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THE NEW FORM OF SPORT: DEVELOPING A CURRICULUM FOR UNIVERSITY STUDENTS IN E-SPORTS*

Yunus Emre KARAKAYA
Prof. Dr., Fırat University, Elazığ, Türkiye, emrekarakaya@firat.edu.tr
ORCID:0000-0002-9858-2103

Melih DİKMEN
Assoc. Prof. Dr., Fırat University, Elazığ, Türkiye, mdikmen@firat.edu.tr
ORCID ID: 0000-0001-7015-6236

Emin Tamer YENEN
Assoc. Prof. Dr., Nevşehir Hacı Bektaş Veli University, Nevşehir, Türkiye, emintameryenen@nevsehir.edu.tr
ORCID:0000-0003-2359-3518

Fazilet Özge MAVİŞ SEVİM
Assoc. Prof. Dr., Tokat Gaziosmanpaşa University, Tokat, Türkiye, ozge.mavis@gop.edu.tr
ORCID:0000-0002-4120-5374

Seda Demir AYÇİÇEK
Assoc. Prof. Dr., Tokat Gaziosmanpaşa University, Tokat, Türkiye, seda.demir22@gop.edu.tr
ORCID:0000-0003-4230-5593

Sebahattin DEVECİOĞLU
Prof. Dr., Fırat University, Elazığ, Türkiye, sdevecioglu@firat.edu.tr
ORCID:0000-0002-8205-295X

Selahattin GELBAL
Prof. Dr., Hacettepe University, Ankara, Türkiye, gelbal@hacettepe.edu.tr
ORCID:0000-0001-5181-7262

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ABSTRACT

E-sports is rapidly gaining popularity among young people and attracting significant interest from universities. However, there is still no consensus on what e-sports curricula should include, and a comprehensive framework for e-sports education has yet to be fully established. In this regard, the present study aimed to develop, implement, and evaluate an undergraduate-level e-sports curriculum in Turkey, designed to be adaptable within an international framework. The research was conducted using a mixed-methods design. The curriculum development process was structured in four main stages: Needs Analysis, Program Design, Program Implementation, and Program Evaluation and Revision. During the needs analysis phase, two distinct participant groups were consulted. A total of 100 stakeholders participated in a needs analysis workshop, and based on the data obtained, surveys were administered to 386 stakeholders across Turkey. For implementation, pilot testing involved 32 undergraduate students (7 weeks, 4 hours per week), while the main implementation

was carried out with another group of 32 undergraduate students (14 weeks, 2 hours per week). Data collection tools included interviews, surveys, observation forms, and performance tests. Descriptive statistics and qualitative content analysis were used to analyze the data. The results of the pilot and main implementations demonstrated that the program enhanced students' awareness, knowledge, and skills in areas such as e-sports ecosystems, ethics, health and ergonomics, communication, and career planning. The study contributes to the establishment of educational standards for e-sports in Turkey. Given the international nature of e-sports, the curriculum developed in this study may also serve as a model for adoption in other countries. By maximizing the educational potential of e-sports, it offers significant contributions to the enhancement of educational quality both nationally and internationally.

Keywords: Curriculum, curriculum development, e-sports, higher education, sports sciences.

Corresponded Author: Assoc. Prof. Dr. Melih Dikmen Fırat University, Elazığ, Türkiye, mdikmen@firat.edu.tr

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INTRODUCTION

The origins of e-sports can be traced back to the 1980s with the increasing popularity of computer games. Since the 1990s, with technological advancements and the rise of online multiplayer games, e-sports has evolved into its current form. E-sports holds tremendous potential to inspire students in acquiring 21st-century skills and to include many students who are marginalized in traditional competitive activities. In many ways, it resembles conventional sports in its ability to foster competition (Falkenthal & Byrne, 2020; Montesano, 2019; Campbell et al., 2018).

The rapid advancement of technology and developments in information and communication technologies have reshaped individuals' quests for entertainment and competition. The swift rise of e-sports has not only gained popularity among younger generations but has also transformed into a major industry (Hilvoorde & Pot, 2016). As an industry driven by digital technology, the continuous expansion of e-sports (Harris et al., 2022; Scholz, 2019; Seo, 2013) has made it a unique and novel commercial phenomenon (Wong & Meng-Lewis, 2022). The global e-sports ecosystem demonstrates collaboration among all stakeholders, including research and practice centers at universities. Particularly in Northern European countries, the United States, Korea, and China, most gaming companies operate in cooperation with universities (Rothwell & Shaffer, 2019). Universities have supported the growth of this field by establishing new associate, undergraduate, and graduate programs to meet the demands of e-sports' tremendous growth and innovative practices (e.g., University of California Irvine, Ohio State University, and the University of Texas) (Monash University, 2019; Burton, 2019). For example, many schools and colleges in Indonesia have developed e-sports curricula and have pioneered e-sports education since the 2016–2017 academic year. Similarly, in the Philippines, the first e-sports college began operations in 2021 (Marta et al., 2021). In several other countries (e.g., the United States, the United Kingdom, Canada, and Spain), e-sports education continues to develop actively (Burton, 2019; St. Andrews University, 2020; University of New Haven, 2024; Middle School Esports League, 2022; Hennick, 2019; NCSA Varsity Esports, 2024).

