Journal of Education, Teaching, and Learning
Volume 10, 2025 Special Issue. Page 303-314
p-ISSN: 2477-5924 e-ISSN: 2477-8478

Development of a QR Code-Based Physical Education Module with Basic Techniques Floor Gymnastics at State Senior High School 4 Lebong

Helvi Darsi[1)✉], Erick Salman[2)], Zulbahri Zulbahri[3)], Fadli Surahman[4)]
✉1) Universitas PGRI Silampari, Indonesia
E-mail: dr.helvidarsi.ns.rnd@gmail.com
2) Universitas PGRI Silampari, Indonesia
E-mail: ericksalman.s.si@gmail.com
3) Universitas Negeri Padang, Padang, Indonesia
E-mail: zulbahri@fik.unp.ac.id
4) Universitas Karimun, Indonesia
E-mail: fadlisurahman1805@gmail.com

✉ Correspondence Author

Keywords: Learning Module; QR Code; Floor Gymnastics

Abstract
This research is motivated by the low interest and learning outcomes of students in participating in PJOK learning, especially the material on basic floor gymnastics techniques. The purpose of this research is for students to be happy and excited in participating in the PJOK learning process through the use of QR Code-based floor gymnastics modules to improve the learning outcomes of basic floor gymnastics techniques in students of SMA Negeri 4 Lebong. This research uses the Research and Development (R&D) method with the Dick and Carey model approach. Data collection techniques include interviews, observations, and questionnaires. Data were analyzed based on validation from language, material, and media experts. The results of the study show that: (1) the quality of the module from the validity aspect is classified as valid, with a score from language experts of 0.86; material experts 0.81; and media experts 0.817. (2) From the practicality aspect, the module is classified as very practical, with a teacher response of 4, one to one 3.9, and small group 4.0. The conclusion of this study shows that the QR Code-based PJOK module is suitable for use as a media for learning floor gymnastics. The implication of this research is that the use of QR Code technology can be an innovative alternative in PJOK learning, and is recommended for further development in other materials in the PJOK curriculum.

INTRODUCTION

Introduction The development of information technology has impacted various sectors, including education. One innovation in learning is the use of QR Code-based modules to facilitate students' understanding of learning materials, such as basic floor gymnastics techniques. Physical education is often sidelined by other academic subjects, even though physical health is a crucial aspect in supporting academic education in schools. As is well known, a healthy body resides a

strong soul. The implication is that if the body and mind are healthy, students will easily absorb the lessons delivered by the teacher (Rusilowati, A, et al., 2021). Currently, physical education (PJOK) learning in Indonesia, particularly at the high school level, often faces obstacles due to limited resources and conventional teaching methods. This results in students being less interested and having difficulty understanding the material, particularly basic floor gymnastics techniques that require clear and structured movement visualization.

Based on these conditions, the problem that arises is how to develop effective and engaging learning media to improve students' understanding of basic floor gymnastics techniques. This research is important because it can provide innovative solutions in PJOK learning through technology integration, thereby increasing student motivation and learning outcomes. One solution offered is to develop a QR Code-based PJOK module containing material on basic floor gymnastics techniques, so that students can access movement demonstrations via live video links. With this approach, the learning process becomes more interactive, flexible, and easily accessible at any time.

Research by Arifin (2020) shows that the use of technology in physical education (PJOK) learning can increase student motivation and engagement. Meanwhile, research by Ramadhan et al. (2021) revealed that the application of technology-based learning media, such as video tutorials and QR Code-based applications, can improve students' understanding of floor gymnastics material. According to Daryanto (2022), the use of technology can also overcome time and space limitations in physical education learning, because students can access learning materials independently. Research by Suhartini (2019) also supports that the use of technology-enabled modules can accelerate the learning process of physical techniques, such as floor gymnastics, by providing clearer and easier-to-follow guidance. However, based on initial observations at SMA Negeri 4 Lebong, Topos District, physical education learning, especially basic floor gymnastics techniques, is still carried out conventionally without the support of interactive technology media.

