Interactive multimedia football as a learning model during the pandemic

Afri Tanri [a][1], Universitas Negeri Medan, Jl. William Iskandar Ps. V, Kenangan Baru, Kec. Percut Sei Tuan, Kabupaten Deli Serdang, Sumatera Utara 20221, Indonesia

Sanusi Hasibuan [b], Universitas Negeri Medan, Jl. William Iskandar Ps. V, Kenangan Baru, Kec. Percut Sei Tuan, Kabupaten Deli Serdang, Sumatera Utara 20221, Indonesia

Tarsyad Nugraha [c], Universitas Negeri Medan, Jl. William Iskandar Ps. V, Kenangan Baru, Kec. Percut Sei Tuan, Kabupaten Deli Serdang, Sumatera Utara 20221, Indonesia

Mashud [d], Universitas Lambung Mangkurat, Jl. Brigjen Jl. Brig Jend. Hasan Basri, Pangeran, Kec. Banjarmasin Utara, Kota Banjarmasin, Kalimantan Selatan 70123, Indonesia

Advendi Kristyandaru [e], Universitas Negeri Surabaya, Indonesia

Abstract

The delivery of football learning materials presents challenges for educators, particularly when practical components must be taught remotely. This study aims to develop an interactive multimedia learning tool for football courses at the Faculty of Sports Science, Medan State University, especially during the COVID-19 pandemic. The research follows a research and development approach to create and validate educational products. The study involved two trial phases, with 30 participants in the first phase and 60 in the second. Data were analyzed using percentage techniques and quantitative methods. Findings indicate that the interactive multimedia tool effectively enhances students' understanding of basic football techniques, achieving an 80 percent success rate. The study developed the "ARA Model" application through three stages: pre-development, development, and evaluation. A needs analysis was conducted through surveys, expert consultations, and focus group discussions. The effectiveness and efficiency of the product were assessed using closed and open questionnaires. Validation involved experts in football, sports coaching, and information technology. The results demonstrate that interactive multimedia is a valuable tool for football education, offering an effective learning model during disruptions such as the COVID-19 pandemic.

Keywords: E-learning; football; interactive multimedia; model learning; physical education.

---

* ADDRESS FOR CORRESPONDENCE: Afri Tanri, Universitas Negeri Medan, Jl. William Iskandar Ps. V, Kenangan Baru, Kec. Percut Sei Tuan, Kabupaten Deli Serdang, Sumatera Utara 20221, Indonesia*. E-mail address*: afritanri12@gmail.com

1. INTRODUCTION

In The year 2020-2021 has proven to be extremely challenging for humanity, with the ongoing Covid-19 pandemic still affecting the world. COVID-19 is a contagious disease caused by the acute respiratory syndrome coronavirus 2 (Fernandez et al., 2020). This virus is a member of the coronavirus family, which can infect animals (Van Berkel et al., 2021). In humans, it leads to respiratory infections that can sometimes result in death (Wang et al., 2020). Covid-19, a novel coronavirus, was first identified in Wuhan, Hubei, China in late 2019 (Zhang et al., 2020). The pandemic has had significant impacts, both positive and negative, on all living beings, prompting governments, particularly in Indonesia, to take measures aimed at minimizing the spread of the virus, including shifting the learning process online to reduce transmission (Gaia et al., 2020).

Online and offline learning methods have emerged as key strategies for bridging the gap in education during the pandemic, providing electronic learning resources (e-learning). Despite the shift, the challenges of maintaining effective classroom-based learning resources persist. The online and offline learning system is based on Information and Communication Technology (ICT) and allows for remote learning via applications that connect individuals or groups (Wang, 2019). These circumstances demand that educators adopt innovative approaches to ensure the material is understood, such as incorporating interactive learning media into football-related lessons (Setiawan et al., 2020; Papastergiou & Mastrogiannis, 2021).

However, challenges such as limited internet access, hardware and software availability, and financial constraints hinder the optimal use of online learning resources. Learning itself is an interactive process between teachers and students, involving two-way communication (Saputro et al., 2018; Dorouka et al., 2024). To effectively convey educational content, appropriate learning media are essential (bin Nordin et al., 2019; Zhao et al., 2024). Engaging and interactive media are crucial to sustaining student interest and motivation, making the learning process more memorable (Alqahtani & Rajkhan, 2020). Additionally, multimedia offers great potential to revolutionize learning by helping individuals acquire, adapt, and apply information in various ways (Zardari et al., 2021; Yang & Feng, 2024; Aghasafari et al., 2025). Multimedia also empowers educators to develop new teaching techniques that can lead to better outcomes (Meng & Xu, 2024; Megat Abdul Rahim et al., 2021).