As e-sports becomes more recognized worldwide, colleges and universities have also begun to identify previously untapped groups of students who excel in teamwork, critical thinking, and technical skills (Sng, 2021). In this context, more than 350 colleges and universities have moved toward offering e-sports scholarships (Kauweloa & Winter, 2019; NCSA Varsity Esports, 2024; Frank, 2017; Harris et al., 2022; Marta et al., 2021; Monash University, 2019; Heilweil, 2019; Sng, 2021; Szoldra, 2016; Lee et al., 2020; Amazan-Hall et al., 2018). Rothwell and Shaffer (2019) emphasize the future of e-sports in higher education with the following statement: "As universities or other post-secondary institutions begin their strategic planning, they should consider establishing e-sports teams and facilities. Given the achievements in K–12 environments, universities must pay attention to and invest in e-sports athletes to attract students with desired skills. The educational, career, and economic opportunities associated with e-sports far outweigh any objections to their inclusion in educational programs. Whether through the creation of a team, the funding of a scholarship, or the construction of a facility, e-sports represent a solid investment for any post-secondary institution."

Purpose and Significance of the Study

Globally, there is not yet a standardized approach to integrating esports into curricula, and it can be argued that existing programs tend to focus solely on the technical aspects. For example, universities in countries like the

United States, Canada, the United Kingdom, and the Philippines offer undergraduate and graduate programs in areas such as esports management and entrepreneurship. However, a comprehensive teaching framework in this field has not yet been fully established (Kauweloa & Winter, 2019; Marta et al., 2021; Scott et al., 2021; Rothwell & Shaffer, 2019). An interdisciplinary academic and applied esports program developed by a small liberal arts college aims to foster community building and an entrepreneurial mindset. This curriculum combines theoretical knowledge with practical experience to help students develop both social connections and innovative thinking skills (King et al., 2021). Accordingly, the aim of this study is to develop, implement, and evaluate an undergraduate e-sports curriculum in Turkey that can also serve as a model internationally.

The global growth of e-sports, the search by universities for potential student groups, the increasing availability of scholarships, and the rising inclination of university students toward e-sports, combined with the lack of advanced undergraduate-level e-sports courses (Marta et al., 2021; Monash University, 2019; Burton, 2019; University of New Haven, 2024; Middle School Esports League, 2022; NCSA Varsity Esports, 2024; St. Andrews University, 2020), have created a scientific need to develop, implement, and evaluate an e-sports curriculum. In Turkey, while some initial steps have been taken in e-sports (Bahçeşehir University, 2022; Hürriyet Newspaper, 2019), these efforts remain at a non-scientific level. Therefore, this study aimed to develop, implement, and evaluate an undergraduate e-sports curriculum in Turkey that can also be adapted internationally.

The significance of offering an e-sports curriculum at Turkish universities lies in raising students' awareness of e-sports, promoting their role as positive role models, increasing the number of informed e-sports players, and enhancing societal awareness of e-sports through university students. The development of such a curriculum is expected to generate broad societal impacts by fostering conscious awareness among university youth and addressing a social need. Ultimately, this research contributes to defining educational standards for e-sports in Turkey. Given the inherently international nature of e-sports, the program developed in this study has the potential to serve as a model for other countries. Moreover, by maximizing the educational potential of e-sports, it offers important contributions to the improvement of educational quality at both national and international levels.

METHOD

Research Model

This study was conducted using a mixed-methods approach (Creswell, 2013; Johnson et al., 2007), specifically employing a multistage design (Creswell, 2013; Pardede, 2019). Within this framework, the development of the e-sports course curriculum was structured into four main phases, based on the "Curriculum Development and Evaluation Model" developed by Maviş-Sevim and Emmioğlu-Sarıkaya (2019). These phases were: Needs Analysis, Curriculum Design, Program Implementation, and Program Evaluation and Revision.

The process was carried out as follows:

Needs Analysis: Conducted according to a phenomenological design, with licensed e-sports athletes, faculty members who had conducted research on e-sports, federation administrators or provincial representatives, and university students interested in e-sports. Needs were identified using a semi-structured interview form. The findings from these interviews were then transformed into a survey through a survey design, which was distributed

to e-sports stakeholders across Turkey. As a result, the most urgent needs were identified, and the primary content areas of the curriculum were established.

Curriculum Design: Conducted with a phenomenological design, in which the views of the study and advisory groups were gathered through semi-structured interviews regarding learning outcomes, content, instructional experiences, and assessment components.

Program Implementation: Conducted through a one-group pretest–posttest design. An "E-sports Achievement Test" was administered prior to the program to assess participants' initial knowledge and skills, and re-administered as a posttest after program implementation. In addition, observation and interview techniques were employed.

Program Evaluation and Revision: Conducted through the use of observation techniques to assess the effectiveness of the curriculum.

Study Group

Participants in the needs analysis were drawn from two separate groups. The first group consisted of individuals who attended the needs analysis workshop, which was carried out both online and face-to-face. This stage of the project was conducted using the criterion sampling method. To ensure representation of different stakeholders, a total of 100 participants were included in the online focus group discussions: 30 licensed athletes registered under the Turkish E-sports Federation, 20 faculty members who had conducted research on e-sports, 20 federation administrators or provincial representatives, and 30 university students interested in e-sports.

The demographic characteristics of this group were as follows: 24 participants were female (24.0%) and 86 were male (86.0%). The largest age group was 19–29 years (64 participants, 64.0%), followed by the 30–39 years group (18.0%) and the 40+ years group (18.0%).

In the second stage of the needs analysis, based on the findings of the workshop, a survey form was created to rank identified needs. To reach a larger group of stakeholders, the survey was distributed online to 400 individuals who had not attended the workshop. Responses from 386 participants were evaluated. Their demographics were as follows: 126 female participants (32.64%) and 260 male participants (67.36%). The majority were 19–29 years old (288 participants, 74.61%), followed by 30–39 years (56 participants, 14.50%) and 40+ years (42 participants, 10.88%).

