International Journal of Science and Research (IJSR)
ISSN: 2319-7064
ResearchGate Impact Factor (2018): 0.28 | SJIF (2019): 7.583

Constructive Teaching and Learning in Physical Education: Correlations between Teachers and Students in Elementary School

Papamichou Aspasia

[1]PhD of Democritus University of Thrace, Greece, School of Physical Education and Sport Science, Democritus University of Thrace, Greece
papamihaspa[at]gmail.com, apapamic[at]phyed.duth.gr

Abstract: ***In Physical Education, constructive teaching is a teaching approach that can lead to constructive learning, focusing on the active engagement of students based on their previous learning experiences. This study investigated the relationship between constructive teaching and learning. The sample consisted of 25 Physical Education Teachers (PETs) and their 909 students from fifth and sixth grade of elementary schools from all regions of Greece. As a measurement tool for teachers was used the Chen, Burry-Stock και Rovegno's (2000) questionnaire The Constructivist Teaching Practices Inventory in Elementary Physical Education (CTPI-EPE) with four factors and 36 questions, and for the students was used an adaptation of the same tool. The results showed very weak to negative correlations between constructive teaching and learning in Physical Education. In conclusion, targeted teachers' training is necessary to reinforce students be leaded to more constructive autonomy in their learning.***

Keywords: constructive teaching & learning, Physical Education, elementary school

Abbreviations

CTS: Constructive Teaching Strategies
PE: Physical education
PETs: Physical Education Teachers

1. Introduction

Constructive teaching is a student-centered teaching strategy, which is opposed to traditional teacher-centered teaching practices, argues that learning builds on the learner's previous experience base, through active engagement in the learning process (Davis & Sumara, 1997).

Initially, constructivism interprets a person's cognitive/ psychological/ developmental approach (whose expression is Piaget and the so-called Geneva School of Thought, later flanked by other theorists such as Von Glasersfeld), according to which, the acceptance of new knowledge occurs when the student invests in the previous knowledge he has acquired, creating a "creative upset". Cobb (1994, page 38) argues that "*for constructivism, learning is a process through which the individual draws on the experience of the past knowledge and in ways of learning to restore cognitive balance through a process of adaptation to the new. On the other hand, behavioral learning* (which is the theoretical approach of teacher-based teaching methods) *is treated as a sensory-kinetic activity in which the individual focuses on the reproduction of specific patterns.*" Piaget's supporters have argued that each person understands situations differently, so new knowledge "hangs over" on the previous basis to update the personal knowledge building. Everyone's experiences lead to knowledge as a collection of conceptual structures that are organized subjectively. The person learns to adapt his reactions to new experiences (Cobb, 1994). Piaget explained knowledge as "adaptive function" instead of "objective representation" of the commonly accepted truth. The pre-existing knowledge of the individual is called by the theoretical constructors "schema" (shape) which reacts to the new knowledge and responds to the new information. Piaget's followers emphasize that existing knowledge patterns and personal experiences depend on the temperament of each individual. Students aged 5-12 years old, are at the heart of the development /cognitive approach to learning (Carey, Zaitchik, & Bascandziev, 2015).

Then constructivism was interpreted from the socio-cultural point of view (Vygotsky' s expressive and so-called Russian school of Thought, which is also supported by theoreticians like Bruner) according to which, learning is achieved through the mutual interaction of the social environment in which each person is active and the personal knowledge-building(Cobb, 1994; Harris & Graham, 1994; Prawat, 1992). Learning is part of a wider activity of the individual in a whole system of action and participation, based on practices cultured organized (Bruner, 1991; Harris & Graham, 1994). Within this context, learning is a socially defined and positioned activity that improves or does not improve, depending on the impact the individual has on the environment.

Both approaches, despite the different perspectives in which they study the learning process, emphasize the development of the individual. Cobb (1992) argued that these two theories can be combined on the basis of a process of self-organization and socialization, which happens when there is interaction with other people.

Constructive Teaching Strategies and learning

Constructivism was the theoretical basis on which constructive teaching strategies were developed (Chen, et al., 2000). Through Constructive Teaching Strategies (CTS), the teacher is able to help students in order that make sense of their own new knowledge, while also enabling them to

discover knowledge through interaction with peers. In classes where the CTS is being used, students are encouraged to share their ideas, while in the classroom where traditional teaching practices apply, the learning process is mainly based on the teaching manual (Brooks & Brooks, 1999).

