

# I LEARN PHYSICAL EDUCATION ON THE INTERNET

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## ABSTRACT

*This article is the outcome of an experimental study conducted under a Master's Degree in Education in the field of Educational Informatics, which has developed a research on the use of the MOODLE platform in Physical Education classes, as an aid in learning a gymnastic ability.*

*The principle that guided this research was that both the learning and the world of sports physical activities may be subject, like any other field of education, to the integration of technology in schools, so as to take advantage of the broad working solutions, especially those based on constructivist paradigms in which students participate actively in the construction of knowledge.*

*The study aims to assess the use of the MOODLE platform (Modular Object oriented Dynamic Learning Environment) to support the teaching of a gymnastic ability – the handstand. The platform has provided students with videos of their performances and, through the platform's tool "questionnaire", it has attempted to focus the student's attention on important aspects of motor execution, thus stimulating a critical reflection on their performances and subsequent improvement of the movement.*

*Keywords: e-Learning, Physical Education*

## INTRODUCTION

How can Information and Communication Technology (ICT) contribute for the learning of Physical Education (PE)? This was the question from which derived this research and it was a difficult one to answer. PE is a physical subject in its essence and execution time in conjunction with the quality of the tasks are fundamental elements for its success (Costa, 1984).

In the physical skills learning domain, feedback and, in particular, the quality and adequacy of its implementation are a fundamental requirement for successful learning, according to Carreiro da Costa (1984), Godinho and Guedes (1996), Condessa (1999), Ennes and Benda (2004).

As an analysis tool, video allows to pinpoint details of the movement and it can be used numerous times. However, its use in a classroom is almost impossible, due to the time frame required for its editing, analysis and personalised discussion.

It is here that ICT can have a preponderant role as it allows for a simple and easy-to-access treatment and distribution of multimedia contents. ITC also enables to create personalised learning environments by using methodologies which suit different personal characteristics and preferences.

The goal of this research was to test students' (Ss) capacity to develop knowledge and skills which improve the understanding and practice of the handstand, by watching videos of their individual performances. These videos were distributed through MOODLE platform, in combination with activities which promoted their reflection about its content.

The handstand movement was chosen due to being a closed physical skill, thus avoiding the need for deeply

complex implementation conditions which could interfere with research results.

## METHODOLOGY

In this study, two groups of 15 students were randomly selected amongst three 7th form classes. These will be referred to as Experimental Group (EG) and Control Group (CG). They had 6 PE classes on handstands (1st and 6th lasted 90 minutes while the other four lasted 45 minutes).

**Table 1** - Sample distribution by gender and age

Group	Age distribution of females					Total
	Age distribution of males					
	11 years old	12 years old	11 years old	12 years old	14 years old	
Control	---	10	1	3	1	15
Experimental	3	5	2	5	---	15
<b>Total</b>	<b>3</b>	<b>15</b>	<b>3</b>	<b>8</b>	<b>1</b>	

Sessions 1 and 6 (90') were used for pre-testing and post-testing which took place in two phases: a written test on the movement's critical components (cognitive domain) and a physical pre-test and post-test to analyse physical performance (psychomotor domain). After this theme unit, Ss answered a questionnaire in order to assess their preferences and opinion about the differentiated teaching methodology (psychological domain).

**Table 2** - Schedule of classroom sessions, of distribution of videos by students and of the objectives in different stages of the investigation.

Week	Classes	Videos / MOODLE	Objective
Week 1	Session 1 (90 min)		Apply motor pre-test
			Apply cognitive pre-test
			Training
Week 2	Session 2 e 3 (45 min)		Training and video registration
Week 3		Videos of sessions 2 e 3	Watch and reflect on practice by answering the questionnaire online
Week 4	Session 4 e 5 (45 min)		Training and video registration
Week 5		Videos of sessions 4 e 5	Watch and reflect on practice by answering the questionnaire online

Week 6	Session 6 (90 min)	Training	
		Apply motor post-test	Apply cognitive post-test
Week 7			Questionnaire

Ss from both groups were filmed at the end of class while executing handstands. Films from sessions 2, 3, 4 and 5 were individually distributed to GE Ss, using MOODLE, in conjunction with a questionnaire which guided their reflection on relevant aspects of physical performance.