Participants in the implementation phase were selected from students enrolled at Fırat University, with two students chosen from each of the 16 faculties. Thus, 32 students were included in the pilot implementation and another 32 students in the main implementation. Criterion sampling was used to ensure that students had an interest in e-sports, while maximum variation sampling was applied to ensure representation from different faculties.

The demographic characteristics of the pilot implementation group were as follows: 11 females (34.4%) and 21 males (65.6%). The largest age group was 20–21 years (11 participants, 34.4%), followed by 18–19 years (31.3%),

22–23 years (25.0%), and 24+ years (9.4%). The majority were sophomore students (10 participants, 31.3%), followed by freshmen (28.1%), seniors (21.9%), and juniors (18.8%).

For the main implementation group, the demographics were: 12 females (37.5%) and 20 males (62.5%). The largest age group was 20–21 years (17 participants, 53.1%), followed by 22–23 years (34.4%), 18–19 years (6.3%), and 26+ years (6.3%). The vast majority were sophomore students (31 participants, 96.9%), with only one freshman (3.1%).

Data Collection Tools

During the stages of needs analysis, curriculum design, program implementation, and program evaluation, the following data collection tools were utilized. These tools are summarized in Table 1.

Table 1. Data Collection Tools Used in the Research.

Data Collection Tool	Description
Needs Analysis Interview Form	This form was used to describe the current situation regarding the esports course, to support the needs ranking with interviews, and to identify potential program objectives and content.
Needs Analysis Survey	It was used to identify relevant topics for the planned program for esports courses and to rank the features required for an effective esports curriculum, based on information gathered from online focus group interviews conducted through a needs analysis workshop
Practice-Based Opinion Survey	It was used to assess the perspectives of program implementers and students regarding the process.
Practice-Based Observation Form	It was used to identify the difference between the intended and implemented program.
Result Evaluation Survey	It was used to conduct an overall evaluation of the program following the pilot implementation of the esports course.
Result Evaluation Interview Form	It was used on five students to provide a more in-depth evaluation of the esports course curriculum.
Esports Attainment Test	It was used to reveal the difference between the pre-implementation and post-implementation input behaviors of students participating in the esports course curriculum.
Performance Evaluation Observation Form for E-Sports	The games "AimLab" and "Valorant" were used for observation during the esports course curriculum implementation process.

The development process of the achievement test began with the creation of an item pool of 115 questions reflecting the scope of e-sports. The item pool was reviewed by one language expert, two subject matter experts, and one assessment and evaluation expert, after which necessary revisions were made.

In the pilot phase, the 115-item draft test was administered to 91 students within a 120-minute time limit. Following the pilot administration, item analysis was conducted, and the results are presented in Table 2.

Table 2. Results Regarding İtem Analysis Results.

M	*pj*	*rj*	*M*	*pj*	*rj*	*M*	*pj*	*rj*	*M*	*pj*	*rj*
1	0.92	0.00	**30**	0.90	0.04	**59**	0.92	-0.11	**88**	0.92	-0.07
2	0.51	0.44	**31**	0.88	-0.04	**60**	0.91	-0.19	**89**	0.90	-0.04
3	0.98	-0.22	**32**	0.52	0.26	**61**	0.51	0.30	**90**	0.51	0.26
4	0.04	0.07	**33**	0.46	0.07	**62**	0.90	0.11	**91**	0.90	0.11
5	0.57	0.26	**34**	0.89	0.07	**63**	0.93	0.00	**92**	0.96	-0.07
6	0.10	0.15	**35**	0.92	-0.07	**64**	0.95	-0.11	**93**	0.93	-0.22
7	0.01	-0.04	**36**	0.91	-0.04	**65**	0.89	0.07	**94**	0.91	0.00
8	0.10	-0.07	**37**	0.90	0.04	**66**	0.04	0.00	**95**	0.93	0.00
9	0.08	0.07	**38**	0.18	0.11	**67**	0.10	0.07	**96**	0.57	0.33
10	0.04	0.07	**39**	0.09	0.04	**68**	0.93	-0.07	**97**	0.52	0.11

11	0.09	0.15	**40**	0.05	0.19	**69**	0.91	0.00	**98**	0.60	0.19
12	0.55	0.11	**41**	0.59	0.33	**70**	0.48	0.41	**99**	0.47	-0.19
13	0.51	0.26	**42**	0.93	-0.15	**71**	0.53	0.33	**100**	0.95	-0.04
14	0.07	0.07	**43**	0.95	-0.04	**72**	0.93	-0.07	**101**	0.49	0.04
15	0.48	0.11	**44**	0.87	0.04	**73**	0.96	-0.07	**102**	0.91	-0.19
16	0.55	0.11	**45**	0.43	0.07	**74**	0.89	-0.04	**103**	0.42	0.30
17	0.08	0.11	**46**	0.88	-0.04	**75**	0.92	0.04	**104**	0.40	0.04
18	0.03	0.11	**47**	0.40	0.19	**76**	0.90	0.00	**105**	0.53	0.22
19	0.44	0.15	**48**	0.87	-0.19	**77**	0.88	-0.04	**106**	0.46	0.33
20	0.86	0.04	**49**	0.93	-0.15	**78**	0.47	0.11	**107**	0.92	-0.11
21	0.91	-0.11	**50**	0.46	0.04	**79**	0.95	-0.04	**108**	0.89	-0.07
22	0.44	0.33	**51**	0.07	0.04	**80**	0.43	0.26	**109**	0.47	-0.11
23	0.93	-0.07	**52**	0.92	-0.04	**81**	0.93	0.00	**110**	0.43	0.07
24	0.07	0.15	**53**	0.42	0.00	**82**	0.54	0.11	**111**	0.86	0.00
25	0.07	0.00	**54**	0.51	0.26	**83**	0.90	0.00	**112**	0.07	-0.07
26	0.90	0.04	**55**	0.41	0.30	**84**	0.43	0.04	**113**	0.04	0.15
27	0.04	-0.07	**56**	0.89	0.00	**85**	0.97	-0.11	**114**	0.05	0.19
28	0.05	0.11	**57**	0.93	0.00	**86**	0.47	0.07	**115**	0.49	0.22
29	0.47	0.20	**58**	0.13	0.11	**87**	0.40	0.22	**-**	-	-

