

RECIPROCAL TEACHING OF GYMNASTIC LINKS IN HIGHER EDUCATION

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Abstract

The aim of this study was to compare the effect of two teaching styles on theoretical knowledge and technical learning of gymnastic links within Higher Education. Similarly, we checked their effects on the number of successful and unsuccessful repetitions of a specific gymnastic link and on the students' degree of satisfaction, participation and opinion about their learning were checked only on the group B (reciprocal teaching style). An experimental design was created with two groups, each of 22 subjects of both sexes, assessed with pre and post measures, using two different methodological teaching models, namely, task assignment and reciprocal teaching. The results showed significant improvements in both groups between pretest and posttest. However, reciprocal teaching proved more effective with statistically significant differences ($p < 0.05$) in the technical learning of the link as well as theoretical knowledge of it, with more correct repetitions of the action. With regard to perception, participation and satisfaction about their learning, group B showed a very positive assessment in all items of the questionnaire.

Keywords: *Higher Education, Gymnastic skills, Teaching styles, Reciprocal teaching, Task assignment.*

INTRODUCTION

Identifying which styles of teaching and learning may be the most effective is an interesting subject for most teachers. The existing teaching styles cover different approaches and possible applications and occupy an important place in contemporary literature in the last two decades: (Ashworth, 1992; Biddle & Goudas, 1993; Boyce, 1992; Brunner & Hill, 1992; Derri & Pacht 2007; Goldberger & Howarth, 1993;

Mosston & Ashworth, 2008; Sicilia-Camacho & Brown, 2008).

With the incorporation of Spanish universities into the Bologna process, the focus is on more formative and participatory teaching styles that promote the college student's autonomous learning and is adapted to the European Higher Education Area (EHEA). Hence Álvarez (2005) points out the importance of actively involving students in their learning process, so that it

is more meaningful for them. The European Framework establishes among its core competences learning autonomy, critical and self-critical capacities, problem solving and decision making, which can be achieved through more participatory teaching styles (Learreta, Montil, González, & Asensio, 2009).

The literature on the subject includes various studies and documents arguing for active student participation in their learning through less managerial and more participatory and autonomous teaching styles (Fraile, 2004; Lara, 2001; Lorente & Joven, 2009; Prieto & Nistal, 2009; Qin, Johnson & Johnson, 1995; Solana, 2005; Velázquez, 2004). In the specific area of artistic gymnastics, Vernetta, Gutiérrez-Sánchez, López-Bedoya, & Ariza (2013) suggest participatory teaching styles, among them reciprocal teaching and working in small groups, to encourage greater autonomy and communication among students who, moreover, become more involved in the teaching-learning process.

These teaching styles have been applied to learning different gymnastic skills in some sessions within a teaching unit, organizing the students in pairs or small groups using observation / evaluation record sheets (Hein & Kivimets, 2000; Thomas, Fiard, Soulard, & Chautemps, 1997; Vernetta, Gutiérrez & López Bedoya, 2009; Vernetta, López Bedoya & Panadero, 2000; Vernetta, López Bedoya & Delgado, 2009). These authors consider that the use of observation sheets as a basic tool in cooperative learning teaching styles has many advantages as it leads students to more meaningful learning, promotes their responsibility to be more autonomous and independent in their learning, stimulates their active participation in the learning process and encourages more positive interpersonal relationships. The studies of Bayraktar (2011), as in the previous studies of Barrett, (2005), Ward and Lee (2005) and Tuncel (2006) indicate the link between cooperative learning and students' academic success, as well as a better attitude toward learning and practicing skills.

Hence, bearing in mind all the benefits described above and seeking more participatory and collaborative processes in the university, we have applied the reciprocal teaching style in a teaching unit of the subject Teaching Artistic Gymnastics. Furthermore, one of the key components of learning these gymnastic skills, executed separately or linked together, is the number of repetitions performed during the process (Bourgeois, 1999; Carrasco, 1989; Rodrigues, Castello, Jardim, & Aguiar 2012). The high coordination requirements also demand execution with the minimum possible error, enabling the student to assimilate a more accurate ideal model and to learn more effectively (Vernetta et al., 2009, Vernetta, López Bedoya, & Delgado, 2009).