Videos shot during sessions 1 and 6 were used to assess learning through the analysis of the number of "errors" in physical implementation. In order to do so, it was used an error test, adapted from one on cartwheel movement (Condessa, 1999).

The error test allows to assess learning gains of Ss in this skill. It encompasses five stages of the movement with several critical components associated to each one of them, in a total of 16 assessment items. These items are ordered by "error levels of execution" which are applied to all the stages and critical components of the movement, as follows:

**Table 3** - Execution error levels.

<b>Execution error levels:</b>
0- No error
1- Existence of minimal error, wholly or partially visible
2- Existence of average error, visible
3- Existence of intensified average error, wholly visible
4- Existence of acute error, wholly visible

Each one of the critical components of the movement, displayed in the next table, describes what the Ss must perform in each stage. Maximum score (the movement done correctly) corresponds to zero, i. e. total absence of error.


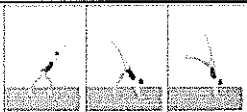

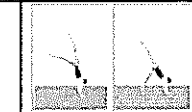






**Table 4** - Critical components for determining the error

<b>Movement phases</b>	<b>Key points to determine the execution error</b>
Moment 1 (initial)	<ul style="list-style-type: none"> <li>• Thrust leg (dominant leg) ahead;                             <ul style="list-style-type: none"> <li>• Arms lifted above the head;</li> </ul> </li> <li>• Body weight placed on the swing leg (back leg);                             <ul style="list-style-type: none"> <li>• Alignment of body segments, arms, trunk and swing leg (back leg);</li> </ul> </li> </ul>
Moment 2 (imbalance; lunge)	<ul style="list-style-type: none"> <li>• Weight projection to the front leg;</li> <li>• Head in a position to peek at one's hands;</li> <li>• Holding the alignment of body segments (arms, trunk and swing</li> </ul>

	leg);
Moment 3 (handstand)	<ul style="list-style-type: none"> <li>• Holding the alignment of body segments (arms, trunk and swing leg);</li> <li>• Holding the balance;</li> </ul>
Moment 4 (exit)	<ul style="list-style-type: none"> <li>• Withdrawal of the thrust leg to create imbalance;</li> <li>• First contact in the soil of the lower limbs is performed by the front leg;</li> <li>• Holding the alignment of body segments (arms, trunk and swing leg);</li> </ul>
Moment 5 (final)	<ul style="list-style-type: none"> <li>• Thrust leg (dominant leg) ahead;</li> <li>• Arms lifted above the head;</li> <li>• Body weight placed on the swing leg (back leg);</li> <li>• Alignment of body segments, arms, trunk and swing leg (back leg);</li> </ul>

Video observation was done having by reference the images of a model performance. The video was stopped at the equivalent moment performed in the model shot, in order to classify the critical components associated to the error levels chart, by comparing.

**Table 5** - Example of comparison of a student's motor execution with the model of execution close to zero (no error).

	1 (initial)	2(imbalance; lunge)	3 (balance)	4(exit)	5(final)
Model					
Student					

To assess observations' reliability, there was a second moment of assessment on the videos from sessions 1 and 6, which was validated by the Bravais- Pearson correlation coefficient, between the values of paired-observations (Coutinho, 2000), and by Bellack's percent agreement formula (1966), suggested by Almeida and Freire (2003). The questionnaire created for this study was applied at the end of the theme unit and had the goal of identifying some variables connected to Ss' physical practice habits and to their thoughts.

## RESULTS

### First hypothesis (Cognitive Domain)

H1 – Using MOODLE, its resources and activities, facilitates knowledge acquisition on the correct execution of handstands.

The difference between the initial values and the final ones, obtained in the written test, allowed to determine each student's knowledge acquisition of the content. The percentual values obtained were converted into a level scale from zero to five (0 – no improvement; 1 to 5 – gradual improvement, from minimum to maximum), and then analysed through a frequency chart.