M: item, pj: item difficulty, rj: item discrimination

The item analysis and finalization of the achievement test showed that items with a discrimination index of 0.19 or lower were considered very weak and therefore removed from the test. Accordingly, 95 items from the draft form were eliminated, and the final version of the Achievement Test was formed with the remaining 20 items (items 2, 5, 13, 22, 29, 32, 41, 54, 55, 61, 70, 71, 80, 87, 90, 96, 103, 105, 106, and 115). The final set of items is accessible at https://espor1001.firat.edu.tr/page/31243 (Fırat University, 2025).

The difficulty indices of the final 20 items ranged between 0.40 and 0.59, while their discrimination indices varied between 0.20 and 0.44. The KR-20 reliability coefficient for the final form was calculated to be approximately 0.70, indicating that the scores obtained from the test were reliable.

Validity-Reliability

In order to ensure the validity of the data collection tools, expert opinions were obtained during the development process of the semi-structured interview forms, surveys, and the E-sports Achievement Test. The draft achievement test was reviewed by one language expert, two subject-matter experts, and one assessment and evaluation specialist, and necessary revisions were made accordingly (DeVellis, 2017; Fraenkel et al., 2012). Item analysis was conducted after the pilot implementation, and items with low discrimination indices were eliminated. As a result, a 20-item final form was created. The difficulty indices of these items ranged between 0.40 and 0.59, and the discrimination indices varied between 0.20 and 0.44, which are considered acceptable for achievement tests (Büyüköztürk, 2018).

For the reliability of the test, the KR-20 coefficient was calculated as 0.70, indicating an acceptable level of internal consistency (Kline, 2013). In addition, the internal reliability of the surveys used in the needs analysis and program evaluation phases was assessed through Cronbach's alpha values, which exceeded the 0.70 threshold accepted in the literature (Nunnally & Bernstein, 1994). These findings suggest that the scales and achievement test used in the study are both valid and reliable for measuring the intended constructs.

Data Analysis

For the analysis of data obtained from interview and observation forms, qualitative data analysis techniques such as content analysis and the open coding method were employed. After transferring the data into digital format, coding was performed, and themes were identified based on commonalities among the codes.

For quantitative analyses, SPSS 24 and AMOS 20 software were used. Descriptive statistics were applied to analyze the demographic information form and survey data. In addition, to assess the reliability of the surveys, Cronbach's alpha coefficient was calculated. A Cronbach's alpha value above 0.70 was considered evidence that the survey produced reliable results.

Ethical Text

This study entitled "The New Form of Sport: Developing a Curriculum for University Students in E-Sports" was reviewed and approved by the Ethics Committee of Social and Human Sciences Research at Fırat University (Decision No: E-50716828-100-276885). All procedures were conducted in accordance with ethical standards.

Curriculum Development and Evaluation Process

In designing and evaluating the program, a model was created by integrating different curriculum development and evaluation approaches (Tyler, 2013; Gredler, 1996; Varış, 1996; Maviş-Sevim & Emmioğlu-Sarıkaya, 2019). Based on the experts' emphasis on the complementary nature of curriculum development and evaluation, both processes were carried out simultaneously.

Given the importance of identifying needs for defining objectives and evaluating the program (Ornstein & Hunkins, 2009), the process began with a needs analysis. In the second stage, program objectives, content, instructional experiences, and assessment processes were designed according to the identified needs and the views of practitioners and experts. Stakeholder participation was ensured at every stage of the process. In this respect, the model drew upon Stake's Responsive Model and Eisner's Educational Criticism Model (Gredler, 1996). Furthermore, multiple data collection methods were utilized, inspired by Scriven's Goal-Free Evaluation Model (Gredler, 1996), Demirel's Analytical Curriculum Evaluation Model (Demirel, 2012), and Cronbach's Scientific-Humanistic Approach to Curriculum Development (Ornstein & Hunkins, 2009).

The third stage involved pilot implementation, during which stakeholders' feedback was collected to identify strengths, weaknesses, and areas for improvement. Before the main implementation, the deficiencies identified during the pilot phase were revised. The E-sports Achievement Test developed during the pilot phase was used to measure the effectiveness of the program in the main implementation. In this way, the fourth stage—Program Evaluation and Revision—was completed.

The functionality of the model was enhanced by the active involvement of both an advisory group (experts in sport sciences, curriculum development, and assessment and evaluation) and a study group (field practitioners and experts in sport sciences, curriculum development, and assessment and evaluation).

Needs Analysis

To determine needs regarding e-sports, a democratic approach (Demirel, 2012) was adopted. At Fırat University, both online focus group discussions and an in-person needs analysis workshop were conducted. In total, six meetings were held: four online focus group sessions followed by an in-person meeting with 20 randomly selected volunteers (five from each participant group). The results from these sessions were compiled and shared in a final meeting for participants' validation.

The "Needs Analysis Interview Forms" were structured based on existing literature (Custer & Russell, 2018; Craig et al., 2018; King et al., 2021; Lee et al., 2020; Nagorsky & Wiemeyer, 2020; Scott et al., 2021; Gibson, 2021; Wood, 2021). International experts were also consulted to identify goals, content, instructional practices, and assessment processes of e-sports curricula implemented abroad.