Therefore, the objectives of this study are as follows:

- To check the effectiveness of reciprocal teaching in acquiring gymnastic links for university students.
- To assess the level of theoretical knowledge of the technique of the gymnastic link practiced.
- To analyze the effects of both styles on the number of correct and incorrect repetitions executed during the teaching-learning process.
- To discover the degree of student satisfaction and their perception of the level of learning in those classes in the group B (*reciprocal teaching style*).

METHODS

Participants

The sample used in this study is part of a university population, students of the Faculty of Sport Sciences in a university in Spain. A total of 44 students (29 men and 15 women) with an age range of 20-21 years ($M = 20.39$, $SD = 0.57$) participated voluntarily. Each signed a consent form after being fully informed of the experiment and its purpose. Consent was also given by the relevant Ethics Committee. None of the participants had previously received classes on the gymnastic link to be studied.

Experimental Design

Two experimental groups of twenty-two students each were formed and pre and post measures were carried out by both.

The dependent variable (DV) to be considered was skill in learning the gymnastic link selected taking into account two aspects:

- The execution of the gymnastic link known as *round off* and *straddle jump*. This skill links an acrobatic gymnastic skill with a jumping skill and is called a *mixed link*. The first skill, (round off), is a forward jump with a handstand in the forward / backward axis with support from alternate hands when passing through the inverted position (the handstand) and a 180° turn in the longitudinal axis, either to the right or left side depending on the driving leg. The second skill, (the straddle jump), is a jump using both feet to push off and land, which in the flight phase consists of raising the extended legs, open to the front, to the horizontal or slightly higher, while the trunk leans forward, making a slight flexion (folding the trunk to the legs). The two skills should be linked without pauses or intermediate steps between them (Figure 1).

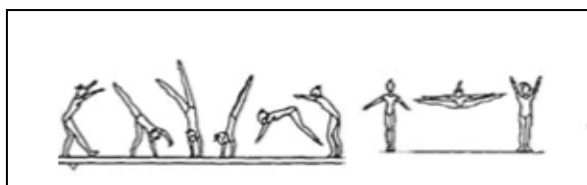


Figure 1. Round off linked to straddle jump (taken from the Code of Points 2009-2012 of Women's Artistic Gymnastics).

- Theoretical knowledge of the learned linking technique. Specific knowledge is required of the technical aspects of the actions to be performed, the methodological approach and mistakes to be avoided.

Furthermore, throughout the process variables were analyzed, such as the number of repetitions and the number of correct and incorrect executions in all sessions. To determine if the link was made correctly or not, it had to meet the following criteria:

- Two criteria in the round off: to bring the legs to the vertical with the correct support of the hands (the 1st in the perpendicular position, the 2nd in internal rotation pointing toward the first) and to make the flight phase after pushing with the hands the legs being in the pike position until landing with both feet simultaneously while continuing into the straddle jump.

- Two criteria in the straddle jump: to raise the extended legs at least to the horizontal, with a slight forward flexion of trunk and to land with both legs stable with feet together.

- Furthermore, the pause between one skills and the next must not exceed one second, and there can be no intermediate steps for the link to be considered correct.

The Independent Variables (IV) were the teaching styles applied to both groups to learn the gymnastic link:

IV 1: Teaching Style "Task Assignment" (TA), using a mini-circuit organization.

IV 2: Participatory teaching style: "Reciprocal Teaching" (RT) through a mini-circuit organization using observation sheets recording details of execution.

Materials

Teaching materials. In teaching the selected gymnastic link, plinths, mini-tramps, trampolines and safety mats were used as auxiliary material to facilitate learning.

Recording Material. Two tripods with two video cameras, one arranged laterally and the other frontally were used to record pre- and post-tests. In addition, several observation sheets were designed:

- A record sheet to evaluate the execution of the gymnastic link (round off plus straddle jump) was used for the pretest and posttest of both groups. A number of technical criteria were specifically described, breaking down the two skills into three phases (initial, main and final), according to the definitions and explanations of relevant technical aspects mentioned by several authors specializing in the field of gymnastic activity (Smoleuskiy

& Gaverdouskiy, 1996) along with a current review of the criteria listed in the latest edition of the Code of Points in Women's Artistic Gymnastics (Edition 2009-2012).

- Questionnaire for the assessment of theoretical knowledge of the skill of the link under consideration. It consists of 16 questions related to the two skills.

- Observation sheets of the technical aspects to be observed during the process for the reciprocal teaching group.

