



## M-LEARNING APPLICATION IN TEACHING BADMINTON FOR PHYSICAL EDUCATION STUDENTS IN VIETNAM

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### Abstract:

The article evaluates the efficacy of M-learning in instructing the Badminton course for K14 university students at the University of Sports and Physical Education in Ho Chi Minh City, Vietnam. Utilizing an experimental design, it contrasts the outcomes of two groups: the K13 students who were taught through conventional face-to-face methods and the K14 students who engaged in blended learning. Both groups were exposed to identical content and assessment procedures. The findings indicate that students in the blended learning approach outperformed their peers in the traditional setting. The study also delves into resource utilization and collects feedback from learners, underscoring the advantages of M-learning in Badminton instruction.

**Keywords:** blended learning, LCMS, M-learning badminton, physical education

### 1. Introduction

In recent years, Mobile Learning (M-learning) for training and management has become a trend in large universities in Vietnam. With numerous remarkable advantages, it has significantly transformed the process of self-learning due to its personalized capabilities, effectively meeting learners' educational activities. Alongside technological advancements, the creation of modern M-learning environments and the development of online teaching content are evolving to be more accessible to learners. This learning model brings flexibility to both learning and teaching, seemingly erasing the constraints of time and space in modern M-learning [1]. In an era where higher education budgets prioritize new expenditures, utilizing resources available from students can substantially

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reduce investment costs for equipment and maintenance, while enhancing the quality of education through efficient utilization.

While many universities across the country have made considerable strides in utilizing mobile devices owned by learners for training and management, this domain remains relatively novel in the field of physical education at sports training institutions nationwide. Transmitting foundational and specialized knowledge is primarily carried out through direct teaching efforts. After classroom sessions, learners often struggle to review the covered content and encounter difficulties accessing the materials that instructors aim to deliver. Additionally, instructors are unable to assess learners' self-study progress beyond classroom hours. Given these reasons, M-learning emerges as an ideal solution for elevating the quality of physical education, both in specific fields and for sports education in Vietnam. Consequently, our study focuses on "Assessing the Application of M-learning in Teaching the Badminton Course for K14 University Students at the University of Sports and Physical Education in Ho Chi Minh City."

## 2. Literature Review

**Blended Learning** Blended learning can be defined as the combination of various pedagogical methods or teaching approaches, such as self-paced learning, cooperative learning, and traditional in-class teaching [2]–[4]. This structured education program involves learners engaging with content through digital and online mediums. Although blended learning relates to aspects of both traditional in-person and online learning, the two are not mutually exclusive [5]. Instead, this learning format combines approaches from both realms into a continuous learning method that intertwines activities [6]–[10]. Other researchers highlight the 'meaningful combination' between online and in-person learning [2], [11]–[13], asserting that blended learning isn't a singular linear approach to teaching. Technologically, blended learning encompasses a range of educational technologies that allow students to learn completely outside the classroom and interact with the curriculum through an online learning management system [5]. Though there are varying opinions on what should fall under the scope of blended learning, some notable characteristics include:

- Blended learning combines online learning forms with offline interaction [8], [12], [14].
- This approach enhances learners' independent work capabilities, enabling them to self-study and utilize materials and resources according to their preferences [10], [15], [16].
- Interactions among learners in online courses are crucial. The success of students participating in online classes heavily relies on their engagement with others in the online environment [6], [17].
- Learner support for online activities is essential. Instructors involved in these programs typically offer necessary help and assistance via both offline meetings and online solutions [6], [18].

Given the specifics of physical education, we chose a blended online teaching format that combines both online and in-person learning. Online learning focuses on theoretical content, while face-to-face sessions concentrate on practical components. In other research, [1], [19]–[21], classic researchers concerned with instructional effects on learner writing performance, explored integrating a Learning Management System (LMS) like Moodle into an English writing program based on a constructivist pedagogical approach. By deploying Moodle's content management system (CMS) technologies into the writing course, instructors benefited in terms of organization, implementation, distribution, communication, and evaluation. Sharing similar concerns, [19] examined Moodle's application in establishing a mixed badminton training course at the University of Sports and Physical Education in Ho Chi Minh City. Their findings revealed Moodle to be a powerful tool in teaching and learning. Through Moodle's writing tool, instructors can effectively coordinate teaching materials, develop communication channels, and collect student profiles via comprehensive statistical reports.