Fosnot & Perry (2005) argued that teachers should be open to all of the student's interpretations rather than diminishing their breadth to that they think right. Teachers have underestimated the value of mistakes on the part of students for building knowledge and it is necessary to give a new perspective to teaching by exploiting mistakes for the benefit of students. The advantage of CTS is that the learner is encouraged to build his/her own solution by learning through his/her mistakes, which in this way becomes important to him/herself (De Vries & Kohlberg, 1990).

According to Chen et al (2000), the use of the CTS teachers is as follows: a. learning processes promote the responsibility of students b. the teacher takes into account the existing cognitive level of the students c. learners are guided in new fields of knowledge d. opportunities for cooperative approach and problem solving are enhanced e. students are challenged to solve problems, to propose solutions, to be receptive to innovation f. the interpersonal relations of students are developed g. holistic learning experiences are used h. mutually supporting the team and the acceptance of each member is reinforced.

As a result of all the above, the student increases confidence in himself by building his personal knowledge on his already existing experience base, interacting with the school environment (Cobb, 1994; Davis & Sumara, 1997; Priest 1999).

Most research on CTS has been conducted in Physics, Mathematics and Chemistry (Opolot-Okurut, 2010) and their results have shown that these strategies are a positive contributor to the development of basic skills to these specific cognitive objects. Also, in researches in the Biology, CTS appeared to positively influence students' perceptions of certain aspects of the learning environment (Henderson, Fisher & Fraser, 2000).

The evolution of the Physical Education is based on the approach of the person as a whole (body, mind, emotions) through student-centered teaching strategies, which absolutely characterizes CTS (Chen, 2006; Chen et al., 2000). Physical Education (PE) according to Light and Fawnes (2001) is the expression of the mind and body as two distinct "entities", converging in a body that "thinks" and learns. This may seem like a separation, but in reality the body and the mind are linked to an ongoing "conversation-coexistence" that gradually reduces the gap between the mind's intention and the ability of the body to apply this intention as expressive knowledge in act (Light & Fawns, 2003). By accepting the above approach, PE is the only cognitive subject where, through the CTS activities, a learning environment can be achieved in which, according to Azzarito and Ennis (2003) students have the ability to actively develop knowledge, exchange information, take leadership roles, responsibilities, make decisions, communicate, and come closer to their peers while learning.

According to research in PE (Chen, Burry-Stock & Rovegno, 2000; Grennon Brooks & Brooks 1993; Prawat 1992; Shapiro 1994; Yager 1991), PETs as mentors through the use of CTS are faced with the challenge of encouraging their students to:

- have autonomy in thinking to pose and solve problems,
- use superior thinking processes by evaluating their learning
- develop their point of views,
- use transport, images and examples from their daily routine and prior knowledge,
- provide opportunities for interaction with peers and friends,
- discuss, negotiate,
- obey the rules of the class, while being sensitive to the ideas of others, working collaboratively.

In order for all the aforementioned benefits to be realized for students, PETs need to understand how students think when they have to solve a problem, how they react and make decisions (Wallian & Ching-Wei Chang, 2007). The approach of PE with CTS is a pedagogically integrated approach with a learner-centered orientation (Kirk & Macdonald, 1998; Light & Wallian, 2008) and creating a supportive learning environment with significant benefits for all students (Hickson & Fishburne, 2004).

There is no research in the international literature that examines the correlation between constructive teaching strategies on the part of teachers and constructive learning on the part of students in PE lesson.

Propose

The purpose of this study was to examine whether constructive teaching strategies are related to constructive learning in PE lesson.

2. Methodology

2.1 Sample

The sample consisted of 25 Physical Education Teachers (PETs) and their 909 students from fifth and sixth grade of elementary schools from all regions of Greece.