- Questionnaire on the satisfaction, participation and opinion of the students about the improvement in their learning. The questionnaire used is based on that proposed by Calderón, Palao and Ortega (2005), subsequently validated by Ortega, Calderón, Palao and Puigcerver (2009), used for PE classes in high schools, obtaining reliable values by internal consistency ($\alpha = 0.825$). Items were selected from both questionnaires and modified as objectives according to the aims of this study. This instrument sets out 10 questions with a rating scale of four answers: Not at all, A little, Quite a lot and Very much, which takes into account the following dimensions: Motivation (items 1 and 6), achievements or learning objectives (items 2, 7 and 8), feedback (items 4, 5, 9 and 10) and initial information (item 3).

Procedure

The research began with the initial assessment of 53 students enrolled in the undergraduate course "Teaching sports: Artistic Gymnastics" (38 men and 15 women), using a pretest of DV (mixed link:

round off and straddle jump) consisting of the execution of three trials of the link after receiving previous instructions on how to do it identical for all participants. Subsequently, the selected sample of 44 participants were assigned to two different training groups by blocking techniques based on data obtained in the pretest for DV (mixed link: round off and straddle jump). The identifying characteristics of the selected sample, plus age range and sex as indicated above, were distinguished by the following characteristics:

- All subjects had taken the previous course "Fundamentals of gymnastic skills" in which they had learned the round off in isolation, as a basic requirement to enable them successfully to learn how to link this skill with the skill of gymnastic straddle jump.

- None of the participants in the experiment had practical experience of this mixed link and all started at a low level in the pretest, excluding those who obtained more than 26% of the maximum score in the total sum of correct items in the proposed link. The data of inter-observer reliability achieved in the pretest was 93%.

- All participants in both groups participated in the same session to learn the link but with different teaching styles, group A- task assignment (TA) and group B- reciprocal teaching (RT). Both groups received a total of 6 sessions of 1 hour 15 minutes per session. The structure of the session was as shown in table 1.

Table 1.

Structure of the session

Phases	Duration
1. Giving out material and information about the session and the tasks	5 minutes
2. Warm-up	15 minutes
3. Main part (execution of the link)	45 minutes
4. Cool down with stretching and collecting material	10 minutes

The characteristics of the methodological approaches for each group is set out in table 2.

Table 2

Methodological approaches characteristic of each experimental group

	Teaching style	Characteristics	Organization and students' role
Group A	Traditional teaching through teaching style: <i>Task Assignment</i>	<ul style="list-style-type: none"> - Teaching centered on teacher. - Teacher takes all decisions on students' learning. - Student merely receives and executes learning tasks. - Teacher administers <i>feedback</i> stimulating and interacting with the student, while moving among them. 	<ul style="list-style-type: none"> - Mass Organization of the group distributed in the space. - Decisions about their situation in the space and the rhythm of execution fall on the student.
Group B	Participative teaching style: <i>Reciprocal teaching</i>	<ul style="list-style-type: none"> - Students' active participation in their own learning. - Students' greater autonomy and responsibility. 	<ul style="list-style-type: none"> - Pairs with observation sheets on criteria of the link. - Pairs interchange roles: executing/observing. - Pairs initiate and conclude the task according to the notes on the observation sheet. - Both students provide <i>feedback</i> after observation and noting the results.

The main part (execution) of all sessions of both groups was recorded to keep track of the number of correct and incorrect repetitions of the overall link.

After the learning phase, the participants were evaluated by performing three repetitions of the mixed link of round off and straddle jump, under the same conditions as the pretest. The reliability of the inter-observer data was 94% in the posttest. Therefore, to evaluate the effectiveness of the two teaching styles, we used a group design with pretest and posttest measures.

Statistical Data Analysis

The preliminary test of normality (Shapiro-Wilk test) and equal variance (Levene test) determined normality ($p > 0.05$) and homogeneity of variance ($p > 0.05$) in both the pretest and posttest for each of the experimental groups in the DV: execution of the gymnastic link of round off and straddle jump, so we proceeded to use parametric techniques for inferential analysis.

RESULTS

Table 3 shows the results of descriptive statistics for the two groups in the pretest and posttest. The mean values of the pretest (out of a maximum of 48 points) were very similar for both groups. The results obtained in the posttest for both groups showed improvements, the average being higher in Group B.