1.1. Purpose of study

Through the development of this learning media, it is expected that educators, particularly university lecturers, can enhance their teaching methods with innovative interactive media for football courses. This development underscores the importance of interactive media in maintaining effective education during the COVID-19 pandemic. The goal is to produce an interactive multimedia product for football courses, which will be used in the learning process during this challenging time.

2. METHOD AND MATERIALS

This study employs a Research and Development (R&D) approach, a powerful methodology for enhancing practices and developing and validating educational products. The aim of this research was to create a learning tool called the "ARA Model" with an integrated application. The research process is structured into several phases: (1) Pre-development phase, which involves conducting a needs analysis through surveys to assess user requirements, preparing instruments, and consulting with experts; (2) Development phase, where the product is created, starting with the design of the initial product and script for "Football Interactive Multimedia," followed by small group trials, revisions after Phase I, large group trials, further improvements in Phase II, and finally mass production; (3) Evaluation phase, which involves the implementation of the final product and its dissemination as a learning tool for students in the Faculty of Sports Science (FIK) at Unimed.

Tanri A., Hasibuan S., Nugraha T., Mashud & Kristyandaru, A. (2024). Interactive multimedia football as a learning model during the pandemic. *International Journal of Learning and Teaching, 16*(4), 243-250. https://doi.org/10.18844/ijlt.v16i4.9634

2.1. Data collection tools

The instruments used for data collection included both closed and open-ended questionnaires. The closed questionnaires assessed the effectiveness and efficiency of the product, while the open-ended ones identified weaknesses and mismatches with user needs, with input gathered through Focus Group Discussions (FGD).

2.2. Participants

The needs analysis was conducted with a sample of 35 respondents, consisting of students from various academic backgrounds. These participants were selected to provide a comprehensive understanding of their learning needs and preferences.

2.3. Data analysis

Data analysis included: (1) a percentage-based needs analysis to gauge product demand; (2) evaluation of effectiveness and efficiency through Phase I trials with 30 participants and Phase II trials with 60 participants, using both quantitative and percentage-based methods; and (3) FGD sessions involving three experts, football, sports coaching, and IT, to validate the product's effectiveness.

Additionally, the study utilized qualitative validation techniques for assessing the feasibility of an Android-based "Chemical Lab Work Guide" application as a practical guide for football courses. Data collection consisted of direct questionnaires with multiple-choice responses, and analysis focused on descriptive data provided by media and material experts, along with assessments of the learning media product's feasibility by these experts.

3. RESULTS

A needs analysis was conducted with 35 respondents, consisting of students, revealing that 89% of the respondents had never engaged in a learning process using interactive media, while 11% were unaware of interactive media being used in the learning process, which later served as the learning tool. The initial design for the interactive soccer media product aimed to support the learning process during the COVID-19 pandemic. The interactive multimedia system, named "ARA MODEL," allows students to access the application via the Playstore. This enables students to learn fundamental soccer techniques, such as passing, shooting, and heading, along with detailed explanations and tutorials (Agata & Monyeki, 2018). The designed research product was then evaluated by media and subject matter experts. After each evaluation stage, a phase I product trial was conducted with samples. The media validation results (Table 1) provided valuable feedback for further refinement.

Table 1

Validation of media expert Phase I

No	Indicator	Score	Category
1	Display Design	3,5	Good
2	Display Text	3	Enough
3	Programming	3,5	Good
4	Video	3	Enough
5	Audio	3	Enough
	Amount		16
	Average		3,2
	Media Quality Category		Enough

The media expert's assessment (Table 2) on this interactive football media product is only display design and programming, which gets a score of 3.5 in the good category; the rest gets a score of 3 and is still

Tanri A., Hasibuan S., Nugraha T., Mashud & Kristyandaru, A. (2024). Interactive multimedia football as a learning model during the pandemic. *International Journal of Learning and Teaching, 16*(4), 243-250. https://doi.org/10.18844/ijlt.v16i4.9634

categorized as sufficient. The assessment of the interactive football media indicator gets a score of 3.2 and is still categorized as sufficient and needs improvement to improve the product so that it can be tested on users.