### **3. Methodology**

In the design of our study, we were dedicated to ensuring that our methodological approach was both comprehensive and rigorous. To achieve this, we integrated a variety of research techniques, including data synthesis, where multiple sources of information were compiled to provide a cohesive picture; in-depth analysis, where the gathered data was broken down to identify patterns and insights; personal interviews, which allowed us to gain qualitative insights directly from individuals; and robust statistical evaluations, where data was tested for validity, significance, and correlation.

Our study's participants were categorized into two distinct but equally vital groups. The first of these was the experimental group. This group was predominantly made up of K14 university students, with the total number reaching 181. They were exposed to a novel blended learning approach. When dealing with the theoretical component of their course, these students relied heavily on online resources. The knowledge they acquired was then assessed through a specialized online platform known as dosports.online. However, recognizing the importance of practical application and hands-on experience, the practical component was structured differently. Instead of online sessions, these students were brought together in offline settings, allowing for direct interaction, feedback, and experiential learning.

Contrastingly, the control group was rooted in the traditional educational approach. This group comprised K13 university students and had a slightly smaller total of 174 participants. Their entire learning journey, encompassing both the theoretical and the practical segments of the course, revolved around in-person teachings. Through this method, students experienced a uniform and consistent classroom atmosphere, benefiting from real-time interactions, spontaneous discussions, and immediate feedback from educators. The face-to-face nature of this group's learning ensured that they

remained embedded in the conventional classroom experience, making it an ideal control for comparing against the blended learning approach of the experimental group.

## 4. Results and Discussion

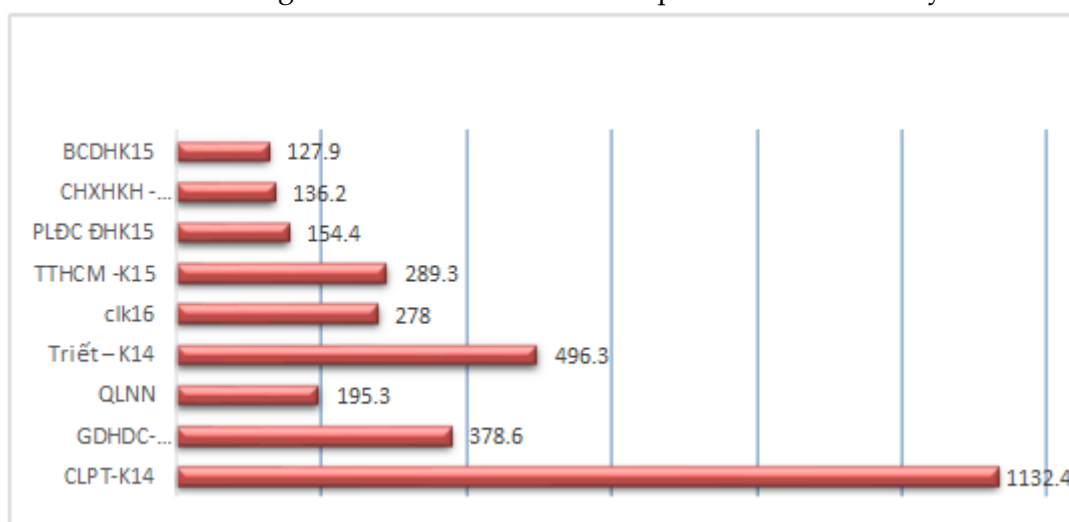
### 4.1 Evaluation of the Exploitation Level of the Badminton Course for K14 University Students in the dosports.online System

To assess the level of course exploitation, we extracted information from the ten courses with the highest data utilization rates within the dosports.online online learning management system during the teaching period. The results are presented in Table 1.