Based on the workshop findings, a "Needs Analysis Survey Form" was developed and distributed online to 400 stakeholders not involved in the workshop, receiving 386 valid responses. This process allowed for the prioritization of learning objectives and the establishment of the program's primary content areas.

Curriculum Design

After identifying the needs, draft learning outcomes, content, instructional experiences, and evaluation components of the course were created. The process began with an educational philosophy, as in all stages of curriculum design, and was shaped by a progressivist philosophy (O'Connor, 2016).

Drawing from the needs analysis data and international practices in e-sports education, draft components (objectives, content, learning activities, and evaluation) were formulated. The draft outcomes were refined through in-depth discussions to ensure alignment with progressivist philosophy. Expert opinions were also sought where necessary. The design emphasized student-centeredness, active participation, interest-driven topics, experiential learning through e-sports activities, and collaboration.

A child-centered design approach was adopted, while a modular programming approach (Demirel, 2012; O'Neill et al., 2014) was used to structure the content. The draft program was reviewed by experts in curriculum development, assessment and evaluation, Turkish language, and sport sciences. Feedback from these experts informed revisions, and the final version of the draft program was produced.

Program Implementation

Two phases of implementation were conducted: pilot and main (Smith & Ragan, 2005).

- Pilot Implementation: Conducted at Fırat University over 7 weeks (4 hours per week).
- Main Implementation: Conducted over 14 weeks (2 hours per week).

In total, 64 students participated—32 in the pilot and 32 in the main implementation. A blended learning approach was adopted, with some sessions held face-to-face and others online. Each session was delivered by a field expert, ensuring systematic and high-quality instruction.

Program Evaluation and Revision

Throughout the pilot program, Researcher Observation Forms were used in every session. At the end of each session, "Implementation Evaluation Questionnaires" were administered to both instructors and students. Additionally, "Summative Evaluation Questionnaires" containing open-ended questions were distributed in the final week to collect students' overall views. Five volunteer students from different programs were also interviewed using a "Summative Evaluation Interview Form."

At the end of the 7-week pilot implementation, students completed the E-sports Achievement Test. Based on the analyses of these data, differences between the planned and implemented programs were identified, and revisions were made.

In the main implementation, the E-sports Achievement Test was administered as a pretest and posttest, and researcher observations were conducted throughout the program. To assess performance, an "E-sports Performance Game" was also employed, in which participants' e-sports performance was evaluated four times between Weeks 11 and 14.

FINDINGS

During the needs analysis process, participants were asked the following questions:

- What problems do individuals face while engaging in e-sports activities, and how do you think these problems can be solved?
- What objectives should be included in the e-sports course curriculum?
- What should be taught in an undergraduate-level e-sports course?
- What teaching methods and techniques should be used within the e-sports course curriculum?
- How should assessment be conducted within the e-sports course curriculum?

Based on the needs analysis, a draft e-sports course curriculum was designed and prepared for presentation in the pilot implementation. The course content headings are shown in Table 3.

Table 3. Course Content Headings for an Undergraduate E-sports Course.

Topic Order	Title Topic	**a/b**	**Topic Order**	**Title Topic**	**a/b**
1	Introduction to E-Sports	a	**14**	Entrepreneurship and Innovation in E-Sports	a
2	History of E-Sports and Gaming Culture	a	**15**	E-Sports Industry and Economy	a
3	Digital Game Types in E-Sports	a	**16**	Career Planning in E-Sports	a
4	E-Sports Ecosystem	a	**17**	Media and Partnerships (Sponsorship) in E-Sports	a
5	Health and Ergonomics in E-Sports	a	**18**	Basic Information and Technologies in E-Sports	a
6	Sports Law and E-Sports	a	**19**	Terminology Used in E-Sports	a/b

7	Morality, Ethics, and Fair Play in E-Sports	a	**20**	Skills Learning in E-Sports	a/b
8	Communication Skills in E-Sports	a	**21**	Technical, Tactical, and Training Knowledge in E-Sports (Data Analysis and Coaching)	a/b
9	Developing Thinking Skills	a	**22**	E-Sports Game Strategies and Strategic Thinking Skills	a/b
10	Management and Organization in E-Sports	a	**23**	Implementation	b
11	Team Management	a	**24**	Implementation	b
12	Time Management	a	**25**	Implementation	b
13	E-Sports Psychology and Stress Management	a			

a: Theoretical; b: Implementation

The researchers carried out the pilot implementation of a 7-week program during the Fall 2023-2024 academic year, following the necessary planning. During the pilot process, the e-sports curriculum sessions were observed, and an "implementation observation form" was completed. While some strengths were noted, certain shortcomings were also identified. Firstly, theoretical sessions primarily relied on methods such as narration, question-and-answer, and discussion. The use of alternative assessment tools, such as written exams, surveys, or short projects, was limited. In terms of time management, the short duration of the sessions often restricted a detailed treatment of the course content.

During the implementation, a "Survey of Implementation-Related Opinions (for Program Implementers)" was completed. The evaluations by the program implementers involved in the pilot process were generally positive regarding the e-sports curriculum. However, they also pointed out significant deficiencies and areas needing improvement. Students complained about the excessive amount of theoretical content, and it was suggested that the implementation process should be faster and more practical. It was emphasized that the e-sports curriculum needed to be enriched with current developments, especially by providing more detailed information on topics like the e-sports ecosystem, ethics, health, and ergonomics. The need for more activities and hands-on training was highlighted to improve the balance between theory and practice. It was also stated that more activities and student support services should be provided to increase the program's effectiveness.