2.2 Measuring tools

a) Teachers

As a tool to measure the constructive strategies of PETs, was used the Chen, Burry-Stock and Rovegno's (2000), questionnaire The Constructivist Teaching Practices Inventory in Elementary Physical Education (CTPI-EPE) with four factors and 36 questions. In particular, the factors are: a. Facilitate the active building of knowledge in dance/gymnastics with 11 questions (for example: Encourage your students to discuss their ideas for dance / fitness routines?) b. Facilitate active knowledge-building in games/skills with 9 questions (for example: Provide students with opportunities to be actively involved in game design

/modification?) c. Facilitate active knowledge-building to personal knowledge with 10 questions (for example: Encourage students to use what they learned during their lesson/module or previous experiences/knowledge of their lives to design/modify their games?) and d. Facilitating Social Co-operation with six questions (for example: Do you instruct your students to negotiate their ideas cooperatively when they do not agree?) Answers were given on the 5th scale Likert (1 = never, 3 = I am neutral , 5 = almost always)

b) Students

In order to evaluate students 'constructive learning, teachers' tool was adapted and used. More specifically, it was adapted to the beginning of the questions because it was addressed to children. The questions started as follows: "In the Physical Education lesson, I have the opportunity to participate, use, expand ...". The questionnaire responded with a Likert five-step scale where 1 = never, 5 = almost always.

2.3 Statistical Analyzes

In order to explore the relationship between constructive teaching and learning to teachers and students, Pearson Correlation was applied

3. Results

The results of the survey showed that there are statistically significant correlations between the variables (Table 1).

Table 1: Associations of Teachers' Constructive Strategic and Students' Constructive Learning

Factors	1	2	3	4	5	6	7	8
1.Dance/gymnastics(T)	1							
2.Games/Skills(T)	.840**	1						
3.Previous Knowledge (T)	.736**	.766**	1					
4. Social Co-operation (T)	.622**	.694**	.734	1				
5. Dance/gymnastics (S)	.320**	-.051**	-.051	0.96	1			
6. Games/Skills (S)	.220**	-.016	-.017	.200	.110*	1		
7. Previous Knowledge (S)	.417	.388**	.-045	.054	.472**	.298**	1	
8. Social Co-operation (M)	.200*	.210*	.-054	.278	.388**	.368**	.912**	1

**Correlation is significant at the 0.01 level (2-tailed) *Correlation is significant at the 0.05 level (2-tailed)
T= Teachers, S= Students

The Facilitation of Building Active Knowledge in Dance/Gymnastics of Teachers presented a weak correlation with Facilitating the active building of knowledge in dance/gymnastics of students (r = .320, p <.01), Facilitating the active building of knowledge in games / skills (r = .220, p <.01) and Social Co-operation (r = .200, p <.01) which appear in Figure 1.

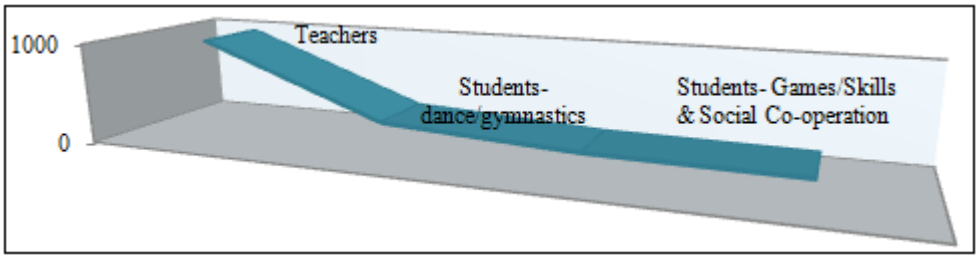

Figure 1: Results from correlations between the Teachers' factor Facilitation of Active Building Knowledge in Dance / Gymnastics with Students' Factors

Facilitating the active building of knowledge in Teachers' games / skills has shown a weak correlation with the Personal Knowledge Building Facility (r=.388, p <.01) and Facilitation of Student Social Co-operation (r = .210, p < .01), which appear in Figure 2.

