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Artificial Intelligence Virtual Instructor System: Badminton Learning Media Designed To Improve Learning Outcomes

Septian Raibowo[1], Bogy Restu Ilahi [2*], Oddie Barnanda Rizki[3]

[1,2,3]Affiliation : Physical Education, Faculty of Teacher Training and Education, University Bengkulu Bengkulu, Indonesia

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Abstract

Penelitian ini bertujuan untuk mengembangkan media pembelajaran interaktif berbasis *android* menggunakan aplikasi *Artifical Intelligence Virtual Instructur System* sebagai inovasi kolaborasi praktek dan teoritis dalam satu tempat dalam pembelajaran praktikum, dimana pembelajaran era abad 21 merupakan pembelajaran antar lintas pada mahasiswa penjas pada mata kuliah bulutangkis. Penelitian ini menggunakan metode *Research and Development (R&D)* yang mengacu pada model penelitian dan pengembangan 4D (*four-D*), yaitu pendefinisian (*define*), perancangan (*design*), pengembangan (*develop*), dan penyebaran (*disseminate*). Media pembelajaran berbasis android yang dikembangkan ini akan diujicobakan pada mahasiswa yang mengambil mata kuliah Bulutangkis, Program Studi Pendidikan Jasmani FKIP UNIB. Instrumen penelitian yang digunakan untuk mengumpulkan data pada penelitian ini menggunakan angket dan teknik tes. Terdapat tiga angket yang akan disebarkan dalam penelitian ini, yaitu angket ahli materi, angket validasi ahli media, dan angket tanggapan mahasiswa. Hasilnya, total skor yang diperoleh dari gabungan validasi ahli materi, media, dan pengguna adalah sebesar *139,5* atau memperoleh nilai rata-rata 4,1 yang artinya Media Pembelajaran Bulutangkis Berbasis *Artificial Intelligence Virtual Instructur System* yang peneliti kembangkan masuk ke dalam kategori Layak digunakan dalam kegiatan pembelajaran.

*Corresponding email : bogyrestu@unib.ac.id

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INTRODUCTION

One of the state universities in Bengkulu City, Bengkulu University is located in three different places: Air Sebakul, Cimanuk, and the Main Campus (Kandang Limun). Bengkulu City's Muara Bangkahulu District's Kandang Limun Village is home to the university's main campus. 97.84 Ha in terms of land area. For the purpose of educating the general public about Bengkulu University, information regarding the campus is crucial.

For students, usually information about the campus is obtained during campus introduction activities or better known as the OSPEK (Study Orientation and Campus Introduction) program. However, even though they have participated in the OSPEK program, there are still many new students who do not know in detail about their own campus, both from facilities, facilities, campus buildings, the latest information on campus, the availability of computers for students available in several buildings, the area around the campus, transportation that students can use to get to campus and the names of employees. Information on employees of the University of Bengkulu, both employee information and lecturer information is quite difficult to obtain. Students generally have problems finding data from the employees they are looking for and the main problem that is often encountered is that students have difficulty finding the NIP and full name of their own lecturers.

One of the required courses in the S1 Physical Education Study Program FKIP Unib is Badminton, which carries a two-credit weight. The learning objectives for this course, which is taught in odd (III) and even (IV) semesters, are for students to be able to recognize, comprehend, and play badminton sports appropriately. To make a high-caliber game, badminton requires the development of some fundamental techniques. The grip technique, body alignment, fundamental strokes, service strokes, foot movements, strategies, and tactics are the techniques used in badminton (Cabello-Manrique et al., 2022). Innovation is required in this day and age to manage both academic and practical learning. Although badminton's practical content is tightly tied to its theory, this does not mean that badminton's theory will automatically influence the caliber of learning results in the courses that are taught.

The learning media provided is not only meaningful for improving the quality of learning but it would also be better if the media was close to the students (Abdulrahaman et al., 2020). Students in the current era are Generation Z students, where they grew up in an era where the digital world is developing rapidly, so this generation is a generation that is literate in technology (Yong & Gates, 2014). Given how used kids are to technology, including devices, educators must see chances to reorganize the way they teach, such as creating learning materials (Blair & Sullivan, 2022) with AI applications.

The interaction of teaching and learning in the classroom is inseparable from the influence of the media used by teachers in delivering teaching materials. The more interesting the media used and supported by the delivery of materials by communicative teachers, the more students will be interested in following lessons in class. There are many benefits to be gained from using learning media., The use of learning media in the teaching and learning process can generate new desires and interests, 2 generate motivation and stimulation of learning activities and even have a psychological influence on students (Solikhin et al., 2022).