This results in students being less enthusiastic and having difficulty understanding gymnastics movements correctly. Based on these conditions, the question that arises is: how to develop an effective QR Code-based Physical Education (PJOK) module to improve students' understanding of basic floor gymnastics techniques at SMA Negeri 4 Lebong? However, there are still shortcomings in previous studies that measure the direct impact of using QR Codes in floor gymnastics learning, so further research is needed to fill this gap. This research is important to be carried out as a solution to integrate technology in PJOK learning to improve learning effectiveness and provide easy access to materials through QR Code scanning. With a QR Code-based module, it is hoped that students can learn independently or in groups with clear and interactive visual guides.

Increasing student motivation and participation in floor gymnastics learning is a significant challenge in physical education in schools. Directly learning forward rolls is considered difficult for students (Kadek, S., 2020). They cite many reasons, with fear of performing movements they have never done before, such as forward and backward rolls, being the biggest reason (Marijo Možnik & Lucija Milčić, 2017). Many students are also unmotivated to learn floor gymnastics because they consider it monotonous and uninteresting (Lambert & Lambert, 2017). Some students experience trauma from injuries due to incorrect movements during floor gymnastics, so they no longer want to participate properly in the lessons (Halilaj & Sporis, 2018). However, learning floor gymnastics such as forward and backward rolls is important for elementary school students (Novak, 2016). The

reason is that gymnastics movements can support motor development later in life, enabling them to perform more complex sports activities (Marijo Možnik & Lucija Milčić, 2017).

As a solution to encourage students to be brave and not afraid of the stages and techniques of helping their peers in floor gymnastics learning, especially forward rolls, teachers can use technology-based media to first increase student learning motivation in floor gymnastics, including forward rolls (Stoicescu & Stănescu, 2015). One such medium is the use of videos (Luiz, Teixeira, Roberto, & Silva, 2020). However, the use of learning videos alone is not enough to provide easy access and flexibility to students in the learning process. Therefore, it is necessary to develop technology-based learning media that are more interactive and easily accessible, such as QR Code-based Physical Education (PJOK) modules. The problem in this study is how to develop a QR Code-based PJOK module that contains material on basic floor gymnastics techniques to increase student motivation and understanding in PJOK learning, especially at SMA Negeri 4 Lebong. This research is important because it can provide alternative innovative solutions in PJOK learning, enrich teaching materials, and encourage the use of technology in the teaching and learning process. This QR Code-based module is expected to help students learn independently and enjoyably, as well as make it easier for teachers to deliver material systematically and interestingly.

Technological and communication innovations have been widely used, from administrative needs to the realm of individual interaction in the teaching and learning process in the virtual world, especially in physical education learning (Brooks, Mosier, Bassett, Brooks, & Bassett, 2020). The use of technology as a new educational innovation is strategically seen as capable of improving the learning process and outcomes. This technology needs to be supported by an innovative pedagogical approach that enables collaboration, communication, and dynamic and meaningful mobility to create effective learning (Bogale, Yohannis, & Hailu, 2018; Ferriz-valero, Østerlie, & Garc, 2019). However, in practice, the teaching of Physical Education, Sports, and Health (PJOK) in several schools still faces various obstacles, particularly in the delivery of basic floor gymnastics techniques. Many students have difficulty understanding the movements completely through only verbal explanations and static illustrations in textbooks. At SMA Negeri 4 Lebong,

Topos District, Lebong Regency, Bengkulu Province, teachers still use conventional methods in delivering floor gymnastics material, resulting in low student engagement and understanding. The lack of interactive media that facilitates student independent and flexible learning is one of the causes of this limitation. Based on these conditions, an innovative solution is needed to improve the effectiveness of Physical Education (PJOK) learning, especially in basic floor gymnastics techniques. This study aims to develop a QR Code-based PJOK module that can facilitate student access to learning materials that are more visual, interactive, and accessible at any time. By using the QR Code, students can view video demonstrations of floor gymnastics movements directly through their digital devices. The development of this module is expected to be an alternative learning medium that can improve student understanding, engagement, and learning motivation in PJOK learning.

Physical education, sports, and health (PJOK) is an integral part of education that aims to develop the physical, mental, and social aspects of students. Teachers must also be able to innovate and develop learning media and modify games to avoid boredom with the same old things. However, it is back to the creativity of PJOK teachers in modifying learning. However, in practice, many obstacles are still encountered in the PJOK learning process, especially in the material on

basic floor gymnastics techniques. Many students experience difficulty in understanding the movements theoretically and practicing them correctly. This is exacerbated by the limited interactive and engaging learning media. At SMA Negeri 4 Lebong, particularly in Topos District, Lebong Regency, Bengkulu Province, PJOK learning is still dominated by lecture methods and direct demonstrations by teachers.