In the intra-group analysis (Table 4), using the paired *t* test, significant differences were found ($p < 0.001$) between the averages for the pretest and posttest in both experimental groups, demonstrating that both groups had improved in learning the mixed link of round off and straddle jump.

Furthermore, when comparing the results in the pretest and posttest measures between the two groups (Figure 2), the results of the pretest confirmed the absence of statistically significant differences, so it appears that the starting levels of both groups were homogeneous before beginning

the gymnastic link. However, the post-test results confirmed the existence of statistically significant differences ($p < 0.05$) between the two groups, Group B (reciprocal learning) having the higher score and therefore a higher level of learning.

In relation to theoretical knowledge of the technique of the link under consideration, after applying the two teaching styles to each of the groups it was observed when comparing the percentages

of grades obtained, that group B, reciprocal learning, gained a significant increase in the percentages of very good (7/8 out of 10) and outstanding compared to group A, task assignment (Table 5).

Regarding the number of repetitions, Table 4 shows the score obtained from both groups in the total number of sessions, and the total number of correct and incorrect repetitions with the respective percentages in each.

Table 3

Descriptive Statistics of Group A and B in Pre and Posttests.

Groups	N	Mean	S.D.	Minimum	Maximum
G A. Pretest	22	13.50	1.71	9	20
G.A. Posttest		28.15	3.13	24	30
G B. Pretest	22	13.71	1,64	9	21
G.B. Posttest		43.15	2.46	33	42

Table 4

Scores for Mixed Link (round off and straddle jump).

Treatment Groups	Round off and straddle jump	
	Pre	Post
Group A (n=22)	13.41±1.71	32.11*±3.13
Group B (n= 22)	13.00±1.64	41.03*±2.46

Points ± SD. * P<0.001

Table 5

Percentage of total scores with respect to total number of students in each group.

GROUPS	Failed		Passed		Very good		Outstanding	
	N°	%	N°	%	N°	%	N°	%
Group A. (TA)	3	13.6%	16	72.7%	3	13.6%	0	
Group B (RT)	0		5	22.7%	11	50%	6	27.7%

Table 6

Number of correct and incorrect repetitions in both groups.

	Mixed Acrobatic link: Round off + Straddle jump									
	GROUP A					GROUP B				
	Total	Correct	%	Incorrect	%	Total	Correct	%	Incorrect	%
Session 1	10	4	40	6	60	10	6	60	4	40
Session 2	15	9	60	6	40	15	11	72	4	28
Session 3	20	11	55	9	45	20	15	75	5	25
Session 4	20	13	65	7	35	20	16	80	4	20
Session 5	25	12	48	13	52	25	20	80	5	20
Session 6	25	14	56	11	44	25	20	80	5	20
TOTAL	115	63		52		115	88		27	
Average		10.5	52.33	8.6	46		14.6	74.5	4.5	25.5

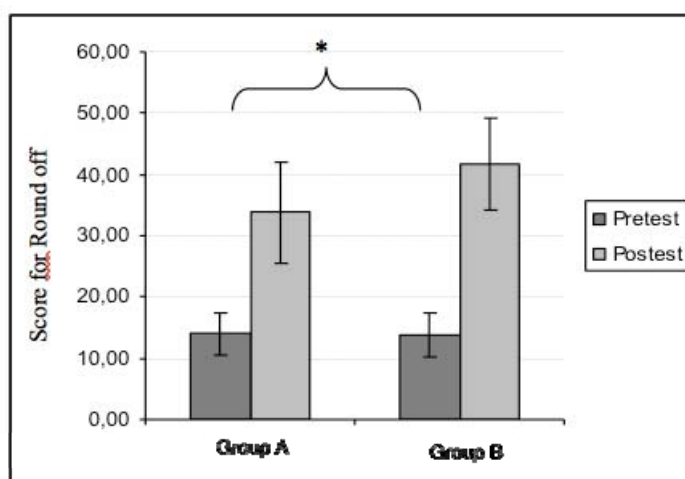


Figure 2. Graph showing pretest and posttest data of groups A and B (* $P < 0.05$).

Table 7.

Questionnaire of Satisfaction and students' perception of the use of reciprocal teaching style in terms of their learning achievements and information and feedback received.