**Table 1:** Statistical Table of the Top 10 Courses with the Highest Average Interaction Rates on the System

No	Courses	Activities	No of participants	Average
1	CLPT-K14	204957	181	1132.4
2	GDHDC-ĐHK15	176800	467	378.6
3	QLNN	103681	531	195.3
4	Triết - K14	100743	203	496.3
5	clk16	75051	270	278.0
6	TTHCM -K15	68842	238	289.3
7	PLĐC ĐHK15	67801	439	154.4
8	CHXHKKH - K15FGHIJ	61001	448	136.2
9	BCDHK15	57279	448	127.9
10	TLHDC K15 - L1	55443	306	181,2

**Chart 1:** Average Interaction Rates of the Top 10 Courses in the System



Based on the statistics, we can observe that the Badminton Course for K14 University Students (denoted as CLPT-K14) demonstrates the highest level of interaction compared to all other courses on the system. This course has garnered 212,185 interactions among 181 users (participants). The average interactions per user account on

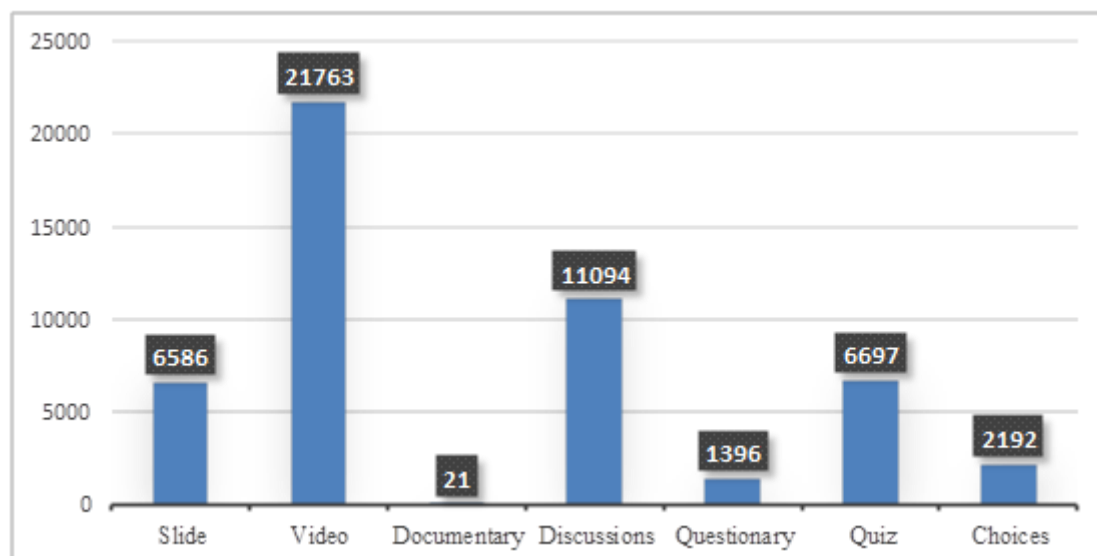
the system amount to 1,451.4 interactions/user, which is three times higher than the Triet Course for K14 (496.3 interactions/user).

To gain a deeper understanding of the interaction level within the course, we conducted an examination of the utilization of several instructional resources within the curriculum. The statistical outcome of interaction frequency is displayed in Table 2.