One of the rapidly developing technologies today is the smartphone. Smartphones are very useful because the internet facilities they bring become a window to the world to exchange information. So that it encourages the number of smartphone users to increase from year to year. In fact, a research institution 3 released on the detik.com portal stated that Indonesia is ranked fifth in the list of the world's largest smartphone users after China, America, India and Japan.

The existence of technology, especially smartphones, which are now increasingly developing must be addressed wisely. The benefits of the existence of this technology must continue to be explored for the sake of better human survival. The phenomenon of the high number of smartphone users is certainly a challenge and opportunity in itself in the world of education. The challenge is in the form of misuse for negative things. Besides being a challenge, the existence of smartphones also brings great opportunities to develop useful technology in the field of education. One of the benefits that can be taken from the existence of this technology is to use it as an effective, creative and educational learning medium. So that educational application media can continue to be developed, one of which is Artificial Intelligence (AI) technology..

Artificial Intelligence aims to develop technologies that allow real-time integration of computer-generated digital content with the real world (Chmait & Westerbeek, 2021). Apart from computer media, currently AR technology has been developed on Android smartphones (Xu et al., 2021) Smartphones with the Android operating system have many advantages, apart from the fact that there are so many users in Indonesia, the Android platform is also open source for developers to create applications.

Artificial Intelligence technology used as a learning medium is expected to improve student learning outcomes If this technology is used as a learning medium, students will be invited to think in real terms, without having to bring in the practical tools directly. This is an advantage for vocational schools that still lack practical tools.

Research on the development of AI-based learning media using the Virtual Intructure System application in the Badminton course is important to be carried out using the Research and

Development (R&D) method (S. Supriyono, 2022).

METHODS

This study uses the Research & Development (R&D) method, which aims to find, formulate, improve, develop, and test the effectiveness of products, models, methods/strategies/ways, or services that are effective and meaningful (Putra, 2011). This study refers to the 4D (four-D) research and development model as explained by Thiagarajan (1974). The 4D research and development model consists of four main stages, namely defining, designing, developing, and disseminating.

Participants

All students enrolled in the FKIP UNIB Physical Education Study Program for the academic year 2024–2025 made up the study's population. However, the study's sample, which consisted of students who completed the Badminton course through the Physical Education Study Program at UNIB, was selected using a proportional approach..

Sampling Procedures

Test methods and questionnaires were used in the collection of data for this investigation. The material expert questionnaire, the media expert validation questionnaire, and the student response questionnaire are the three that will be given out in this study. The purpose of distributing the questionnaire is to ascertain its viability.

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Materials and Apparatus

Research instruments are tools used to collect research data. The instruments used are objective questions and essays as well as questionnaires that researchers will distribute (Nind & Lewthwaite, 2020).

The instrument's outline is as follows. The elements evaluated for the student assessment questionnaire are learning, materials, learning media display, and its application. In contrast, learning (learning objectives, delivery of materials, and evaluation) and materials (relevance and material selection) are evaluated in the material experts' assessment questionnaire. The media specialists' assessment questionnaire comes next, and it evaluates the usage and presentation of educational media. Ten multiple-choice questions are used in the test to gauge pupils' comprehension.

Procedures

The development of learning media for Physical Education and Sports Management based on Collaborative Teaching Style consists of 4 main stages. The following is the flow of the implementation of the research procedure that the researcher will carry out.

1. Tahap Pendefinisian (Define)
   a. Activities in this stage are initial – final analysis, student analysis, material analysis, task analysis, and specification of learning objectives.
   b. Material Analysis This material analysis is the basis for compiling learning objectives. This material analysis is also useful in determining the parts of the

material that will be studied in learning.

c. Task Analysis This task analysis is compiled based on basic competencies and achievement indicators in badminton learning materials.
d. Specification of Learning Objectives The activities carried out by researchers at this stage are to describe basic competencies into more specific indicators and to adjust them to the results of the material analysis and task analysis carried out previously.