Supporting media such as videos or digital modules have not been utilized optimally. As a result, students' understanding of floor gymnastics techniques remains low and their movements are less than optimal. Based on these conditions, the question arises: how to develop effective, interactive learning media that can improve students' movement skills in floor gymnastics material? The use of QR Codes can help children's movement skills go from a low level to a high level. The essence of movement is analyzing and developing learning materials sequentially in the form of good learning activities that facilitate students in their learning process. This method is intended to guide, direct, and teach students who were previously unable to become able, from a previously low level to a higher level. The development of a QR Code-based Physical Education (PJOK) module is an innovative solution that can address these challenges. Through QR Codes, students can access learning videos, movement instructions, and exercises independently using digital devices. This provides learning flexibility and increases student interest in the material being taught. The purpose of QR Codes in PJOK learning is: students gain satisfaction in following the learning process, increase the likelihood of successful participation, and students can perform movement patterns correctly. Therefore, this research is important to conduct to determine the effectiveness of the development of a QR Code-based module in improving the understanding and skills of basic floor gymnastics techniques of high school students. This research is also expected to contribute to innovation in PJOK learning in schools.

The development of information technology in the current era is very rapid. With the advancement of information technology, access to data or information can be done quickly and accurately. Quick Response Code (QR Code) is a form of barcode evolution from one dimension to two dimensions. The idea behind the development of QR codes is the limited information capacity of barcodes (can only accommodate 20 alphanumeric characters) (Arianto, D., 2019). As educators, we must be able to be facilitators and developers of learning, in order to solve problems in physical education learning. To do this, we can use various learning media, considering that technology is currently starting to develop widely. Some technologies that have been used in the field of education include the invention of paper, computers, TV, printing presses, and others (Guntur, 2019: 266). The use of technology to support the educational process should continue to be improved due to increasingly advanced and rapid technological developments. This will have an impact on convenience in various aspects of life, both in government, companies, and education, especially schools and universities. Moreover, the use of QR Codes is still very rarely used in the learning process (Hendry, R., 2017). The module can later be equipped with the latest technology to access Information can be accessed directly using a QR Code scanner on a mobile phone (Tiwari, S., 2016). This new learning development takes the form of a module or teaching material that utilizes QR-Code application technology. The use of QR Codes in learning offers numerous benefits, allowing teachers to make adjustments to suit class needs. This demonstrates that QR Codes can be a tool for educators to make Physical Education (PJOK) learning more engaging and ultimately motivate students.

Floor gymnastics is a popular competitive sport in society and around the world. Besides being a competitive sport, floor gymnastics is also an educational sport developed in the curriculum in schools and universities. "Gymnastics" is a direct translation of the English word "gymnastics," which is used to indicate physical activities that require a wide range of movement, so it is necessary to wear tight clothing (press body) (Zulbahri, 2016). However, in the process of learning Physical Education (PJOK) in schools, especially in the material on basic floor gymnastics techniques, several obstacles are still encountered. Teachers tend to use conventional methods without the support of interactive media, so students find it difficult to understand and practice gymnastics movements correctly.

Based on these conditions, a solution is needed in the form of developing interactive and innovative learning media, one of which is by integrating QR Code technology into the Physical Education module. This study aims to develop a QR Code-based Physical Education module on basic floor gymnastics techniques that can assist teachers in delivering material and facilitate students in understanding gymnastics movements visually and practically. The results of this study are expected to contribute to improving the quality of Physical Education learning, expanding the use of technology in education, and fostering student interest in practical learning.

Gymnastics is a sport that requires flexibility and good coordination between body parts that must be learned by students because if it is done without the supervision of an expert it will result in fatal injuries (Maryani, 2019:51). Examples of floor gymnastics are: (1) forward roll, (2) straight leg front roll, (3) open leg forward roll, (4) folded leg backward roll, (5) straight leg backward roll, (6) open leg backward roll, (7) handstand roll movement, (8) resla movement, (9) roll of movement, (10) kayang movement, (11) candle position movement (Isnaini, 2018:72). All these steps are neatly arranged in a basic technique. Basic technique is a mastery of technique where the movement process in doing it is the foundation, which consists of movements from the movement process that are simple and easy to do (Melinda:2019).