Table 2

Validation of Phase I material expert assessment

No	Indicator	Score	Category
1	Learning Pictures	3,5	Good
2	Tutorial video	3,5	Good
3	Learning materials	3,5	Good
4	Material Explanation	3,7	Good
Amount		14,2	
Average		3,55	
Media Quality Category		Good	

The material expert's assessment of the interactive media, specifically the four indicators of the "ARA MODEL" soccer interactive media, revealed the following results: the assessment of learning images, learning videos, and learning materials received a score of 3.5, while the material explanation indicator received a score of 3.7, both falling within the "good" category. The overall assessment of the soccer interactive media had an average score of 3.55, categorizing it as good, though it was noted that improvements were needed to enhance the product further. Following the first stage of validation and implementing the suggested improvements, the researchers made revisions to the product. Subsequently, stage II validation was conducted by experts. The results of this second validation phase are as follows (table 3):

Table 3

Media expert assessment Phase II

No	Indicator	Score	Category
1	Display Design	4,5	Very good
2	Display Text	4,3	Very good
3	Programming	4,5	Very good
4	Video	4	Good
5	Audio	4,2	Good
Amount		21,5	
Average		4,3	
Media Quality Category		Very good	

The results of the second stage of validation by the media experts above show an assessment of the interactive media product for football "ARA MODEL" where the display design indicators, display text and programming get a score of 4.5 and 4.3 with very good categories, next on the video indicator and audio with a score of 4 and 4.2 in the good category. The results of the assessment of the interactive football media indicator "ARA MODEL" with an average score of 4.3 and categorized as very good and then the product can

be tested on a sample.

product can be tested on a sample.

Table 4

Validation of Phase II material expert assessment

No	Indicator	Score	Category
1	Learning Pictures	4,3	Very good
2	Tutorial video	4,4	Very good
3	Learning materials	4,3	Very good
4	Material Explanation	4,5	Very good
Amount		17,5	
Average		4,37	
Media Quality Category		Very good	

Improvements based on the Phase I material expert validation were implemented, and Phase II validation was then conducted (Table 4). The results of the second phase of validation showed that the learning image indicators and learning materials received a score of 4.3, categorized as "very good." The learning videos scored 4.4, while the material explanation received a score of 4.5, both also falling into the "very good" category. The overall assessment of all material expert indicators yielded an average score of 4.37, which is classified as "very good," indicating that the product is ready for testing.

Following the validation feedback from both experts, the necessary revisions were made to the "ARA MODEL" interactive multimedia product, which is intended to be used as a learning tool for soccer material by FIK Unimed students. These improvements provided the foundation for researchers to proceed with trials on the sample. After these revisions, the interactive multimedia product on basic soccer techniques was ready for Phase I and II testing.

A Group I trial was conducted with 30 students to assess the feasibility of the interactive media. Students filled out a user feasibility test questionnaire, which was divided into media, material, and learning aspects.

Table 5

Results of Phase I trial

Indicator	Score	Category
Media Aspect	4,07	Good
Material Aspect	3,58	Good
Learning Aspect	3,67	Good

The results of the initial field trial (Table 5) indicate that the interactive soccer multimedia developed by the researchers received a score of 4.07 for the media aspect, 3.58 for the material aspect, and 3.67 for the learning aspect. This resulted in an average score of 3.79, placing it in the "Good" category, which signifies that the media is suitable for use as a learning tool.

The findings from the three indicators suggest that while the overall implementation of the Phase I trial falls within the "Good" category, there are still areas that require improvement to achieve optimal results in the Phase II trial. The feedback from the first trial was used to refine the product, aiming to enhance its effectiveness in subsequent testing. The results from the second trial yielded the following outcomes:

Table 6

Results of Phase II trials

Indicator	Score	Category
Media Aspect	4,46	Very Good
Material Aspect	4,07	Good
Learning Aspect	4,36	Very Good

The results presented in Table 6 show that the media received an average score of 4.46, placing it in the "Very Good" category for the media aspect, 4.07 for the material aspect, categorizing it as "Good," and 4.36 for the learning aspect, which also falls into the "Very Good" category. This results in an overall average score of 4.28, which is classified as "Very Good." These scores indicate that the Phase II trial was successful, with the overall implementation falling into the "Very Good" category. The product will now move forward for broader implementation and dissemination. This study highlights the effectiveness of interactive multimedia football as a learning model during the pandemic.

4. DISCUSSION

The results of the Phase I and Phase II trials demonstrate the effectiveness of the "ARA MODEL" interactive multimedia product as a learning tool for soccer. The feedback from both media and material experts, as well as the student trials, highlights the improvements made throughout the validation and trial phases. During the first trial, several aspects of the media, material, and learning content were identified as needing improvement, leading to modifications that enhanced the product's overall quality. The second trial showed significant improvements, with scores in the "Very Good" category for the media and learning aspects, indicating that the revised product was more effective and well-received by students.