2. Design Stage

The aim of this stage is to produce a design for learning devices. Activities at this stage are:

a. Media selection At this stage, the researcher determines the right and appropriate media to present the Physical Education and Sports Management material that is in accordance with the learning model used. The selection of media is adjusted to the learning objectives, student characteristics, teaching and learning strategies, time, media functions, and the lecturer's ability to use the media.
b. Format selection At this stage, the researcher selects a format for designing content, selecting learning strategies, and learning resources that are in accordance with the principles, characteristics, and steps that are in accordance with the learning model used.
c. Initial design The initial design of the learning devices in this study includes the Learning Implementation Plan (RPP), Student Worksheets (LKM) and Learning Outcome Tests. The design of the learning devices and learning outcome test instruments produced

3. Development Stage

The purpose of the development stage is to produce a good final draft of the learning device. Activities at this stage are:

a. Expert validation The results of the initial design, namely draft I, were validated by the validator, and the revision was used as a basis for improving the learning device to obtain draft II.
b. Readability Test The readability test was conducted on several selected students and fellow lecturers to see whether the learning tools in the form of LKM, learning outcome test instruments, and RPP could be read clearly and easily understood.

4. Dissemination Stage

The aim of this stage is to conduct validation tests on learning devices that have been tested and revised, then distributed to the field.

Design or Data Analysis

The data analysis technique used in this study is questionnaire data for material experts and media experts as well as student response questionnaires carried out with five assessment scales, where the highest score is 5 (strongly agree) and the lowest score is 1 (disagree). To calculate the total average score of each questionnaire, the formula is used: $X = \Sigma X / N$. The scores obtained are then converted according to the table reference below:

Table 1. Convert scores on a five-point scale

Value Interval	Category
X > Xi + 1,8 Sbi	Strongly Agree
Xi + 0,6SBi < **X** ≤ Xi + 1,8Sbi	Agree
Xi - 0,6SBi < **X** ≤ Xi + 0,6Sbi	Quite Agree
Xi – 1,8SBi < **X** ≤ Xi - 0,6Sbi	Disagree Less
X ≤ Xi – 1,8Sbi	Don't Agree

RESULT

34 students who attended the Badminton course in semester three of class A participated in the testing phase of the Artificial Intelligence Virtual Instructor System learning media, which has been validated by media professionals and material specialists. Prior to testing, the researcher had a Zoom conversation to go over how to use the learning materials. Next, in order to facilitate students' understanding of the functioning of the Artificial Intelligence Virtual Instructor System learning media, the researcher forwarded a link to a simulation. In order to access the Artificial Intelligence Virtual Instructor System learning materials aided by the program, the researcher additionally requested that students register using a Gmail account or any other social network account.

The trial was conducted 4 times with varying levels of difficulty of questions and materials. Although the questions produced by the researcher were 9 Artificial Intelligence Virtual Instructor System questions from 9 chapters of material, the trial only used 4 Artificial Intelligence Virtual Instructor System questions with varying levels of difficulty. This was due to the limited time for collecting the trial results. However, these 4 Artificial Intelligence Virtual Instructor System questions are a representation of the Badminton material. The four materials are 1) History of Badminton, 2) basic techniques of Badminton, 3) facilities and infrastructure for Badminton, and 4) Badminton rules. The following are the results of the trial of using the Artificial Intelligence Virtual Instructor System Badminton learning media for students.

Table 2. Media Trial Results

No	Type of Material	Average
1	History of Badminton Game	81,44
2	Development of Badminton	83,02
3	Badminton Game Techniques (Passing & Dribbling)	79
4	Badminton playing techniques (Shooting and Catching)	76,1
	Average	**79,89**

The table above is a description of the results obtained in the implementation of the trial on 32 students who took the Badminton course. Where each material that is transformed into the form of Artificial Intelligence Virtual Instructor System as a learning media consists of 20 Artificial Intelligence Virtual Instructor System questions per topic of material. It can be seen that for the material History of Badminton obtained by students amounted to 81.44 The material presented in the learning media in the form of Artificial Intelligence Virtual Instructor System is material with a moderate level of difficulty because this material is quite familiar to students. The closeness and characteristics known to students are what make this material have a moderate level of difficulty. Of course this has implications for the results of the trial obtained by students, namely in the category of Eligible

In the second trial with the material of Badminton development, students overall obtained an average score of 83.02. There was an increase in results between the first trial and the second trial. This happened because students were already familiar with this learning media. Unlike the first trial where students were using the Artificial

Intelligence Virtual Instructor System application media for the first time, in the second stage, students felt that they were used to it and were also supported by the level of difficulty of the material which was categorized as Eligible.