**Table 2:** Statistics on the Utilization of Selected Instructional Resources in the CLPT-K14 Course

No	Resources	No	Activities	Average (n=181)
1	Slides	6	6586	35
2	Videos	21	21763	115
3	Documentaries	9	21	0
4	Discussions	9	11094	59
5	Questionary	2	1396	7
6	Quiz	6	6697	35
7	Choice	6	2192	12

**Chart 2:** Statistics on the Utilization of Selected Instructional Resources in the CLPT-K14 Course



The table of statistics on the utilization level of learning resources reveals the following:

- Regarding learning materials: The utilization level of learning materials is not uniform. Learners primarily focus on video materials with 21,763 interactions, averaging 115 interactions per learner. Reading materials, on the other hand, are scarcely utilized with only 21 interactions, averaging 0 interactions per learner. The utilization level of PowerPoint lectures reaches 6,586 interactions, averaging 35 interactions per learner.
- Regarding activities: Discussion activities are the most actively participated in by learners, with 11,094 interactions on average, or 59 interactions per learner. Following that is the assessment activity, which receives 6,697 interactions on average, or 35 interactions per learner. The third most participated activity is

attendance taking, with 2,192 interactions on average, or 12 interactions per learner. Lastly, the survey activity garners 396 interactions on average, or 7 interactions per learner.

Based on the data extracted from the dosports.online system, we observe that the CLPT-K14 course, developed by us, exhibits a very high utilization level from learners. This suggests that the course has yielded positive outcomes in enhancing learners' self-study awareness. Moreover, the learning resources adequately meet learners' needs. However, through the statistics on the utilization of learning resource activities in the course, we recognize an uneven exploitation of data, especially in the section related to documents, which received only 21 interactions. We interpret this as a result of the majority of these documents being in English, causing learners to hesitate in accessing them. This is an issue we need to research and adjust appropriately. Conversely, for video learning materials, learners are highly interested, with 21,763 interactions. This underscores the significance of video materials, particularly in practical subjects. The activities designed within the CLPT-K14 course are actively participated in by most students, particularly the discussion activity, which garnered 11,094 interactions. Other activities fluctuate between 1,396 and 6,697 interactions.

## 4.2 Evaluation of the Development of Achievement in the Two Experimental and Control Groups after One Semester of Training

### 4.2.1 Initial Achievement Status of the K13 and K14 University Groups Before the Experiment

To assess the initial competency of the two experimental and control groups, we conducted a test of the low forehand grip technique. The content and format of the test were identical to the final assessment plan for the badminton course. Following the test, we processed the data using SPSS software, yielding the following results:

#### 4.2.1.1 The Results of the Independent Samples t-test for the Initial Semester Exams

The independent samples t-test was employed to determine whether there was a statistically significant difference in achievement between the experimental group (K14) and the control group (K13). Based on the average scores from the initial semester exams exported from the SPSS software, as shown in Table 3, the average score for the experimental group (K14) was 5.223, while the average score for the control group (K13) was 5.328. Upon visual inspection, we noticed that the average score for the initial semester exam of K13 was slightly higher than that of K14.

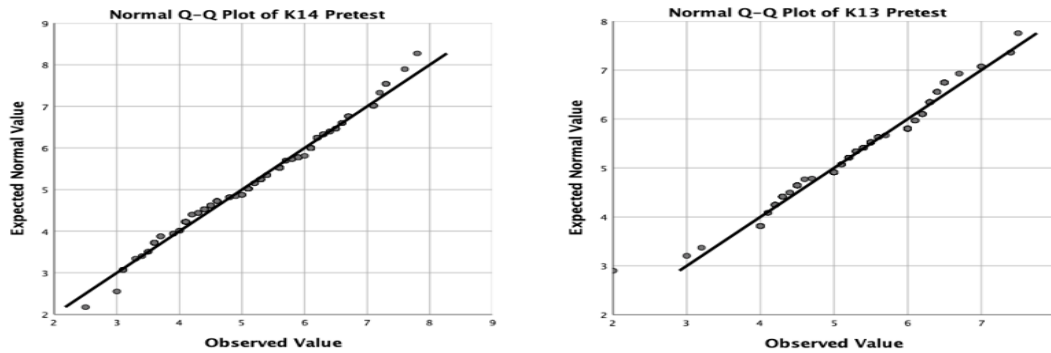
To draw a conclusion about the equivalency of the initial competencies between K13 and K14 at the start of the semester, we employed the independent samples t-test for two groups to verify.