	Not at all	A little	Quite a lot	Very Much
1.- Did you enjoy the practice in this Teaching Unit?			5%	95%
2.- To what extent do you think you are skilled (reaching the planned objectives) after finishing the Teaching Unit?			4%	96%
3.- Do you think that the information the teacher gave you AT THE BEGINNING of each session helped you improve?			3%	97%
4.- Do you think that the information your partner gave you DURING each session helped you improve your level of gymnastic skill?			3%	97%
5.- To what extent are you satisfied with the information you gave your partner DURING the execution of the exercises proposed by the observation sheets used?			8%	92%
6.- Did you enjoy the exercises planned by your teacher throughout this Teaching Unit?			2%	98%
7.- Do you think that the exercises proposed have helped you to assimilate and learn the Content of this Teaching Unit?			3%	97%
8.- Do you think that the exercises proposed have helped you improve your overall gymnastic level?				100%
9.- Do you think that the feedback you have given to your partner through the use of the observation sheets has helped you in your own learning?			2%	98%
10.- Do you think the responsibility of giving feedback to your partner is important for you in the future as a teacher?				100%

It can be seen, firstly, that the total number of repetitions was the same in all sessions for both groups, since they were scheduled as follows: (1st session: 3 blocks of 5 repetitions, 2nd session: 3 blocks of 5 repetitions 3rd and 4th sessions: 4 blocks of 5 repetitions, 5th and 6th sessions: 5 blocks of 5 repetitions). However, Group B made

more correct repetitions of the link, and thus fewer incorrect links, being only 25.5% compared to 46% of Group A, task assignment.

With regard to satisfaction, participation and their opinion about their learning, group B (reciprocal teaching style), showed a very positive assessment in

all items of the questionnaire (Table 7). The valuations were highest in some items related to the influence on their learning, and the importance of feedback. Regarding their learning achievements, this perception reached 100% in the valuation of the proposed tasks on their gymnastic level (item 8). Equally, 96% considered that the exercises helped them to assimilate and learn the content of the teaching unit, so achieving the aim of the class (item 7), with 96% feeling that they had become competent (item 2).

Motivation (items 1 and 6) was also rated very positively, 95% stating that they had enjoyed themselves and the exercises in this teaching unit very much.

In relation to items 3, 4 and 5 on the information received during the whole teaching and learning process, the students' assessment was also very positive, especially in items referring to the information given by the teacher at the beginning of each session (item 3) and the information given by the classmate/partner during each session (item 4). In both items, 97% considered that the information given had helped them improve Very much). Regarding the importance of the responsibility of giving *feedback* to their partner as future teachers, all students gave this responsibility the full value of 100% (item 10). Similarly, the assessment of the impact on their own learning of giving feedback to their partner was rated as highly positive (item 9).

DISCUSSION AND CONCLUSIONS

This work is part of the introduction of reciprocal teaching in the subject of "Teaching Artistic Gymnastics" within the degree of Bachelor of Science in Sport and Physical Activity. The main aim of this study was to compare whether reciprocal teaching influences students' learning. The results found, firstly, judging by the significant improvement of the students in both groups, that both teaching styles produce significant rates of learning. These

results agree with those obtained in other studies that have shown the efficacy of different methodological approaches in learning different gymnastic skills (Cox, 2002; Vernetta et al., 2009; Vernetta, López Bedoya & Delgado, 2009; Vernetta et al., 2013).

Our results confirm the findings of other studies which show that more participatory teaching styles that involve the students enable them to achieve greater success in practice or motor execution (Dyson, 2001; Dyson, Griffin & Hastie, 2004; Glover & Midura, 1992; Vernetta, López Bedoya & Robles, 2009).

Similarly, with regard to the results of technical theoretical knowledge on linking, it was noted that no Group B student failed the course. This may be explained by the students' greater involvement in the dynamics of the course, participating with the responsibility of giving knowledge of results to their peers, so guaranteeing better learning. In short, one can say "good evaluation that instructs", that is, evaluation becomes a learning and knowledge-enhancing activity (Alvarez, 2000).

The fact that students in Group B observe, assess and correct their fellow-students' execution encourages a more rigorous and detailed observation than if only the teacher does so; this enables students to understand the learning process better, and as a result, gives them more meaningful learning, both theoretical and practical (Vernetta, López Bedoya & Delgado, 2009). However, Cox (2002), comparing three styles of teaching and learning: command style, task assignment and reciprocal learning in gymnastic skills, found no difference in the learning achieved by the three models, although he found that the number of feedback imparted by the reciprocal teaching style group was the highest.