Next is the trial stage 3 and stage 4 which the level of difficulty of the questions is categorized as high. In the trial stage 3 with the material of basic badminton game techniques. The average value obtained by students on this material is Eligible Not much different from the trial stage 3 with the material of basic badminton game techniques, the results of the trial in stage 4 showed that students obtained an average score of 4 for the discussion of basic techniques (Shooting & Catching) All trials conducted by researchers from trial stage 1 to trial 4 showed Eligible results, namely the four trials obtained an average score of 79.89. This means that the transformation of Badminton material into the form of Artificial Intelligence Virtual Instructor System learning media based on Android provides a fairly good understanding for students or users. This is in line with the results of the validation of materials and media, where the learning media that researchers create obtains results that are feasible for use in learning.

DISCUSSION

The research conducted by the researcher shows that the development of the Artificial Intelligence Virtual Instructor System Badminton learning media based on android assisted by this application is feasible to be used as a learning media in Badminton courses. This research and development adapts a learning model consisting of 4 main stages. However, based on the research objectives mentioned earlier, it should be underlined that the research that adapts this 4D model is only carried out up to the development stage. Where at that stage there is only a trial of products that have been validated by material experts and media experts to students. The research procedure consists of the definition stage (define), the design stage (design), and the development stage (develop).

The definition stage is a stage carried out to analyze the needs related to users, namely lecturers who teach courses and also students who take Badminton courses. In addition to analyzing needs, this stage also aims to determine the tendency of the use of learning media in literature courses in the Physical Education Study Program. Data from this needs analysis were obtained from questionnaires that had been answered by prospective users of the Artificial Intelligence Virtual Instructor System learning media which were distributed using Google Form. The results showed a scale of 4.7 and 3.4 from an average minimum interval of 3. This means that the development of Android-based Artificial Intelligence Virtual Instructor System learning media is feasible.

Simple media creation using the help of an android application to create an Artificial Intelligence Virtual Instructor System and also a fast distribution flow to students and the hope of a more interesting and interactive learning situation for students using the online Artificial Intelligence Virtual Instructor System media. The conclusion is that the Android-based Artificial Intelligence Virtual Instructor System learning media is needed for its

development. In addition, from the needs analysis by providing 8 questions to students as part of media users, it can be concluded that there is great interest from students to use learning media in the form of Artificial Intelligence Virtual Instructor System games where the game is packaged in android technology so that students become more interested and feel more embraced by the adjustment of technology in the generation Z era.

The design stage is carried out with the help of an application. The stages that researchers carry out in this stage are choosing materials, designing test items, and finally designing the display. Researchers choose Badminton with the aim of arousing students' interest in the game material. The combination of classic materials with technology is the key to making students more enthusiastic in learning the game of Badminton. The next stage is the stage of designing test items where the main source of material that researchers will transform into the form of statement questions and questions of the Artificial Intelligence Virtual Instructor System is from (Wismanadi et al., 2020). The last stage is the stage of designing the Artificial Intelligence Virtual Instructor System box based on the questions that have been created. At this development stage, researchers are assisted by the application. The results are then distributed to students in the form of links via any social media. Users only need to click on their respective Android displays and then the Artificial Intelligence Virtual Instructor System game will appear which is a transformation of the Badminton material. The results of the preparation of this media are then validated by media experts and also material experts and users of learning media.

This validation was carried out by giving a questionnaire to the expert validator of the material. This questionnaire contains 16 statements that are grouped into 3 aspects, namely the aspect of the question material, the aspect of language, and the aspect of implementation. Overall, the aspect of the question material received an average value of 4.06, which means that it is included in the category of being suitable for use as a learning medium. Next is the validation carried out by media experts which aims to assess the feasibility of the media that the researcher has created. The questionnaire distributed to media experts consists of 1 aspect with 6 statement items. The results obtained a score of 3.8 which means that this media is suitable for use in learning. After validation by media experts and material experts, the next stage is the trial of the Artificial Intelligence Virtual Instructor System Badminton learning media to 34 students as users. The trial was carried out 4 times with 4 materials of varying levels of difficulty. The materials are 1) History of Badminton 2) Development of Badminton, 3) Badminton game techniques (Passing & Dribbling), 4) Badminton game techniques (Shooting & Catching). Overall, the results of the trial showed that students scored an average of 79.89, which means that the transformation of Badminton material into the form of Artificial Intelligence Virtual Instructor System Badminton learning media based on Android provides a fairly good understanding for students or users.