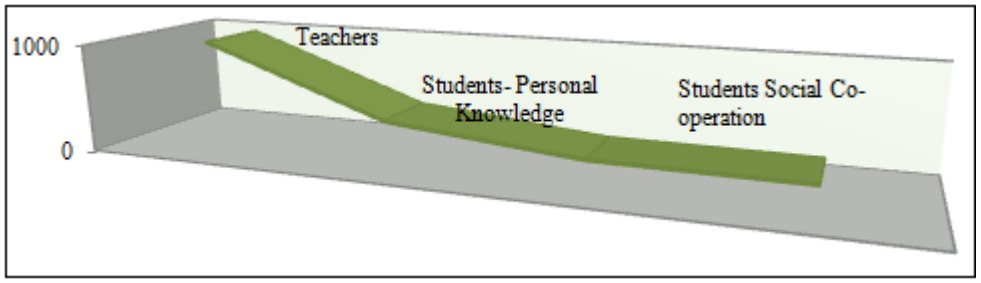

Figure 2: Results from correlations between the Teachers' factor Facilitation of Active Building Knowledge in games / skills with Students' Factors

However, there have been negative correlations between Facilitating the building of personal knowledge of teachers and all Factors of the students: Facilitating the active building of knowledge in dance / gymnastics (r = - 051, p <.01), Facilitating the active building of knowledge in games / skills (r = - .017, p <.01), Facilitating the building of personal knowledge (r = -.045, p <.01) and Facilitating Social Co-operation (r = =-.054, *p*<.01), which appear in Figure 3.

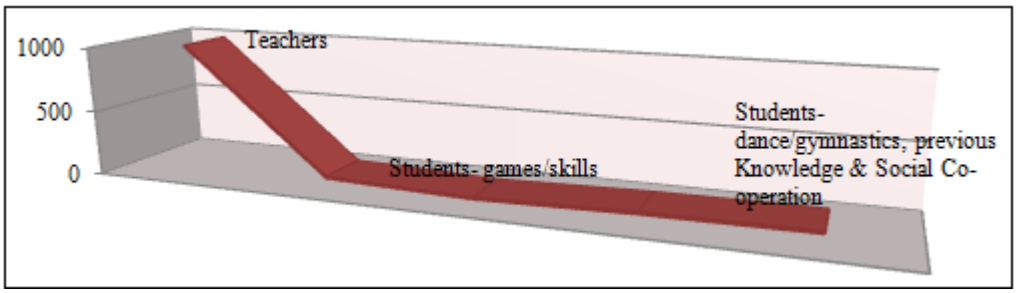

Figure 3: Results from the negative correlation between Teachers' Factor Facilitating the building of personal knowledge with students' factors

4. Discussion

The results of this research showed that there are significant correlations between the variable teachers and students as follows:

Facilitating the active build of knowledge in dance/gymnastics of teachers has shown a weak correlation with Facilitating the active building of knowledge in dance/ gymnastics, Facilitating the active building of knowledge in games/skills and Facilitating students' Social co-operation. Facilitating the active building of knowledge in teacher games/skills has shown a weak correlation with Facilitating the Active Building of prior Knowledge and Facilitating Student Social Co-operation.

However, there have been negative correlations between Facilitating the active build-up of prior knowledge of teachers and all actors of the students: Facilitating the active building of knowledge in dance / gymnastics, Facilitating the active building of knowledge in games/skills, Facilitating the active building of the previous Knowledge and Facilitation of Social Co-operation.

The results of the constructivist correlation between teachers and students presented above are in line with other surveys (Kroll, 2007) making constructivism a top tool in the hands of teachers (Krahendduhl, 2016). In particular, PETs who are using the CTS can improve the level of teaching and associate the constructive learning of their students according to the factors of the measurement tool they follow.

Facilitating the active building of knowledge in dance/gymnastics is the first factor in the questionnaire on the extent to which a teacher encourages and facilitates children to participate actively by creating their own dance and gymnastics series as well as alternative motion reactions (Chen et al., 2000). PETs are able to provide students with opportunities to be actively involved in the creation of dance sequences/ routines, to integrate student suggestions into learning a new motor activity, to encourage students to rely on their cultural backgrounds to create meaningful dances for themselves. According to the researchers who created the CTPI-EPE tool, the methodology of teaching dances and gymnastics is similar, so only one factor covers the research needs of these two cognitive subjects.