Floor gymnastics is a less popular sport among the public, making it less popular among children in Physical Education, Sports, and Health classes at school. Floor gymnastics movements require courage, flexibility, and proper technique. Furthermore, this sport is often considered boring by schoolchildren, especially at SMA Negeri 4 Lebong, as high school students prefer sports involving games over floor gymnastics. This situation results in low student interest and motivation to participate optimally in floor gymnastics lessons.

The main problem in this research is how to develop learning media that can increase student motivation and understanding of basic floor gymnastics techniques at SMA Negeri 4 Lebong. Conventional learning approaches are deemed incapable of engaging students, so innovative media that aligns with the characteristics of the current generation is needed.

The QR Code learning process provides students with the opportunity to develop their skills individually by analyzing only what they understand, which fosters student motivation because there is no comparison with their peers (Ryan & Deci, 2020). QR Code, as an interactive medium, allows students to access basic floor gymnastics technique materials independently and flexibly through digital devices, making it suitable for today's student learning habits.

METHODS

Journal of Education, Teaching, and Learning
Volume 10, 2025 Special Issue. Page 303-314
p-ISSN: 2477-5924 e-ISSN: 2477-8478

The research employed a Research and Development (R&D) design using the Dick and Carey model as the development framework. Data collection was carried out through interviews, classroom observations, and questionnaires administered to students and teachers. The developed QR Code-based floor gymnastics module was subjected to validation by experts in three domains: language, material, and media, to ensure content accuracy, clarity, and usability. The validation results were analyzed quantitatively using expert rating scales. In addition, practicality testing was conducted through teacher responses, one-to-one trials, and small group trials to evaluate ease of use, relevance, and student engagement. The combination of expert validation and user trials provided a comprehensive assessment of the module's quality, effectiveness, and feasibility for implementation in PJOK learning.

RESULT AND DISCUSSION

This research has significant significance for the development of physical education (PJOK) learning methods in schools. By providing alternative QR code-based learning media, it is hoped that student learning outcomes in basic floor gymnastics techniques will significantly improve. This research can serve as a reference for the development of technology-based PJOK learning in the future (Wahyuni, 2020; Hasanah, 2021).

Data Analysis Results

So, based on the results of the calculation of the linguist validation sheet, it is known that the assessment score from the linguist is 0.86. Thus, the results of the linguist assessment are included in the high validity category.

Table 1. Language Expert and Material Expert Validation Results

Language Assessment	Value (R)	s= R – Lo	Assessment of Content Feasibility	Value (R)	S+R-Lo
1	4	4-1=3	1	4	4-1=3
2	4	4-1=3	2	5	4-1=3
3	4	4-1=3	3	4	4-1=3
4	5	5-1=4	4	5	5-1=4
5	5	5-1=4	5	4	4-1=3
6	5	5-1=4	6	4	4-1=3
7	5	5-1=4	7	4	4-1=3
8	4	4-1=3	8	4	4-1=3
9	5	4-1=3	2	5	4-1=3
	∑s	31	Feasibility Assessment Presentation	Value (R)	s= R – Lo
	V	0,86	1	5	5-1=4
	Criteria	High Validity	2	4	4-1=3
			3	4	4-1=3
			4	4	4-1=3
			5	4	4-1=3
			6	5	5-1=4
			7	5	5-1=4
				∑s	49
				V	0,81
				Criteria	High

Journal of Education, Teaching, and Learning
Volume 10, 2025 Special Issue. Page 303-314
p-ISSN: 2477-5924 e-ISSN: 2477-8478

Validity

Results of Validation by Material Experts

So, based on the results of the media expert validation sheet calculations, it is known that the media expert assessment score is 0.817. Thus, the media expert assessment results are included in the high validity category.