After the trial, the researcher distributed a questionnaire containing student responses to the Android-based Artificial Intelligence Virtual Instructor System Badminton learning media. This questionnaire consists of two aspects, namely the learning aspect and the display aspect of the learning media. Overall, the user assessment of the Artificial Intelligence Virtual Instructor

System Badminton learning media obtained a score of 51.5 or an average score of 4.29, which means that for users, namely students, this media is categorized as very suitable for use in learning activities. The total score obtained from the combined validation of material experts, media, and users is 139.5 or an average value of 4.1, which means that the Artificial Intelligence Virtual Instructor System Badminton learning media that the researcher developed is categorized as suitable for use in learning activities.

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CONCLUSION

The conclusions that researchers can formulate from the Development of Badminton Learning Media Based on Artificial Intelligence Virtual Instructor System to Improve Learning Outcomes of Physical Education Students are as follows.

1. This research and development adapts a learning model consisting of 4 main stages. However, it should be underlined that the research that adapts the 4D model is only carried out up to the development stage. Where at that stage there is only a trial of products that have been validated by material experts and media experts to students. This research procedure consists of the definition stage (define), the design stage (design), and the development stage (develop).

2. Overall, the total score obtained from the combined validation of material experts, media, and users is 139.5 or obtains an average value of 4.1, which means that the Development of Badminton Learning Media Based on Artificial Intelligence Virtual Instructor System to Improve Learning Outcomes of Physical Education Students that researchers develop is included in the category of being suitable for use in learning activities.

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REFERENCES

Abdulrahaman, M. D., Faruk, N., Oloyede, A. A., Surajudeen-Bakinde, N. T., Olawoyin, L. A., Mejabi, O. V., Imam-Fulani, Y.

O., Fahm, A. O., & Azeez, A. L. (2020). Multimedia tools in the teaching and learning processes: A systematic review. *Heliyon*, *6*(11), Article 11. https://doi.org/10.1016/j.heliyon.2020.e05312

Blair, H. C., & Sullivan, H. (2022). Effects of Long-term Professional Development Training in Technology Integration on Teacher and Student Performance. *International Journal Of Instructional Technology*, *1*(1), Article 1. https://doi.org/doi.org/10.15408/ijit.vxix.xxxx

Cabello-Manrique, D., Lorente, J. A., Padial-Ruz, R., & Puga-González, E. (2022). Play Badminton Forever: A Systematic Review of Health Benefits. *International Journal of Environmental Research and Public Health*, *19*(15), 9077. https://doi.org/10.3390/ijerph19159077

Chmait, N., & Westerbeek, H. (2021). Artificial Intelligence and Machine Learning in Sport Research: An Introduction for Non-data Scientists. *Frontiers in Sports and Active Living*, *3*, 682287. https://doi.org/10.3389/fspor.2021.682287

Nind, M., & Lewthwaite, S. (2020). A conceptual-empirical typology of social science research methods pedagogy. *Research Papers in Education*, *35*(4), 467–487. https://doi.org/10.1080/02671522.2019.1601756

S. Supriyono. (2022). *RESEARCH AND DEVELOPMENT: MODEL BORG & GALL (BAHAN AJAR REVISI)*. https://doi.org/10.13140/RG.2.2.10113.94566

Solikhin, F., Handayani, D., & Rohiat, S. (2022). The Effect of Using Augmented Reality-Based Learning Media on Chemistry Students' Conceptual Understanding on Molecular Shape. *Acta Chimica Asiana*, *5*(2), Article 2. https://doi.org/10.29303/aca.v5i2.128

Wismanadi, H., Kafrawi, F. R., Pramono, M., Firmansyah, A., & Rusdiawan, A. (2020). Rasio Interval Training Dalam Latihan Shadow Bulutangkis Terhadap Power dan Kecepatan. *Journal Sport Area*, *5*(2), 186–198. https://doi.org/10.25299/sportarea.2020.vol5(2).5019

Xu, Y., Liu, X., Cao, X., Huang, C., Liu, E., Qian, S., Liu, X., Wu, Y., Dong, F., Qiu, C.-W., Qiu, J., Hua, K., Su, W., Wu, J., Xu, H., Han, Y., Fu, C., Yin, Z., Liu, M., … Zhang, J. (2021). Artificial intelligence: A powerful paradigm for scientific research. *The Innovation*, *2*(4), 100179. https://doi.org/10.1016/j.xinn.2021.100179

Yong, S.-T., & Gates, P. (2014). Born Digital: Are They Really Digital Natives? *International Journal of E-Education, e-Business, e-Management and e-Learning*, *4*(2), Article 2. https://doi.org/10.7763/IJEEEE.2014.V4.311