A "Final Evaluation Survey (for Students)" was administered to the participant group during the e-sports course curriculum development process. It was found that a lack of equipment and certain technological infrastructure deficiencies were prominent during the program's implementation. Students requested higher quality equipment and computers, as well as more advanced technological infrastructure. The duration of the practical sections and the intensity of the course content were also criticized in the participants' feedback. Regarding the curriculum content, there was a focus on including more variety, adding topics such as social media and team management, and covering different game genres. Furthermore, it was stated that more education and awareness activities were needed to improve the public perception of e-sports.

During this process, a "Final Evaluation Interview Form (for Students)" was used. Additionally, after the pilot implementation was completed, 5 students were asked questions based on this form. It was noted that the limited duration of the curriculum posed an obstacle to students gaining sufficient knowledge and developing their skills. Students mentioned that the practical part was too short, which led to an insufficient reinforcement of theoretical

knowledge. They also highlighted the inadequacy of the classroom's physical environment and technological infrastructure. The insufficient computer hardware and slow internet speed in the e-sports labs were found to affect the efficiency of the teaching process.

In conclusion, the researchers evaluated the shortcomings mentioned above before the main implementation began. The necessary revisions were made to the draft e-sports curriculum, and the main implementation process was initiated.

The results of the achievement test administered during the pilot implementation process showed that a 20-item test was given to 32 students in the main implementation, and a dependent samples t-test was used to examine whether there was a statistically significant difference between their pre-test and post-test scores. A dependent samples t-test was used to examine whether there was a statistically significant difference between the students' pre-test and post-test scores. It was found that the mean pre-test score was 11.22, while the mean post-test score was 14.16. The results of the dependent samples t-test ($t = -5.591$; $p = 0.000$) showed that there was a significant difference between the mean pre-test and post-test scores on the e-sports achievement test. In other words, the e-sports training provided was found to have caused a significant increase in the students' average achievement in e-sports.

Table 4. Dependent Samples T-Test Results for Pre-test and Post-test Scores from the Achievement Test.

	N	$\overline{X}$	SS	*t*	sd	*p*
Pre-test	32	11.22	3.54	-5.591	31	0.000*
Post-test	32	14.16	2.36			

*p< 0.05

The results from the main implementation process indicated that the main implementation phase began with a 14-week program in the spring semester of the 2023-2024 academic year. During this process, course sessions for the e-sports curriculum were monitored, and an "implementation observation form" was completed.

In the first session of the e-sports curriculum, the definition of e-sports and its key concepts were discussed. In all theoretical sessions, methods such as narration, question-and-answer, and discussion were used effectively, often with visual aids, to increase student interest. The course content provided students with information on the definition of e-sports, popular games, and the general structure of the industry. Students participated interactively, sharing their own e-sports experiences, which created a productive communication environment between the instructor and the students. The instructor recommended that students watch e-sports videos and tournament broadcasts to gain a deeper understanding of the topic.

The session on the "E-sports Ecosystem" provided information on the topic. The instructor used question-and-answer and observation methods to gauge student interest and knowledge levels. Students asked questions about the e-sports ecosystem and e-sports teams in Turkey. The instructor emphasized the importance of knowing the stakeholders within the ecosystem and provided advice on career opportunities in the field.

During the session on "Digital Game Genres in E-sports," different game genres and their place in the e-sports ecosystem were explained in detail. Student interaction was very high. Students asked questions about whether

mobile games are included in e-sports. The instructor recommended that students visit e-sports venues to gain more hands-on experience. This session provided students with in-depth knowledge of digital game genres, resulting in a successful learning experience.

The session on "Health in E-sports" and "Ergonomics in E-sports" provided detailed explanations of the health effects of e-sports and the ergonomic factors that players need to consider. The presentation, supported by visual materials using a projector and computer, facilitated a more effective transfer of knowledge. Students showed their interest in the course content by asking questions about common health problems in e-sports and ways to protect eye health. The instructor advised students to sit in the correct position at the computer and adopt a healthy lifestyle with physical activities.

The topic of "Sports Law and E-sports" was addressed in this session. The legal aspects of e-sports, especially regulations in countries like Germany, South Korea, and Norway, were explained in detail. Students actively participated by asking questions about e-sports law in Turkey. The interaction between the instructor and students was positive.

This session focused on "Communication Skills in E-sports," highlighting the importance of effective communication and how to develop these skills. Students actively participated by asking about the role of communication in e-sports and the traits of successful communicators. The instructor focused on concepts such as empathy, emotional intelligence, teamwork, and strategic planning to help students improve their communication skills.

The session on "Morals, Ethics, and Fair Play in E-sports" provided a detailed explanation of the concepts of ethics, morals, and fair play. The discussion focused on what these concepts mean and how they are applied within the e-sports context. Students asked questions about doping and fair play practices in e-sports. It was observed that the instructor successfully captured the students' attention using a question-and-answer approach.

The session on "Developing Thinking Skills in E-sports" explained the definition, importance, and ways to develop thinking skills within the context of e-sports. Students actively participated by asking questions about the role of thinking skills in environments that require quick decision-making and strategic thinking, like e-sports. The instructor explained the importance of quick thinking and reaction times in e-sports games and suggested various techniques for students to improve their thinking skills. The interaction between the student and instructor was highly effective.

The session on "Management and Organization in E-sports" provided detailed information on the management and organization of e-sports. Important topics such as sponsorship, the e-sports ecosystem, and federations were explained. Students showed their interest in the topic by asking questions about sponsorships and e-sports organizations.

The session titled "Leadership, Communication, Team Management, Stress Management" covered these topics. The interaction among students was at a good level, and they actively participated throughout the class. The instructor encouraged students to think by posing relevant questions.