The development of interactive multimedia products like the "ARA MODEL" proves to be especially important during the pandemic, where traditional face-to-face learning has been severely limited. With 89% of respondents in the needs analysis indicating they had never experienced interactive media in learning, this study provides valuable insights into the potential of multimedia tools to bridge gaps in learning. This is particularly relevant for subjects like soccer, where physical demonstration and hands-on practice are essential. The use of digital platforms to teach basic soccer techniques through interactive tutorials offers students a way to engage with the material independently and at their own pace, enhancing their understanding of complex concepts.

Furthermore, the results of this study align with previous research, indicating that interactive media can play a crucial role in improving student learning outcomes and engagement, particularly in fields where hands-on experience is vital. The integration of interactive elements such as tutorials and explanatory videos helps to make learning more accessible and engaging, ultimately improving students' skills in soccer techniques. The ongoing development and dissemination of such products can be instrumental in enhancing the quality of education and ensuring students are better equipped to learn effectively, even in challenging circumstances, such as the COVID-19 pandemic.

As the pandemic posed significant challenges to students' understanding of football material, innovative approaches, such as interactive media, were necessary to enhance student comprehension (Priymak et al.,

Tanri A., Hasibuan S., Nugraha T., Mashud & Kristyandaru, A. (2024). Interactive multimedia football as a learning model during the pandemic. *International Journal of Learning and Teaching, 16*(4), 243-250. https://doi.org/10.18844/ijlt.v16i4.9634

2021). In line with previous research, the findings underscore the need for innovation in the learning process, which is crucial for improving students' independent learning skills.

5. CONCLUSION

The research was conducted with FIK Unimed students across various classes in both the first and second phases of the trial. The Phase I trial results indicated that the media, material, and learning aspects were rated as "Good," while Phase II trial results showed significant improvement, with all indicators rated as "Very Good." Based on these outcomes, the product will proceed to the next stages of implementation and dissemination.

The results of the study show that the development of learning innovations during the COVID-19 pandemic is very necessary. One of them is making interactive multimedia football as a learning model during the pandemic. The results that have been obtained using interactive multimedia football as a learning model during the pandemic can increase students' understanding of knowing basic techniques in soccer games. In addition, the effectiveness and efficiency of the product in learning during the pandemic is very appropriate for student understanding.

Conflict of Interest: The authors declare no conflict of interest.

Ethical Approval: The study adheres to the ethical guidelines for conducting research.

REFERENCES

Agata, K., & Monyeki, M. A. (2018). Association between sport participation, body composition, physical fitness, and social correlates among adolescents: The PAHL study. *International Journal of Environmental Research and Public Health*, *15*(12), 2793. https://www.mdpi.com/1660-4601/15/12/2793

Aghasafari, S., Needles, T., & Malloy, M. (2025). Multimedia arts learning: connecting STEAM among special education students. *Discover Education*, *4*(1), 1-15. https://link.springer.com/article/10.1007/s44217-025-00440-7

Alqahtani, A. Y., & Rajkhan, A. A. (2020). E-learning critical success factors during the COVID-19 pandemic: A comprehensive analysis of e-learning managerial perspectives. *Education sciences*, *10*(9), 216. https://www.mdpi.com/2227-7102/10/9/216

bin Nordin, M. N., Mustafa, M. Z. B., & Razzaq, A. R. B. A. (2019). The Practice of Headmasters' Leadership and Its Effect on Job Satisfaction of Special Education Integration Program (PPKI) Teachers in Johor, Malaysia. *Universal Journal of Educational Research*, *7*(9), 2008-2014. https://www.academia.edu/download/64256989/ujer23-19590846__1_.pdf

Dorouka, P., Kalogiannakis, M., & Blonder, R. (2024). Tablets and Apps for Promoting Nanoliteracy in Early Childhood Education: Results from an Experimental Study. *Journal of Science Education and Technology*, *33*(6), 910-927. https://link.springer.com/article/10.1007/s10956-024-10132-w

Fernandez, J., Gratacos-Ginès, J., Olivas, P., Costa, M., Nieto, S., Mateo, D., ... & Lozano, M. (2020). Plasma exchange: an effective rescue therapy in critically ill patients with coronavirus disease 2019 infection. *Critical care medicine*, *48*(12), e1350-e1355. https://journals.lww.com/ccmjournal/fulltext/2020/12000/plasma_exchange__an_effective_rescue_therapy_in.70.aspx

Gaia, C., Maria Chiara, C., Silvia, L., Chiara, A., Maria Luisa, D. C., Giulia, B., ... & Paolo, R. (2020). Chest CT for early detection and management of coronavirus disease (COVID-19): a report of 314 patients admitted