**Table 6** - Students frequencies in the two study groups, depending on the analysis of the improvement achieved

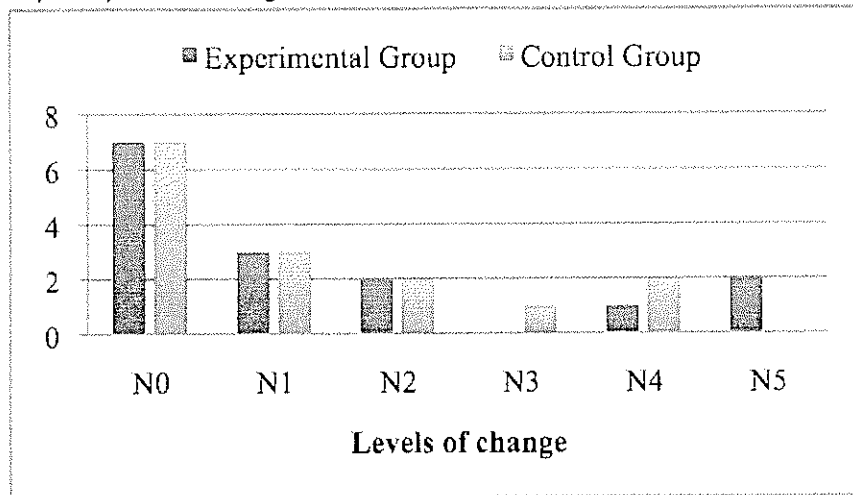
in the written tests - "acquired knowledge".

Change in the Written Test (Knowledge Improvement) *		Experimental Group	Control Group
None	N0	7	7
With	N1	3	3
	N2	3	3
	N3	2	2

**Legend:** Acquired knowledge from the 1st to the 2nd written test: N0 – No improvement (-80 a 0%); N1 – low improvement (0,1 a 10%); N2 – slight improvement (10,1 a 20%); N3 – average improvement (20,1 a 30%); N4 – average/high improvement (30,1 a 40%); N5 – high improvement (40,1 a 60%).

The frequency of relative gains indicates student's positive or negative evolution, between the first and the second test.

**Graph 1** - Frequency of relative gains occurred in the final written test in both study groups.

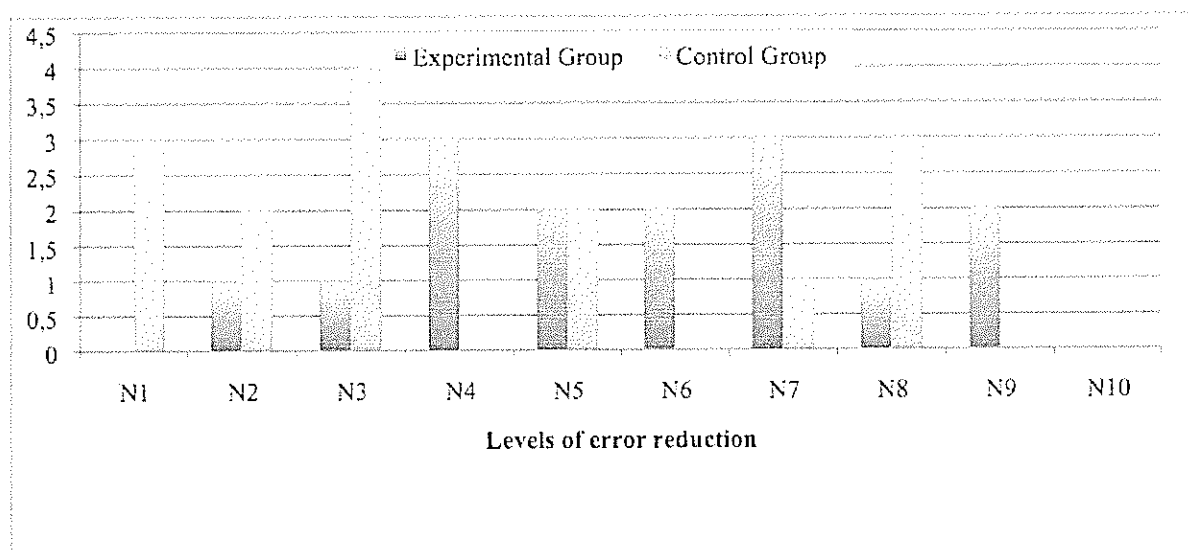


From the first to the second test, data shows that, for each group, there were no changes in almost half of their elements (47% of individuals). From those who improved, the distribution through the different levels is also very similar in both groups.