The presentation on "Entrepreneurship and Innovation in E-sports" focused on types of entrepreneurship and how innovation can be linked to sports. Students asked questions about what innovation in sports is and about process innovation. The instructor emphasized that students should continuously follow the topics of entrepreneurship and innovation.

The session on "Time Management in E-sports" focused on types of time and the basic principles of time management. Technological materials like a projector and a computer were used to help with a better understanding of the subject. Students asked questions about the importance of time management in e-sports and the factors that influence it, and they also shared their thoughts on its advantages.

The session on "E-sports Psychology and Stress Management" focused on the psychological effects on e-sports players' performance, stress management, and sports psychology. Students asked questions about the psychological effects of stress and the factors that cause it. The instructor provided explanations on topics such as external and internal factors.

The presentation on "The E-sports Industry and Economy" thoroughly covered the industrial dimensions and economic impacts of e-sports. The use of presentation and narration methods reinforced student interest. The interaction among students was very positive due to the engaging nature of the topic. Students asked questions about the size of the e-sports economy and industry levels. The instructor provided detailed answers to these questions.

During the "Career Planning in E-sports" session, student interaction was at a high level. Students asked questions about career opportunities in the field, and they received detailed answers from the instructor.

The presentation on "Basic Knowledge and Technologies in E-sports" was fluid and engaging. Students asked questions about gaming and computer terms. They wanted to learn more about games and software. The instructor explained the topic in a way that was consistent with the course content.

During the session on "Media and Partnership in E-sports," students actively interacted with the subjects being taught and asked relevant questions. Their questions about e-sports companies showed their interest in the professional world. As the instructor was also an e-sports player, students were more interested in the course content and received satisfying answers to their questions.

The presentation on "E-sports Terminology" provided students with information about e-sports terminology. The interaction between the instructor and students was at a high level. Students questioned how the learned terms could be useful in in-game communication and received detailed answers from the instructor.

The session on "Skill Instruction in E-sports" provided information on skill development in e-sports. The interaction between students and between the instructor and students was at a good level. Students actively participated by asking questions about what they could do to improve their e-sports skills and about the benefits of e-sports.

The session on "Technical, Tactical, and Training Knowledge in E-sports" provided comprehensive information on the technical, tactical, and training processes of e-sports. Students actively interacted with the content due to its engaging nature, and the interaction with the instructor was at a high level. Students specifically asked technical and tactical questions. The instructor provided professional feedback to these questions, taking into account the students' skill levels.

In the e-sports application sessions, a hands-on training was conducted with the students. The session provided students with information about e-sports games. The session was run efficiently in terms of time management. The interaction among students and between the instructor and students was at a good level. Students asked detailed questions, especially about the game. Students showed their curiosity about the course content with short questions such as, "How do we play the game Valorant?" During the main implementation, students were given hands-on game training. Students asked various questions about in-game matchmaking and using weapons. The instructor answered these questions in detail. The instructor advised students to practice more to improve their in-game skills.

For performance evaluation, the games "AimLab" and "Valorant" were used as tools to analyze students' development in detail. AimLab is a platform actively used by e-sports players and professionals. It is an ideal training ground for measuring and improving students' reflexes, hand-eye coordination, target tracking, and overall game skills. First, reflex shooting exercises were conducted to evaluate students' reflex speed and help them improve in this area. This initial stage was critical for measuring their reactions to sudden and unexpected situations. In the second stage, the focus was on shooting at moving targets. The main goal was to improve students' keyboard and mouse skills and to enable them to react more effectively and quickly to moving targets. These exercises were designed to increase students' in-game performance by simulating various scenarios they might encounter in games. In the third stage, exercises focused on circular targets were carried out to improve hand-eye coordination. The primary goal was to improve students' ability to make quick decisions, focus on the right target, and react effectively during action moments. Exercises such as plane shooting and micro-shooting were used to reinforce the skills students had gained in previous training sessions and to embed these skills in their visual memory permanently.

In the later weeks of the training, the goal was to have students transfer the skills they gained in AimLab to the game Valorant. In this process, students were asked to kill "100 Bots" in the shortest time possible. This exercise was an ideal tool for measuring students' reflexes, focus, and quick decision-making abilities. In these weekly exercises, students showed a significant improvement in their performance. (Data for these applications can be found at https://espor1001.firat.edu.tr/page/31243 (Fırat University, 2025)). At the end of the 4-week intensive training period, students made significant progress each week, taking important steps toward understanding the games more deeply and continuously improving themselves. This process allowed students to develop not only

their in-game skills but also critical competencies such as strategic thinking, quick problem-solving, and teamwork.

The results of the achievement test administered during the main implementation process revealed that when the pre-test and post-test scores of the students were compared, a statistically significant difference was found ($p < 0.05$). The results revealed that the students' achievement post-test scores were significantly higher (Table 5).

Table 5. Comparison of Achievement Pre-test and Post-test Scores.

	Average	**N**	**Ss**	**t**	**sd**	**p**
Pre-test	57.878	33	9.522	-10.989	32	0.000*
Post-test	82.424	33	9.110			

* $p< 0.05$

CONCLUSION and DISCUSSION

Globally, there is not yet a standardized approach to integrating esports into curricula, and it can be argued that existing programs tend to focus solely on the technical aspects. For example, universities in countries like the United States, Canada, the United Kingdom, and the Philippines offer undergraduate and graduate programs in areas such as esports management and entrepreneurship. However, a comprehensive teaching framework in this field has not yet been fully established (Kauweloa & Winter, 2019; Marta et al., 2021; Scott et al., 2021; Rothwell & Shaffer, 2019). An interdisciplinary academic and applied esports program developed by a small liberal arts college aims to foster community building and an entrepreneurial mindset. This curriculum combines theoretical knowledge with practical experience to help students develop both social connections and innovative thinking skills (King et al., 2021).