**Table 3:** Average Scores of Initial Semester Exams for K13 and K14 University Groups

	Group	N	Mean	Std. Deviation	Std. Error Mean
Pretest	K13	174	5.328	.9026	.0684
	K14	181	5.223	1.1286	.0839

Before performing the independent samples t-test, it's essential to ensure that the data from the two compared groups are normally distributed. To assess the normal distribution of the data, we employed Q-Q plots generated using SPSS software.

**Chart 3: Q-Q Plot of Average Initial Semester Exam Scores for K14 and K13**



The Q-Q plot (Chart 3) visually demonstrates that the data for the initial semester exam scores of both K14 and K13 follow a straight-line pattern. This observation indicates that the average initial semester exam scores of K14 and K13 satisfy the condition of having a normally distributed data distribution before conducting the independent samples t-test.

**Table 4: Results of Independent Samples t-test  
for Initial Semester Exam Scores of K13 and K14**

		Levene's Test for Equality of Variances		t-test for Equality of Means						
		F	Sig.	t	df	Sig. (2- tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
									Lower	Upper
Pretest	Equal variances assumed	10.438	0.001	0.96	353	0.338	0.1044	0.1087	-0.1094	0.3182
	Equal variances not assumed			0.964	341.78	0.336	0.1044	0.1083	-0.1085	0.3173

Based on the results of the independent samples t-test for the initial semester exam scores of K13 and K14, as presented in Table 4, we observe that the Levene's test for equality of variances has a significance value (Sig.) of 0.001 (Sig. < 0.05), indicating that the variances of the two score samples are not equal. Therefore, we use the t-test value from the second row of Table 3.17. With a level of statistical significance for the t-test greater than 0.05 ( $t = 0.964$ ,  $df = 341.8$ ,  $p = 0.336 > 0.05$ ), we can conclude that the difference in the average scores of the initial semester exam between the experimental group K14 ( $M = 5.223$ ,  $SD = 1.1286$ ,  $N = 181$ ) and the control group K13 ( $M = 5.328$ ,  $SD = 0.9026$ ,  $N = 174$ ) is not

statistically significant. In other words, at the beginning of the semester when both K14 and K13 had not yet used the E-learning system, there is no significant difference in the academic performance between these two groups of students.

#### 4.2.2 Evaluation of Performance Development between the Two Groups after a Training Semester

In order to evaluate the technical skill development of the research subjects, the thesis employs assessment content detailed in the curriculum that has been approved by the university's scientific council. After conducting the assessments, we use the SPSS software to process the data, yielding the following results:

##### 4.2.2.1 Results of the Independent Samples T-test for the Final Semester Exams

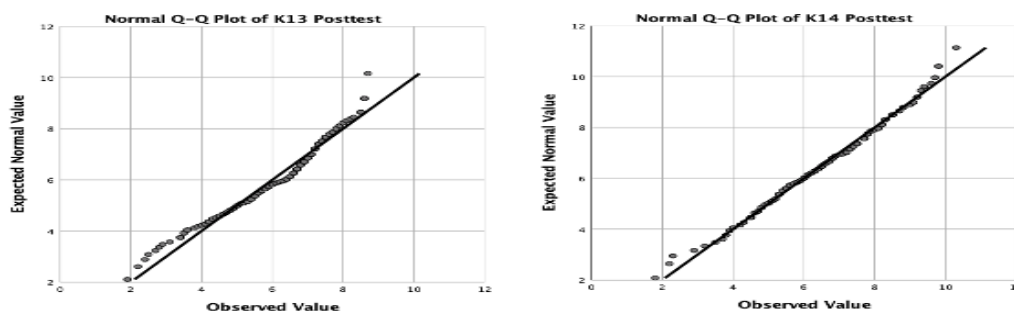
The results of the independent samples t-test for the final semester exams are employed to examine whether there is a statistically significant difference between the experimental group (K14) and the control group (K13) in their end-of-semester exams. According to the average scores from the final semester exams extracted from the SPSS software, as shown in Table 12, the average score of the experimental group (K14) is 6.607, while the average score of the control group (K13) is 6.133. Upon initial observation, we note that the average score for the final semester exams is higher in the experimental group K14 compared to the control group K13. To determine whether there is a statistically significant difference in the initial proficiency levels of K13 and K14 at the end of the semester, we continue to use the independent samples t-test for verification.