Furthermore, the study of Vernetta, López Bedoya and Delgado (2009) and Vernetta, López Bedoya and Robles (2009) found students learned gymnastic skills better when they used observation sheets, as they had more control of the information

about the skill they had to learn. The fact that students in Group B (RT) had that selective attention on the information to be given to their partner immediately after completion of the mixed link enabled them not only to give details of execution to their partner, but also to pay more attention to these key points in their own execution. This efficiently improved their own learning since they had greater control and understanding of that information. Hence, technical knowledge was greater in the questionnaire on theoretical content in this group.

The student's role as observer should be highlighted as it is an important ingredient of their learning and complements their know-how, making them more autonomous learners. Regarding this autonomy, many authors consider that to form responsible people within a democratic education, students have to be given responsibility and student involvement in the teaching-learning process should be encouraged (Fraile, 2004; Martínez, Santos & Sicilia, 2006).

Moreover, the existence of a greater number of correct repetitions during the process by Group B is consistent with the results of other studies that have shown the importance of correct repetitions with minimum possible error in the specific field of teaching-learning different gymnastic skills (Vernetta et al., 2009; Vernetta, López Bedoya & Delgado, 2009; Vernetta, López Bedoya & Robles, 2009). It is important to appreciate that specific guidance on the mistakes to avoid can become an indispensable resource in learning these unusual skills that make high demands on spatial orientation because of the body's inverted position.

Finally, the degree of satisfaction and enjoyment, participation and feeling of improvement in learning are consistent with the findings of Vernetta et al. (2009) and Vernetta, López Bedoya and Delgado (2009), who pointed out that university students who accept the challenge to become more involved in the teaching-learning process are more responsible for

their learning. As verified in this study, students who participated in it with the RT method, using observation techniques on their execution, not only recognized its importance to the successful learning of this link, but also their own greater responsibility.

According to the results of this study, it can be emphasized that the use of RT as a participative style was more effective in the students' theoretical and technical learning, corroborating the studies of Barrett (2005), Bayraktar (2011), Tuncel (2006) and Ward and Lee (2005). Furthermore, as Viciano and Delgado (1999) stated, its most valuable application lies in the training of students who will be future teachers, instructors or coaches, thus presenting them with a consistent model in accordance with the demands of skills in undergraduate training. Students' self-perception of their skills directly and indirectly influences their acquisition, reinforcing their persistence (Bandura, 1997). We would point out that, in the context of the objectives of the EHEA, if this methodology is incorporated into the learning environment, it will facilitate the transition from the role of student to the professional role that students must perform after graduation (Eva & Lingard, 2008; Schmidt, Vermeulen & Van der Molen, 2006).

A limitation in the generalization of the results of this particular study is the small number of the sample. Accordingly, further work is required to increase the number of students and to try different links of different motor skill structures and gymnastic complexity. Also, the degree of development of other social variables could be chosen to better link this type of cooperative learning with learning other skills.

REFERENCES

Álvarez, J.M. (2000). *Evaluar para conocer, examinar para excluir [Evaluate to discover, examine to exclude]*. Madrid: Morata.

Álvarez, B. (2005). Adaptation of the educational method to the European Space of Higher Education: the students' motivation as the key. *Estudios sobre Educación*, 9, 107-126.

Ashworth, S. (1992). The spectrum and teacher education. *Journal of Physical Education, Recreation and Dance*, 63(1), 32-35, 53.

Bandura, A. (1997). *Self-efficacy in changing societies*. Cambridge: Cambridge University Press.

Barret, T. (2005). Effects of cooperative learning on the performance of sixth-grade physical education pupils. *Journal of Teaching in Physical Education*, 24, 88-102.

Bayraktar, G. (2011). The effect of cooperative learning on students' approach to general gymnastics course and academic achievements. *Educational Research and Reviews*, 6(1), 62-71. Available online at <http://www.academicjournals.org/ERR> □ISSN 1990-3839. *Academic Journals*.

Biddle, S. & Goudas, M. (1993). Reaching styles, class climate and motivational in physical education. *Journal Physical Education, Recreation and Dance*, 24(3) 38-39.