Esports programs within higher education institutions have the potential to enhance the positive impact of a university education by offering students various learning opportunities. These programs provide chances to develop analytical thinking, problem-solving skills, and an increased interest in technology. They also contribute to the development of social skills such as teamwork, leadership, and communication (Barber, 2012; Rothwell & Shaffer, 2019; Geneva, 2023). Covering a wide range of topics, these programs prepare students for various career paths, including live event management, psychological research, sports science, marketing, public relations, and community management (Scott et al., 2021; King et al., 2021).

In this study, a 20-item multiple-choice achievement test was developed to determine the difference in knowledge levels of students before and after participating in the esports course program. As stated above, the fact that the 20 items on the final test form had sufficient discrimination and appropriate difficulty levels showed that the test was effective in measuring students' achievement. Additionally, the sufficient reliability coefficient of the test supported the reliability of the scores obtained from it. Based on the pre-test and post-test results, a significant increase was found in students' achievement levels after the esports training. This result indicated that the provided esports education significantly increased students' knowledge and skills. In conclusion, the findings of the study revealed that significant steps were taken in test development and that the esports education led to a meaningful increase in students' achievement levels. It was concluded that the curriculum contributed to students' academic success.

According to the survey results from esports curriculum practitioners, the program's content was generally evaluated positively. However, it was noted that students expected to move into practical application quickly. It was determined that the curriculum contributed to topics such as the esports ecosystem, ethics, health, and ergonomics, and that the content was internationally appealing. Although the implementation process was heavily theoretical, it was found to be a comprehensible and effective process. It was stated that the program should be recommended because it provides students with personal and professional development. The program's strengths included offering a wide range of knowledge, increasing students' awareness, and contributing to their career development. Weaknesses were identified as the heavy theoretical focus and the need to offer more supportive services to students.

During the pilot application, students who took the esports courses stated that the program generally contributed to their development, particularly in areas like awareness, decision-making, and increased self-confidence. In the main application, the sessions within the esports curriculum were planned and implemented in a way that would attract students' interest, using various teaching methods and technological tools. Throughout the program, a wide range of topics was covered, from basic esports concepts to digital game genres, health and ergonomics, and communication skills. Presentations supported by effective time management, interactive teaching methods, and visual materials ensured active student participation. Students' contributions with individual questions related to their interests and the productive interaction between instructor and student significantly contributed to the successful implementation of the program.

During this process, it was determined that students gained awareness of the esports ecosystem and acquired in-depth knowledge of different aspects of the subject, becoming more conscious of career planning, technical-tactical knowledge, and ethical issues related to esports. Furthermore, a noticeable improvement was observed in students' performance. Students showed more development each week, taking significant steps toward a deeper understanding of games and continuously improving themselves. This process allowed students to develop not only their in-game skills but also critical competencies like strategic thinking, quick problem-solving, and teamwork.

It was determined that the developed esports curriculum has the potential to meet the current needs in Turkey and fill a gap in the literature. Therefore, it is crucial to adapt and develop the esports curriculum in Turkey according to the country's specific needs. The inclusion of esports in educational curricula has received great interest due to its potential to develop various competencies and skills among students. This developed curriculum demonstrated that its content is universally applicable. Related studies have also reached similar conclusions. For example, Chang et al. (2023) presented a systematic framework for esports education, identifying cognitive, metacognitive, academic, and professional competencies and proposing various educational approaches to support these competencies in different contexts. Another study (Ibda et al., 2023) reveals that esports games in primary schools can have both positive and negative potential effects on students. Lee et al. (2020) stated that an integrated curriculum including esports could effectively incorporate literacy and reading skills into the learning process while connecting students to academic and career opportunities. Such a curriculum can help students develop these skills and improve their educational success.

In conclusion, these results demonstrate the need for an esports course curriculum in Turkey and affirm that the developed program is applicable. To meet students' expectations for quick practical application, it is important to increase the number of applied sessions and to keep the program current in collaboration with industry experts. Moreover, adapting the curriculum to different learning levels based on the achievement test results will meet the needs of a wider student population. The development and implementation of the esports curriculum as a national and international model will provide long-term contributions to students' personal, academic, and professional development.

RECOMMENDATIONS

Future esports curricula should prioritize a stronger balance between theoretical content and applied learning opportunities, ensuring that students can quickly engage in practical experiences alongside conceptual knowledge. Collaboration with industry professionals is essential to keep the program content current and aligned with real-world needs, while also offering mentorship and networking opportunities for students. Additionally, adapting the curriculum to different learning levels will expand its accessibility and effectiveness, supporting a wider student population. Finally, continuous updates in areas such as ethics, health, and ergonomics should be integrated to promote both personal and professional development, ensuring that esports education contributes meaningfully to students' academic success and career readiness.

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CONTRIBUTION RATE	CONTRIBUTORS
Idea or Notion	Yunus Emre KARAKAYA, Sebahattin DEVECİOĞLU, Selahattin GELBAL
Literature Review	Fazilet Özge MAVİŞ SEVİM, Seda Demir AYÇİÇEK
Method	Melih DİKMEN, Emin Tamer YENEN, Selahattin GELBAL
Data Collecting	Yunus Emre KARAKAYA, Emin Tamer YENEN
Data Analysis	Melih DİKMEN, Fazilet Özge MAVİŞ SEVİM
Findings	Yunus Emre KARAKAYA, Sebahattin DEVECİOĞLU
Discussion and Commentary	Melih DİKMEN, Seda Demir AYÇİÇEK, Selahattin GELBAL

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