Facilitating the active building of knowledge in games/skills is the second factor. PETs can encourage students to expand/adapt the use of a skill to different and/or original game situations, to generate their own queries about the kinetic game/ skill execution throughout the course but and if they are actively involved in assessing the quality of their moves. It is good to provide students with opportunities to modify the rules in games by adapting them to their developmental and cognitive level (Lieberman & Houston-Wilson, 2009). Modifying games allows students to practice their skills and participate in decision making in "real" play situations, putting them in an energetic learning state, since sports and games, traditional and others, are a big part of cognitive objects of the Physical Education.

Facilitating the active build-up of prior knowledge is the third factor in the questionnaire and according to the Munafo review (2016), learning is not only cognitive, but through PE it is socialized and motorized, so the previous experience base is a determining factor. Knowledge building is based on the former cognitive and kinetic experience of the individual, who is his personal kaleidoscope, where the variety and the alternation of the events of his life coexist. PETs during the course can provide students with the opportunity to use examples/images related to their life experiences, teaching / key points to be relevant to prior learning and/or student life experiences, encourage them to use their motor repertoire to explore a variety of executions of a learning skill.

The Facilitation of Social Co-operation is the fourth and final factor of the measurement tool. According to the researchers who created the tool (Chen, et al., 2000), illustrates the degree to which PETs guides their students to co-decide and implement the rules for group or collaborative work is depicted. It also outlines the level of encouragement for students to share their ideas on exploring different approaches to improving the performance of a group or coupled skill, to reflect on how well they work together, whether they and their classmates set rules to accept the mistakes of others, to negotiate their ideas together when

they do not agree with each other and to consider their role in the problems that arise.

In PE but also in all subjects, it is advisable to have a correlation between the teaching strategies chosen by the teacher and the learning process. From the results of this research it appeared that constructive teaching approach is very little associated with constructive learning, and this leads to the conclusion that targeted teacher- training is necessary, so that students can work more autonomously during their learning.