Bourgeois, M. (1999). *Didáctica de la gimnasia. Gimnasia para el alumno: el placer de aprender [Teaching of gymnastics. Gymnastics for students: the pleasure of learning.]*. Madrid: Biblioteca Nueva.

Boyce, B. (1992). The effects of three styles of teaching on university students' motor performance. *Journal of Teaching in Physical Education*, 11(4), 389 - 401.

Brunner, R. & Hill, D. (1992). Using learning styles research in coaching. *Journal of Physical Education, Recreation and Dance*, 63(4) 26-28, 61.

Calderón, A., Palao, J.M. & Ortega, E. (2005). Effect of the form of organization on the participation, feedback distributed, the quality of execution and the motivation on the education of athletic abilities. *Cultura, Ciencia y Deporte*, 3(1), 145 -155.

Carrasco, R. (1989). *Gymnastique aux agréx. L'activité du debutant. Programmes*

pedagogiques [Gymnastics at the agréx. The activity of the beginner. Pedagogical programs]. Paris: Vigot.

Code of Points (Edition 2009-2012). Women's artistic gymnastics. International Federation of Gymnastics.

Cox, R.L. (2002): A systematic approach to teaching sport. *European Journal of Physical Education*, 5, 109-115.

Derri, V. & Pachta, M. (2007). Motor skills and concepts acquisition and retention: A comparison between two styles of teaching. *International Journal of Sport Science*, 3(3), 37-47.

Dyson, B. (2001). Cooperative learning in an elementary school physical education program. *Journal of Teaching in Physical Education*, 20, 264-281.

Dyson, B., Griffin, L. & Hastie, P. (2004). Sport education, tactical games, and cooperative learning: theoretical and pedagogical considerations. *Quest*, 56, 226-240.

Eva, K.W. & Lingard, L. (2008). What's next? A guiding question for educators engaged in educational research. *Medical Education*, 42, 752-754.

Fraile, A. (2004). *Didáctica de la Educación Física: una perspectiva crítica y transversal [Didactics of physical education: a critical and cross-cutting perspective.]*. Madrid: Biblioteca Nueva.

Glover, D. & Midura, W. (1992). *Team building through physical challenges*. Human Kinetics: Champaign, IL.

Goldberger, M. & Howarth, K. (1993). The national curriculum in physical education and the spectrum of teaching styles. *The British Journal of Physical Education*, 24(1) 23-28.

Hein, V. & Kivimets, M. (2000). The effects of two styles of teaching and teachers qualification on motor skill performance of the cartwheel. *Acta Kinesiologiae Universitatis Tartuensis*, 5, 67-78.

Lara, S. (2001). An effective strategy for fostering cooperation. *Estudios sobre Educación*, 1, 99-110.

Learreta, B., Montil, M., González, A., & Asensio, A. (2009). Percepción del

alumnado ante el uso de metodologías activas de enseñanza como respuesta a las demandas del espacio europeo de educación superior [Perception of students to the use of active teaching methodologies in response to the demands of the european space of higher education]. *Apunts. Educación Física y Deportes*, 95(1), 92-98.

Lorente, E. & Joven, A. (2009). Self-management in physical education: an ethnographic research study. *C & E: Cultura y Educación*, 21(1), 67-79.

Martínez, L.F., Santos, M. L. & Sicilia, A. (2006). De la pedagogía del silencio a la pedagogía del diálogo. La autoevaluación y la autocalificación como formas de promoción democrática [The pedagogy of silence to the pedagogy of dialogue. Self-evaluation and self-qualification as forms of promotion of democracy]. In V.M. López Pastor and others. *La evaluación en educación física. Revisión de los modelos tradicionales y planteamiento de una alternativa: la evaluación formativa y compartida [The evaluation in physical education. Review of traditional models and an alternative approach: shared and formative evaluation]* (pp 421-446). Buenos Aires: Miño y Dávila.

Mosston, M. & Ashworth, S. (2002). *Teaching physical education*. (5th ed). San Francisco CA : Benjamín Cummings.

Ortega, E., Calderón, A., Palao, J.M. & Puigcerver, M.C. (2009). Diseño y validación del contenido de un cuestionario sobre la satisfacción, participación y opinión de mejora en la clase de E.F. en secundaria. [Design and validation of the content of a questionnaire of satisfaction, participation and perception of improvement in the physical education class in high school]. *Wanceulen: Educación Física Digital*, 5, 16-26, <http://www.wanceulen.com/revista/index.html>.