Tanri A., Hasibuan S., Nugraha T., Mashud & Kristyandaru, A. (2024). Interactive multimedia football as a learning model during the pandemic. *International Journal of Learning and Teaching, 16*(4), 243-250. https://doi.org/10.18844/ijlt.v16i4.9634

to Emergency Department with suspected pneumonia. *La radiologia medica*, *125*, 931-942. https://link.springer.com/article/10.1007/s11547-020-01256-1

Megat Abdul Rahim, P. R., Idris, S. L., Abdul Rahman, Z. I., Ya Shaq, M. S., & Nasir, N. F. (2021). Approaching listening and speaking skills using online to facilitate interactive learning from students' perspectives. *Asian Journal of University Education (AJUE)*, *7*(2), 203-214. https://ir.uitm.edu.my/id/eprint/53740/

Meng, Z., & Xu, M. (2024). *Latency Optimization in Interactive Multimedia Streaming*. Springer. https://link.springer.com/content/pdf/10.1007/978-981-97-6729-8.pdf

Papastergiou, M., & Mastrogiannis, I. (2021). Design, development, and evaluation of open interactive learning objects for secondary school physical education. *Education and Information Technologies*, *26*(3), 2981-3007. https://link.springer.com/article/10.1007/s10639-020-10390-2

Priymak, S., Krutsevich, T., Pangelova, N., Trachuk, S., Kravchenko, T., Stepanenko, V., & Ruban, V. (2021). Modeling of functional support of sports activities of biathletes of different qualifications. https://rua.ua.es/dspace/handle/10045/101912

Saputro, A. D., Rohaeti, E., & Prodjosantoso, A. K. (2018). Promoting critical thinking and problem solving skills of Preservice elementary teachers through process-oriented guided-inquiry learning (POGIL). *International Journal of Instruction*, *11*(4), 777-794. https://eric.ed.gov/?id=EJ1191708

Setiawan, J. A., Suparno, S., Sahabuddin, C., Tasrif, T., & Ramadhan, S. (2020). The role of parents on the character education of kindergarten children aged 5-6 years in Bima. *Universal Journal of Educational Research*, *8*(3), 779-784. https://www.academia.edu/download/91186949/UJER7-19514447.pdf

Van Berkel, B., Vandevenne, J., Coursier, K., Alberts, V., Van Offenwert, J., Verduyckt, J., ... & Verswijvel, G. (2021). Chest CT diagnosis of COVID-19: accuracy using CO-RADS and CT-involvement scoring. *Journal of the Belgian Society of Radiology*, *105*(1), 17. https://pmc.ncbi.nlm.nih.gov/articles/PMC8034407/

Wang, L. (2019). Research on Intelligent Learning APP in Junior English Vocabulary Teaching. *Theory and practice in Language Studies*, *9*(12), 1573-1578. https://go.gale.com/ps/i.do?id=GALE%7CA608889550&sid=googleScholar&v=2.1&it=r&linkaccess=abs&issn=17992591&p=AONE&sw=w

Wang, X., Wen, P., Sun, Z. G., Xing, C. Y., & Li, Y. (2020). Combination of chest CT and clinical features for diagnosis of 2019 novel coronavirus pneumonia. *Open Medicine*, *15*(1), 723-727. https://www.degruyter.com/document/doi/10.1515/med-2020-0107/html

Yang, G., & Feng, X. (2024). Computer aided technology based on graph sample and aggregate attention network optimized for soccer teaching and training. *Journal of Big Data*, *11*(1), 48. https://link.springer.com/article/10.1186/s40537-024-00893-x

Zardari, B. A., Hussain, Z., Arain, A. A., Rizvi, W. H., & Vighio, M. S. (2021). Development and validation of user experience-based e-learning acceptance model for sustainable higher education. *Sustainability*, *13*(11), 6201. https://www.mdpi.com/2071-1050/13/11/6201

Zhang, B., Zhang, J., Chen, H., Chen, L., Chen, Q., Li, M., ... & Zhang, S. (2020). Novel coronavirus disease 2019 (COVID-19): relationship between chest CT scores and laboratory parameters. *European Journal of Nuclear Medicine and Molecular Imaging*, *47*, 2083-2089. https://link.springer.com/article/10.1007/s00259-020-04854-3

Zhao, J., Liu, T., & Li, S. (2024). Scalable computer interactive education system based on large-scale multimedia data analysis. *Journal of Intelligent Information Systems*, *62*(3), 665-682. https://link.springer.com/article/10.1007/s10844-022-00719-3