**Second hypothesis (Physical Domain)**

H2 – MOODLE, with its resources and activities, enables the improvement of student's handstand performance. Through the analysis of Chart 2, it can be verified that on the levels which represent lower error reduction (N1, N2 and N3), CG Ss are the ones with higher frequency values. However, when learning is more significant, i.e. when the level or error reduction is higher (N4 to N10), frequency values become more representative in EG, except for levels N5 and N8, which are respectively equal and inverted.

**Graph 2** - Frequency of relative gains occurred in the final motor test in both study groups.



**Legend:** Error reduction from the 1st to the 2nd motor test: N1 – very low reduction, of 0 to 9,9% of errors; N2 – low reduction, of 10 to 19,9% of errors; N3 – low-middle reduction, of 20 to 29,9% of errors; N4 – average recutio, of 30 to 39,9% of; N5 – middle-high reduction, of 40 to 49,9% of errors; N6 – good reduction, of 50 to 59,9% of errors; N7 – good reduction, of 60 to 69,9% of errors; N8 – good reduction, of 70 to 79,9% of errors; N9 – high reduction, of 80 to 89,9% of errors; N10 – high reduction, of 90 to 100% of errors.

In Table 7, it is verifiable that the groups do not differentiate in what concerns the initial level of the physical test, a factor that might help understand the influence of using MOODLE to improve performance.

**Table 7** - Comparative analysis of initial and final levels of the motor test and error reduction between tests, in experimental and control groups.

	Group	Average	Desvio Padrão	t Test	Sig.
Initial level of motor test	CG	1,67	0,724	1,169	0,254
	EG	1,40	0,507		
Final level of motor test	CG	3,40	1,454	1,210	0,236
	EG	4,00	1,254		
Error reduction of motor test	CG	3,13	2,134	2,469	0,020 (*)
	EG	4,87	1,685		
Gains on the motor test	CG	3,86	2,82	2,047	0,050 (*)
	EG	5,73	2,12		

(\*)  $p \leq 0,05$  significant difference

By confronting the final level of the physical test, it is demonstrable that the use of MOODLE does not appear to have been a profoundly differentiating factor in the final performances of the two groups. However, when determining the differences concerning execution error reduction ( $t = 2,469$  to  $p = 0,020$ ), and gains related to the physical test ( $t = 2,047$  to  $p = 0,050$ ), more favourable results were obtained in EG.

Actually, the group of students who used MOODLE (EG) displayed a reduction of errors compared to their highest initial performance. Relative gains in performance of the group that did not use the platform (CG) were of 33,49%, while the ones in the group that used MOODLE (EG) were of 51,65%, an average of 18,16% less errors.

### Third hypothesis (Ss perception)

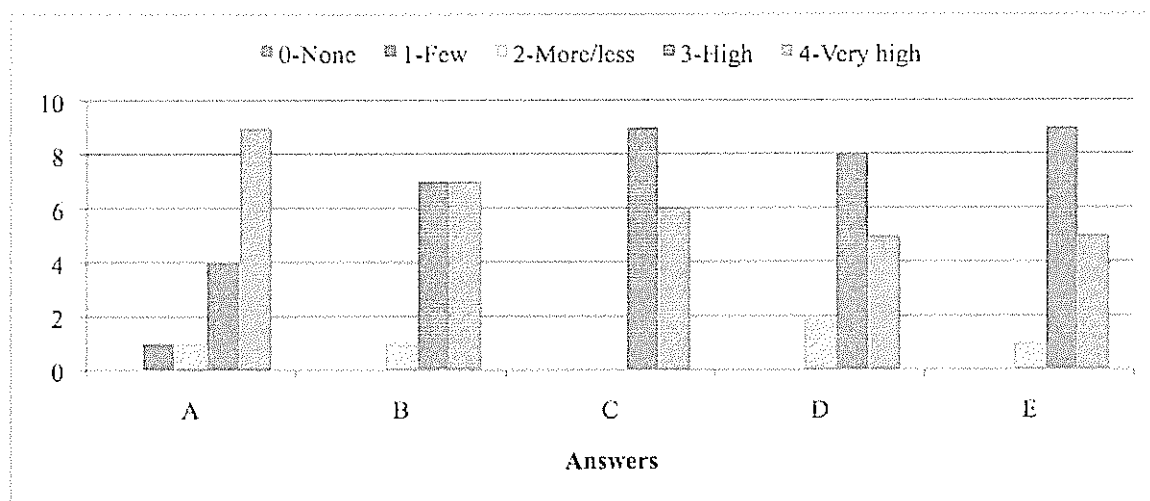
H3 –MOODLE was acknowledged as a learning tool in PE by the Ss who used it.