**Table 5:** Descriptive Statistics of Mean Scores for Final Semester Exams of Groups K13 and K14

	Group	N	Mean	Std. Deviation	Std. Error Mean
Posttest	K13	174	6.133	1.4975	.1135
	K14	181	6.607	1.6765	.1246

The prerequisite for conducting an independent two-sample t-test is that the data from the two compared groups must follow a normal distribution. To verify the assumption of equal distribution, a Q-Q plot was employed using the SPSS software.

**Chart 4:** Q-Q Plot of Mean End-of-Semester Scores for K14 and K13





The Q-Q plot in Figure 3.12 indicates that the data for the mean end-of-semester scores of K14 and K13 are concentrated along a straight line. This suggests that the data distribution of the mean end-of-semester scores for both K14 and K13 meets the assumption of data homogeneity before conducting the independent samples t-test.

**Table 6:** Results of Independent Samples t-test for End-of-Semester Scores of K13 and K14

		Levene's Test for Equality of Variances		t-test for Equality of Means						
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
									Lower	Upper
Posttest	Equal variances assumed	2.400	.122	-2.808	353	.005	-.4744	.1689	-.8067	-.1422
	Equal variances not assumed			-2.814	351.123	.005	-.4744	.1686	-.8060	-.1429

Based on the results of the independent samples t-test for the beginning-of-semester scores of K13 and K14, as shown in Table 6, Levene's test for equality of variances has a Sig. value of 0.122 (Sig. > 0.05), indicating that the variances of the two score samples are equal. Therefore, the t-test value in the first row of Table 6 is used. With a significance level of the t-test less than 0.05 ( $t = -2.808$ ,  $df = 353$ ,  $p = 0.005 < 0.05$ ), we can conclude that there is a statistically significant difference in the mean end-of-semester scores between the experimental group K14 ( $M = 6.607$ ,  $SD = 1.6765$ ,  $N = 181$ ) and the control group K13 ( $M = 6.133$ ,  $SD = 1.4975$ ,  $N = 174$ ). In other words, at the end of the semester, after a period of 3 months using the dosports.online learning management system for learning and training, the technical proficiency of the two student groups differs significantly. The experimental group K14 achieved significantly better learning outcomes, which can be attributed to the support provided by the dosports.online learning management system.

## 5. Conclusion

The CLPT-K14 course has shown a high level of engagement from the learners, indicating that the course has brought about positive effects in enhancing learners' self-study awareness. Additionally, the learning resources provided have effectively met the learners' needs. Throughout the experimental process of this thesis, the effectiveness of the dosports.online learning management system in teaching has been demonstrated through the academic performance of the experimental group K14 (6.607), which is higher than the control group K13 (6.133). This indicates that the application of online teaching in practical subjects contributes to the improvement of learners' skills. Feedback from learners has indicated high levels of satisfaction with most of the resources in the

course that we developed, highlighting their relevance and the flexibility and efficiency of the dosports.online learning management system.

To sum up, the implementation of the CLPT-K14 course and the dosports.online learning management system has shown positive outcomes in improving learners' self-study awareness and skill development. The results and feedback support the effectiveness of online teaching in practical subjects and the suitability of the dosports.online platform for managing and delivering educational content.

### **Conflict of Interest Statement**

The authors of this article declare that they have no potential conflicts of interest with respect to the research, authorship, and/or publication of this article. Specifically, the authors declare that they have no financial or personal relationships that could inappropriately influence or bias their work. Furthermore, the authors have no affiliation with any organization or entity with a financial or personal interest in the subject matter discussed in this article. The authors confirm that they have followed the guidelines of their institutions regarding conflicts of interest and declare that there are no other conflicts of interest to report.

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