References

[1] Azzarito, L., & Ennis, C.D. (2003). A sense of connection: Toward social constructivist physical education. *Sport, Education, and Society*, 8, 179-197.
[2] Beamer, T., Van Sickle, M., Harrison, G., &Temple, G. (2008). Lasting impact of a professional development program on constructivist science teaching. *Journal of Elementary Science Education*, 20(4), 49-60.
[3] Brooks, J.G., & Brooks, G.M. (1999). *In search of understanding: The case for constructivist classrooms*. Alexandria, VA: Association for Supervision and Curriculum Development.
[4] Bruner, J. S.(1991).The Narrative Construction of Reality. In: Critical Inquiry, 18, 1-21
[5] Burry-Stock, J.A. (1995). Expert science teaching evaluation model (ESTEEM): Theory, development, and research. Kalamazoo, MI: The Evaluation Center, Western Michigan University.
[6] Carey, S. Zaitchik, D. & Bascandziev, I. (2015). Theories of development: In dialog with Jean Piaget. *Developmental Review*, 38, 38-54.
[7] Chen, W.(2006). Teachers' Knowledge About and Views of the National Standards for Physical Education. *Journal of Teaching in Physical Education*, 25,120-142
[8] Chen, W., Burry-Stock J.A. & Rovengo I. (2000). Self-Evaluation of Expertise in Teaching Elementary Physical Education from Constructivist Perspectives. *Journal of Personnel Evaluation in Education* 14(1), 25-45.
[9] Chen, W., Mason, S., Staniszewski, C., Upton, A. & Valley, M.(2012). Assessing the quality of teachers' teaching practices. *Educational Assessment Evaluation and Accountability* 24(1) 25-41
[10] Cobb, P. (1994). Where is the mind? Constructivist and sociocultural perspectives on mathematical development. Educational Research, 23(7), 13-20.
[11] Davis B., & Sumara D. J. (1997). Cognition, complexity, and teacher education. *Harvard Educational Review*, 67(1), 105-125.
[12] DeVries, R., & Kohlberg, L. (1990). Constructivist early education: Overview and comparison with other programs. Washington, DC: NAEYC
[13] Derri, V.. (2007). Physical Education in the Beginning of the 21st Century. Purposes-Goals-Pursues in Primary Education. Thessaloniki: Christodoulides Publications.
[14] Emmanouilidou K., Derri, V., Vassiliadou, O. & Kioumourtzoglou. (2007). DSPES, Democritus University of Thrace. The Academic Time of Learning in Physical Education in Primary Education. Inquiries in Physical Education & Sports volume 5 (1), 1 - 9 Published: April 27, 2007.
[15] Fosnot, C.T., & Perry, R.S. (2005). Constructivism: A psychological theory of learning. In C. T. Fosnot (Ed.), *Constructivism: Theory, perspectives, and practice* (pp. 8-38). NY: Teachers College Press.
[16] Graham, G., Holt-Hale, S.A., & Parker, M. (1993). Children moving: A reactive approach to teaching physical education. Palo Alto, CA: Mayweed.
[17] Grennon-Brooks, J., & Brooks, M. G. (1993). *In search of understanding: The case for constructivist classrooms*. Alexandria, VA: Association for Supervision and Curriculum Development.
[18] Harris, K.R., & Graham, S. (1994). Constructivism: Principles, paradigms, and integration. *Journal of Special Education*, 28(3), 233-247.
[19] Henderson, D. Fisher, D. & Fraser,B. (2000). Interpersonal Behavior, Laboratory Learning Environments, and Student Outcomes in Senior Biology Classes. *Journal of Research in Science Teaching* 37(1):26-43
[20] Hickson, C., & Fishburne, G. (2004). What is effective physical education teaching and can it be promoted with generalist trained elementary school teachers? Paper presented at the Australian Association for Research in Education conference, Melbourne.
[21] Keller, C. L., & Duffy, M. (2005). "I said that?" How to improve your instructional behavior in just 5 minutes per day through data-based self-evaluation. *Teaching Exceptional Children*, 37(4), 36–39.
[22] Kirk D. & Macdonald D.(1998).Situated Learning in Physical Education. *Journal of teaching in physical Education*17, 376-387.
[23] Krahenduhl, K.S.(2016).Student-centered Education and Constructivism: Challenges, Concerns, and Clarity for Teachers. *The Clearing House: A Journal of Educational Strategies, Issues and Ideas*, 89 (3), 97-105
[24] Kroll, L.R. (2007).Constructing constructivism: how student-teachers construct ideas of development, knowledge, learning, and teaching. *Teachers and Teaching*, 10(2), 199-221
[25] Lieberman L, Houston-Wilson C (2009).Strategies for inclusion: a handbook for physical education. Champaign, IL: Human Kinetics.
[26] Light, R. & Fawns, R.(2003). Knowing the game: Integrating speech and action through TGfU. *Quest*, 55, 161-177.
[27] Light, R., & Wallian N. A.(2008). Constructivist-Informed Approach to Teaching Swimming. *Quest*, 60(3), 387–405
[28] Munafo, C. (2016). Cooperative Learning as Formative Approach in Physical Education for All. *International Journal of Sport Culture and Science* 4, (2), 105-205
[29] Opolot-Okurut, Ch.(2010). Classroom learning environment and motivation towards mathematics and Chemistry among secondary school students in Uganda. *Learning Environments Research* 13(3),267-277

[30] Prawat, R.S. (1992). Teachers' beliefs about teaching and learning: A constructivist perspective. American Journal of Education, 100(3), 354-395.
[31] Priest, S.(1999). The semantics of adventure programming. In J. Miles & S. Priest (Eds.), *Adventure programming*. Champaign, IL: Human Kinetics.
[32] Rovegno, I. (1992). Learning a new curriculum approach: Mechanisms of knowledge acquisition in preservice teachers. *Teaching and Teacher Education*, 8(3), 253-264.
[33] Rovegno, I.(1993a).Content-knowledge acquisition during undergraduate teacher education: Overcoming cultural templates and learning through practice. *American Educational Research Journal*, 30(3), 61-64.
[34] Rovegno, I. (1993b).The development of curriculum knowledge: A case of problematic pedagogical content knowledge during advanced knowledge acquisition. *Research Quarterly for Exercise and Sport*, 64, 63-88.
[35] Shapiro, B.L. (1994). *What children bring to light: A constructivist perspective on children's learning in science*. New York, NW: Teacher College Press.
[36] Wallian N. & Ching-Wei Chang C.W. (2007) Language, thinking and action. *Physical Education and Sport Pedagogy*12(3), 2007.
[37] Yager, R.E. (1991). The constructivist learning model. *The Science Teacher*, 51, 52-57.