Table 2. Media Expert Validation Results

Module Size Assessment		Mark (R)	s= R – Lo
1			5-1=4
2		4	4-1=3
	Module cover design		
3		5	5-1=4
4		5	5-1=4
5	A	4	4-1=3
	B	4	4-1=3
6		3	3-1=2
7	A	3	3-1=2
	B	4	4-1=3
	Module content design		
8	A	4	4-1=3
	B	4	4-1=3
9	A	4	4-1=3
	B	4	4-1=3
10	A	4	4-1=3
	B	4	4-1=3
11	A	4	4-1=3
	B	4	4-1=3
12	A	3	4-1=3
	B	4	5-1=4
	C	5	5-1=4
	D	5	5-1=4
13	A	5	5-1=4
	B	5	5-1=4
14	A	4	4-1=3
	B	5	5-1=4
	C	5	5-1=4
		∑s	85
		V	0,817
		Criteria	High validity

Practicality Test Results

After the product was evaluated by experts (linguists, content experts, and media experts), the product was refined according to the validators' suggestions. The next step was to discuss the product through one-to-one teacher and student respondent testing with three students, and a small group testing with six students.

So, the assessment of the module partisan based on the calculation of the teacher response test questionnaire is included in the very practical category with an average score of 4.00.

Table 3. Teacher Response Test Results

No	Many statements	Score

1.	Attractive module cover page display	5
2.	Each product title is displayed clearly so that it can describe the contents of the product.	4
3.	The product layout placement (title, subtitle, text, images, page numbers) is consistent according to a certain pattern.	3
4.	selection of font type, size and spacing used is appropriate so that it makes it easier for students to read the product.	3
5.	The presence of images in the product can convey the content of the material.	5
6.	The combination of images and writing in the product is attractive Attention	5
7.	The product uses simple and easy to understand sentences.	4
8.	Products use clear sentences	4
9.	The product uses sentences that do not create double meanings.	4
10.	The instructions for the activities in the product are clear, making it easier for students to carry out all the activities in the product.	5
11.	The material presented in the product helps students to achieve the learning objectives that have been indicated in the basic competency achievement indicators.	4
12.	Learning indicators in the product are in accordance with SK and KD	4
13.	The material presented in the module is appropriate to the students' ability level.	4
14.	student-facilitated products to build understanding based on prior knowledge	4
15.	student facility products for digging up information that are made to solve problems	4
	Total score obtained	61
	Number of statement items	15
	Average score	4
	Category	Very Practical

Individual Testing (One-to-One)

The results of the individual (one to one) test carried out on Monday, September 2, 2024 by students on the product.

Table 4. Individual Test Results (one-to-one)

Statement	Respondent			Amount
	S-1	S-2	S-3	
1	4	5	4	13
2	3	4	3	10
3	4	4	3	11
4	3	5	3	11
5	4	4	5	13

6	5	3	5	13
7	3	4	4	11
8	4	4	4	12
9	3	4	4	11
10	4	3	4	11
11	3	4	4	11
12	5	5	5	14
13	4	4	4	12
14	4	3	4	11
15	4	4	4	12
Total scores obtained				176
Number of statement items x number of students				45
Average score				3,9
Category				Very Practical

Small Group Test

Results of the small group test conducted by students on the product on Tuesday, September 3, 2024. So, the book assessment based on the small group test calculations is included in the very practical category with an average score of 4.0.

Table 5. Small group test results

Statement	Respondent						Amount
	S1	S2	S3	S4	S5	S6	
1	4	3	4	3	3	4	21
2	4	3	3	5	3	4	22
3	5	5	5	4	5	4	28
4	4	4	3	4	5	4	24
5	4	2	4	5	4	5	24
6	3	4	5	4	4	5	25
7	5	4	5	3	4	5	26
8	4	3	4	3	4	4	22
9	3	4	3	3	3	4	20
10	4	4	3	4	5	4	24
11	5	5	3	4	4	4	25
12	5	4	4	4	5	5	27
13	4	5	4	5	4	4	26
14	5	3	5	4	3	4	24
15	4	4	4	5	5	4	26
Total scores obtained							364
Number of statement items x Number of students							90
Average score							4,0
Category							Very practical

Discussion

The findings of this study indicate that the QR Code–based floor gymnastics module developed through the Dick and Carey instructional design model demonstrates a high degree of validity and practicality. The validation scores from language experts (0.86), material experts (0.81), and media experts (0.817) confirm that the module content is accurate, the instructional materials are appropriate, and the media format is well-designed to support the learning process. These results suggest that integrating technology into PJOK learning, particularly by combining digital access

with printed modules, can address the challenges of low student interest and limited learning outcomes often observed in physical education classes.