Prieto, J.A. & Nistal, P. (2009). Influencia del Aprendizaje cooperativo en Educación Física. [Influence of cooperative learning in Physical Education.] *Revista Iberoamericana de Educación*, 49(4), 1-8.

Qin, Z., Johnson, D.W. & Johnson, R.T. (1995). Cooperative versus competitive efforts and problem solving. *Review of Educational Research*, 65(2), 129-143.

Rodrigues, S.T., Castello, V.M., Jardim, J.G., & Aguiar, S.A. (2012). "Motor learning based on biological motion demonstrations." *Motriz. Journal of Physical Education*, 18(4), 636-645. <http://dx.doi.org/10.1590/S1980-65742012000400002>.

Sicilia-Camacho, A. & Brown, D. (2008). Revisiting the paradigm shift from the versus to the non-versus notion of Mosston's Spectrum of teaching styles in physical education pedagogy: A critical pedagogical perspective. *Physical Education and Sport Pedagogy*, 13(1), 85-108.

Solana, A. (2005). La utilización de los estilos de enseñanza en el ámbito del deporte escolar: posibilidades para incrementar la implicación del alumno/jugador en su propio aprendizaje. [The use of the styles of teaching in the field of sport in schools: possibilities to increase player student involvement in their own learning]. *Habilidad Motriz*, 25, 18-24.

Schmidt, H.G., Vermeulen, L. & Van der Molen, H.T. (2006). Long term effects of problem-based learning: a comparison of competencies acquired by graduates of a problem-based and a conventional medical school. *Medical Education*, 40(6), 562-567.

Smoleuskiy, V. & Gaverdouskiy, I. (1996). Tratado general de Gimnasia Artística Deportiva. [General Treaty of Artistic Gymnastics]. Barcelona: Paidotribo.

Tunçel, Z. (2006). Effect of the Cooperative Style on P.E. Achievement, Cognitive Process and Social Behaviours. Published Doctorate Thesis, Dokuz Eylül University, Institute of Social Sciences, Izmir.

Thomas, L., Fiard, J., Soulard, C., & Chautemps, G. (1997). *Gimnasia Deportiva: De la escuela a las asociaciones deportivas*. [Gymnastics: From school to sports associations]. Lérida: Ágonos.

Velázquez, C. (2004). Las actividades físicas cooperativas. Una propuesta para la

formación en valores a través de la EF en las escuelas de educación básica. [Cooperative physical activities. A proposal for the formation in values through the Physical Education in the schools of basic education]. Secretariat of public Education. México DF.

Vernetta, M., Gutiérrez, A. & López Bedoya, J. (2009). Effect of the level of mastery of the model and prior knowledge of the errors on the learning of the an acrobatic skill. *Revista de Investigación en Educación*, 6, 24-32.

Vernetta, M., Gutiérrez-Sánchez, A., López-Bedoya, J., & Ariza, A. (2013). Learning cooperative in higher education. An experience in learning gymnastic skills. *C&E: Cultura y Educación* 25(1), 3-16.

Vernetta, M., López Bedoya, J. & Delgado, A. (2009). Shared assessment in learning gymnastic skills in European higher education space. *European Journal of Human Movement. Motricidad*, 23, 123-141.

Vernetta, M. López Bedoya, J. y Panadero, F. (2000). *Unidades didácticas para secundaria XI. Habilidades gimnásticas: Minicircuitos*. Barcelona: INDE.

Vernetta, M., López Bedoya, J. & Robles, A. (2009). Evaluación compartida con fichas de observación durante el proceso de aprendizaje de las habilidades gimnásticas. Un estudio experimental. [Evaluation shared with observation sheets during the process of learning the gymnastics skills. a pilot study.] *Rev. Iberoamericana de Educación*, 50(2), 1-14.

Viciano, J. & Delgado, M.A. (1999). La programación e intervención didáctica en el deporte escolar (II). Aportaciones de los diferentes estilos de enseñanza. [Programming and educational intervention in school sport (II). Contributions of the different styles of teaching]. *Apunts. Educación Física y Deportes*, 56, 17 -24.

Ward, P. & Lee, M.A. (2005). "Peer-assisted Learning in Physical Education: A Review of Theory and Research". *Journal of Teaching in Physical Education*, 24, 205-225.

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