than four hours have a relatively low level of critical and logical thinking compared to students who do not play esports games [97].

Research in Germany suggests that sports training and cooperative learning are highly effective through games in sports because they increase learning enjoyment for students in physical education subjects. Children's physical, social and cognitive development is primarily determined by activities through rounds in school learning [102]. Elementary school teachers should be trained to develop virtual game-based multimedia using augmented and virtual reality to impact learning positively. Teachers are trained to innovate, develop, operate, and apply virtual games. It affects student motivation and learning achievement [103]. In education, esports training is used in classes and outside lessons through video game competitions between individuals and teams. According to the analysis of sports spectacle disposition theory, esports players and spectators in front of the computer have the same expression as watching traditional sports outside the sports field [101].

The development of digital learning models and media must be matched by teacher training. This can be done through various forms of training and development, such as sports education (SE) and teaching games for understanding (TGfU). The SE and TGfU hybrid model facilitate manual and digital-based learning that supports equitable, autonomous, and inclusive learning environments regardless of gender. The research cited this model as impacting students' social interaction, enjoyment, and opportunities to interact in education [99]. Training elementary school teachers in esports are done by building new forms of work, and processes, changing existing game patterns, generating new options, and organizing benefits for players. In the context of students, of course, they must be directed to keep learning even at the elementary school level, especially for the underprivileged (children of laborers/factory workers) must be required to stay in school even in conditions of deprivation rather than just seeking profits from esports [123].

Teachers must be trained to use Counterstrike, Rocket League, League of Legends, StarCraft II, and FIFA esports to reduce negative impacts. This is urgent because it impacts students' competence, performance, and competitive spirit. But achieving this requires guided, specific, and focused training in each esports game [17]. Research in Canada says esports negatively impact elementary and junior high school children because it is used for organized gambling and impacts mental health [113]. Esports in the Asian study resulted in addiction syndrome, participation motivation, and delinquency. The solution to overcome esports addiction is to modify the mood and involve the family in accompanying the child during esports play [85]. A study of 78 elementary school students in Bali, Indonesia, applied a snakes and ladders game to a natural science lesson on the transmission and types of human *Taenia saginata* worm infections [88]. Esports Tic-Tac-Toe Game Playing Career Guidance System (TTTGP-CGS) assesses perseverance, patience, and intelligence to strengthen student career guidance [89].

The presence of esports has mixed impacts. Students engaging in physical exercise without pause can harm their mental health. At the same time, the virtual use of esports shapes the improvement of students' psychological health. However, esports use requires age-relevant methods, resources, management, and content [100]. The intensity of students playing esports games impacts purchase intent, play engagement, production, new player recruitment, and esports campaigns [109]. Esports have had an impact on increasing competition in sports. Studies on QLASH esports say that to become an esports athlete; students must practice diligently, consult with coaches, and follow game guidelines [115].

The implementation of esports in education has various impacts, such as the availability of entertainment during leisure time, increasing children's interest in competing for championships, and the developing physical and mental skills [116]. For elementary school children, too much esports play, according to most psychologists and several studies, has been linked to addiction syndrome and unstable mental health [118], gambling, cheating, and fighting among esports players [119]. In the context of children, a study says online games like esports impact physical activity, ecology, and dietary behavior, which most people rarely examine [121].

Esports gaming or gamification in general in education impacts social effects, the interaction between users, motivation, rewards, and material benefits, and supports online education because games are used as a learning medium [124]. During the COVID-19 pandemic, many students and youth play esports games due to lockdowns. However, this research mentions that esports for elementary and junior high school students hurt students' psychological and health factors. So the solution to the impact of esports is for students to improve their self-regulation, growth mindset, and general health perception through positive youth development programs [125].

Until 2019, there were 2.6 billion esports users worldwide, including 30 percent of elementary to high school students. The widespread use of esports among elementary school students impacts the profits of global industry players, and they earn billions of dollars. Until 2018, the total economic value of the esports industry was \$138 billion [126]. A study of 294 gamers comprising students, youth, and adults in a

hedonism study with economic theory and planned behavior cited the impact of esports as producing enjoyment, arousal, emotional satisfaction, pleasure, sensory experiences, escapism, fantasy, and role projection, particularly in video game-type esports [127]. The popularity of esports in Germany is rapidly increasing within education and beyond. However, over-implementation of esports impacts students' psychology, physical health, sleep activity, stress, fatigue, and well-being [131].

#### IV. CONCLUSION

The concept of esports games in elementary school originated from digital innovations, online video competitions with tournament systems, and the gaming industry that developed and applied in elementary education. Esports has various features, namely the development of manual sports with digital rules and augmentation, competitive computer and multiplayer game experiences, digitized representations of physical sports, and new features based on technology, virtual, augmented reality, and educational games. Elementary school children use various esports games, including LoL (MOBA), Battle Royal, FIFA EA Sports, Mobile Legend, WISE game, etc.

Training for teachers before using esports games in primary education is conducted through socialization, education, guided workshops, Game Development Life Cycle (GDLC)-based training, training in developing esports games curriculum and multimedia in education, etc. The implementation of esports games in elementary schools is done through competitions, the application of motion and entertainment, the application of game-based multimedia inside and outside the classroom, the application of sports education (SE), and teaching games for understanding (TGfU). Esports games in elementary schools have positive and negative impacts. The positive effects of esports games in elementary schools are increased sports competence, performance, competitive spirit in students, increased critical, logical thinking skills, learning enjoyment, entertainment, enjoyment, passion, emotional satisfaction, pleasure, sensory experience, and fantasy. The negative impacts are addiction syndrome, influence on physical activity, ecology, mental health instability, gambling, quarrels between gamers, etc.

This study has limitations in that it only collected information from current literature, reviewed esports at the elementary school level, and not from field studies. Future research needs to explore esports gaming in elementary schools from other perspectives, such as the development of esports in various cross-curricular subjects and its use as digital multimedia.

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