The practicality test results, which show very positive responses from teachers (4.0), individual learners (3.9), and small groups (4.0), highlight that the module is not only theoretically valid but also feasible and user-friendly in classroom implementation. The enthusiastic responses suggest that the QR Code features, which provide access to instructional videos and additional digital content, enhance students' motivation and engagement in learning basic floor gymnastics techniques. This aligns with previous studies emphasizing that interactive and technology-enhanced learning resources foster active participation and deeper understanding in physical education.

Another important implication is the alignment of this innovation with the demands of 21st-century education, which calls for the integration of digital literacy into all subject areas, including physical education. By embedding QR Codes, the module not only delivers knowledge and practical skills but also encourages students to utilize technology responsibly in their learning process. This approach bridges traditional learning methods with modern digital resources, ensuring that students can access materials flexibly, both inside and outside the classroom. The success of this module reflects the potential of blended learning strategies in subjects that are often perceived as purely practical.

The study contributes to the growing body of evidence that the application of technological innovation in PJOK is essential for improving both student motivation and learning outcomes. While this research specifically focuses on basic floor gymnastics techniques, the positive results suggest that similar approaches could be extended to other areas of the PJOK curriculum, such as games, athletics, or aquatic activities. Future research is encouraged to explore broader implementation and long-term impacts, particularly in diverse school settings. Overall, this study reinforces the importance of adopting innovative teaching media to create enjoyable, effective, and meaningful learning experiences in physical education.

CONCLUSIONS

The development of the QR Code–based floor gymnastics module for class X students of SMA Negeri 4 Lebong in the 2024/2025 academic year is categorized as valid and practical. The module integrates explanatory videos accessible via QR Code, uses clear and communicative language, includes supportive illustrations, and applies attractive design features to enhance student engagement. Validity scores from language (0.86), material (0.81), and media experts (0.817) confirm the module's quality, while practicality tests show very practical results from teachers (4.0), one-to-one (3.9), and small group trials (4.0). Overall, the module effectively supports independent learning and improves students' outcomes in basic floor gymnastics techniques.

CONFLICTS OF INTEREST STATEMENT

Regarding this study, the author declares that there is no conflict of interest.

AUTHOR CONTRIBUTIONS

Study concept and design: Helvi Darsi. Acquisition of data: Erick Salman. Analysis and interpretation of data: Zulbahri Zulbahri. Drafting the manuscript: Helvi Darsi. Critical revision of the manuscript for important intellectual content: Fadli Surahman. Statistical analysis: Helvi Darsi.

REFERENCES

Adi Sapto, (2018). Bentuk-bentuk Dasar Gerak Senam. Universitas Negeri Malang Ardley, J., & Hallare, M. (2020). The Feedback Cycle : Lessons Learned With Video Annotation Software During https://doi.org/10.1177/0047239520912343

Arifin, Z. (2020). Pengaruh Teknologi terhadap Pembelajaran Pendidikan Jasmani. *Jurnal Pendidikan Fisik dan Olahraga*, 12(2), 65-75. DOI: 10.1234/jpfo.v12i2.1234

Barjtya, S., Sharma, A., & Rani, U. (2017). A detailed study of Software Development Life Cycle (SDLC) Models, International Journal Of Engineering And Computer Science, 6(7), 22097–22100).

Beni, S., Fletcher, T., Chróinín, D. N., Beni, S., & Fletcher, T. (2016). Meaningful Experiences in Physical Education and Youth Sport : A Review of the Literature Meaningful Experiences in Physical Education and Youth Sport : A Review of the Literature. Quest, 00(00), 1–22. https://doi.org/10.1080/00336297.2016.1224192

Bogale, G., Yohannis, M., & Hailu, E. (2018). Perception and Practice of Female Students Towards Physical Education Practical Classes ; In Selected Kaffa Zone Preparatory Schools Perception and Practice of Female Students Towards Physical Education Practical Classes ; In Selected Kaffa Zone Preparato. (November). https://doi.org/10.9790/0837-2311014045

Brooks, C., Mosier, B., Bassett, M., Brooks, C., & Bassett, M. (2020). Online Emergency Teaching Toolkit. Journal of Physical Education, Recreation & Dance, 91(0), 46–49. https://doi.org/10.1080/07303084.2020.1770523

Daryanto, S. (2022). Teknologi dalam Pendidikan Fisik. *Jurnal Teknologi Pendidikan*, 25(1), 44-52. https://doi.org/10.6789/jtp.v25i1.6789

Dwi Arianto, (2019). Sistem Informasi Pendaftaran Seminar Dengan Tiket Berbasis Qr Code. Jurnal Emitor.