From data obtained in the last questionnaire, the highlights go to EG Ss recognition of the influence of MOODLE in learning technical gesture, and to how much they valued its use.

The analysis of the following chart shows that, among Ss from EG, there is general acceptance of the importance of MOODLE as a complementary tool in learning handstand movement. In all the questions, there was a large

choice for the highest degree answers (very much/much), in what concerns the components which reinforce any physical learning, namely, in its support to knowledge acquisition, to performance, to the construction of an adjusted and reinforced physical plan, and to the ability of reflecting upon practice.

**Graph 3** - Frequencies of the results of five cloze questions of the questionnaire used in the experimental group (EG)



**Legend:** Question posed - "Your appreciation of the support of the elearning platform MOODLE" in the learning of "Handstands" is that ..." - The ... supported you in learning the "Handstands" B ... helped you in the clear knowledge of the proper execution of " Handstands "; C ... helped create a more real image of your execution, which allowed you to correct performance; D ... helped create a more real image of your execution, which motivated you in your practice; And ... facilitated reflection on practice in classes.

In addition, the percentage of Ss who considered its use as positive, by classifying it with very much and much, varied between 86, 6% and 100% in several questions and displayed an average value of 92%, what can be seen as a clear acknowledgement of its usefulness as a learning strategy.

## DISCUSSION & CONCLUSIONS

After this study, one may conclude that using MOODLE did not generate any significant results in the acquisition of knowledge about the execution of handstands. This may be related to the way in which the platform was used during the research, i. e. to promote Ss' reflection about their performances, not to teach them about physical performance.

The results obtained from performance clearly indicate that MOODLE facilitated their handstand executions, especially when analysing individual gains, i.e. error reduction between session 1 and session 6.

Using questionnaires, as a strategy to lead Ss to confront their performances with a model, is a mechanism that aims to guide the student in gathering important information to correct his/her movement.

The latter, by using questions which accompanied Ss' individual performance videos, concurs with the guidance effect attributed to feedback which, according to Schmidt (1993), Godinho et al. (1995) and Chiviacowsky and Tani (1997), directs student's attention to relevant aspects of physical performance.

As it was not the teacher who treated and distributed this data, one can believe that it was the data processing done by each student that supported favourable results in the acquisition of a performance with less execution errors.

In fact, Miranda (1998) and Castañón (2005) have already stated the importance of an active participation of subjects in the learning tasks. This participation is all the more important as higher is their commitment and motivation, what may have been achieved by the contents' characteristics.

The strategy used in the organization of activities in MOODLE, which allowed to identify errors and difficulties, to reflect upon practice, and to find solutions to correct the movement, was valorised by Ss in the process of learning handstands. This happened mainly because it helped them create a more exact image of their performances and, consequently, enabled them to better correct their mistakes.

These results agree with the ones obtained in the physical test and with results obtained by Condessa (1999), where Ss with higher motivation reached higher results in performance.

Despite not contributing to an improvement in knowledge acquisition on physical execution, maybe due to content structuring and to research strategies used in this study, it may be stated that using MOODLE contributed for the improvement of handstand performance, especially in what concerns error reduction, a fact which is acknowledged by the Ss who used it as a learning tool.

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