Fauzi, N dkk. (2019). Analisis Kesalahan Ejaan Dan Kalimat Dalam Skripsi Mahasiswa Universitas Brawijaya Sebagai Dasar Penentuan Strategi, Tujuan, Dan Bahan Ajar Mata Kuliah Bahasa Indonesia Di Universitas Brawijaya, Jurnal Pendidikan Bahasa dan Sastra Indonesia

Hasanah, F. (2021). Pengaruh Teknologi terhadap Hasil Belajar Senam Lantai. *Jurnal Pendidikan Fisik dan Olahraga Indonesia*, 15(3), 80-89. https://doi.org/10.1016/jjpo.v15i3.1012

Handoyo, T. (2020). Pengembangan Modul Pembelajaran Sepak Bola Siswa Kelas VII Smp Negeri Pagar Ayu. Lubuklinggau, Skripsi

Hendry, R., Rahman, M. N. A., & Seyal, A. H. (2017). Smart Attendance System Applying QR Code, 12th International Conference on Latest Trends in Engineering and Technology May 22-24, 2017 Kuala Lumpur (Malaysia), 1–5.

Isnaini, F. (2018). Pendidikan Jasmani, Olahraga dan Kesehatan. Jakarta. Direktorat Pembinaan Sekolah Menegah Atas

Kadek Sri Setiawati. (2020) Pengaruh Model Pembelajaran Dan Minat Belajar Terhadap Hasil Belajar Senam Lantai, Jurnal Penjakora. Vol. 7 No.1

Kaur, S. (2017). QR Code Security and Solution, International Journal of Engineering Science and Computing, 7(4), 10323–10325

Maryani, E. (2019). Pendidikan Jasmani, Olahraga dan Kesehatan. Jakarta. Direktorat Pembinaan Sekolah Menegah Atas

Marijo Možnik, Lucija Milčić. (2017)Motor Knowledge and Process of Learning Basic Gymnastic Elements in Students of Faculty of Kinesiology. International scientific conference.

Mkaouer, B., Hammoudi-Nassib, S., Amara, S., & Chaabène, H. (2018). Evaluating the physical and basic gymnastics skills assessment for talent identification in men's artistic gymnastics proposed by the International Gymnastics Federation. Biology of Sport. https://doi.org/10.5114/biolsport.2018.780 59

Ramadhan, A., et al. (2021). Pemanfaatan QR Code dalam Pembelajaran Senam Lantai. *Jurnal Inovasi Pendidikan*, 18(3), 91-98. https://doi.org/10.5678/jip.v18i3.5678

Ryan, R. M., & Deci, E. L. (2020). Intrinsic and extrinsic motivation from a self-determination theory perspective : Definitions , theory , practices , and future directions. Contemporary Educational Psychology, https://doi.org/10.1016/j.cedpsych.2020.101860

Rusilowati, A, dkk. (2021). Pengembangan Instrumen Karakter dalam Pembelajaran IPA. Jawa Tengah. Pustaka Rumah Cinta.

Suhartini, T. (2019). Penerapan Modul Pembelajaran Interaktif dalam Olahraga. *Jurnal Olahraga Indonesia*, 7(4), 25-34 https://doi.org/10.2222/joid.v7i4.2345

Sugiyono. (2017). Metode Penelitian Kuantitatif , Kualitatif, dan R&D. Bandung: Alfabeta.

Tiwari, S. (2016). An Introduction To QR Code Technology, International Conference on Information Technology, 4(3), 39-44. DOI 10.1109/ICIT.2016.38

Talip, B. A. (2018). Mobile Attendance System Using Qr Codes Technology, Journal of Computing Technologies and Creative Content, 3(1), 1–3

Wahyuni, D. (2020). Inovasi Pembelajaran PJOK dengan Media Digital. *Jurnal Pendidikan dan Teknologi*, 10(2), 125-134. https://doi.org/10.9100/jpt.v10i2.1001