

THE ROLE OF STREET DANCE IN DEVELOPING PSYCHOMOTOR SKILLS AND CREATIVITY OF STUDENTS

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<https://doi.org/10.35189/dpeskj.2024.63.1.1>

Abstract. *Given the premise that dance is an activity suitable for integration in Physical Education and Sport classes, we aimed to test this by implementing teaching projects incorporating elements of Street Dance. Similar to other sports, which rely on motor skills and actions, only in this case mostly performed to music, Street Dance can bring countless benefits to a person's life. Whether we are talking about psychomotor or cognitive skills, the literature argues that dance can be a valuable tool for improving them. Considering the novelty that Street Dance represents, and its ongoing evolution, coupled with the increasing attraction of young people to this dance style, we considered this research to be beneficial. The study was carried out in a secondary school in Bucharest, Sector 3, and the 17 participants were 8th grade students. As part of the research, we used the RCMV computerized test, which helped us to investigate the reactivity, hand-foot coordination and vigilance of the subjects. Also, creativity was explored through a test consisting of geometric figures, adapted by Mihaela Roco. The statistically significant differences (Wilcoxon test was used) allow us to say that the improvements achieved are not random, but are also due to the exercise programme intervention.*

Keywords: *Street Dance; psychomotor skills; creativity; secondary school students.*

Received: 21 December 2023 / **Accepted:** 12 February 2024 / **Published:** 30 March 2024

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Introduction

“Hip hop is studied worldwide as an exemplary multidisciplinary field, with loans from sociology, politics, religion, economics, urban studies, journalism, American studies, transatlantic studies, history, musicology, comparative literature, English, linguistics and many other disciplines” (Dyson, 1993, p. 12).

For many young people, hip-hop reflects the realities and conditions of life, both social and economic, political and cultural, and due to its longevity and convincing message, for many youths around the world it cannot be considered just a passing fashion or a movement that will soon end its course. This all-unitary phenomenon warrants serious consideration on cultural, political, economic and intellectual fronts, deserving a level of attention akin to previous African-American artistic and cultural movements, such as Blues, Jazz, or other civil rights movements (Aldridge & Stewart, 2005). Street-dance is an umbrella term comprising different

dance styles and techniques in American hip hop culture at the end of the 1960s (Macmillan Dictionary, 2007). This is a sports activity and the characteristics of this dance include rapid changes in footsteps, strong explosive power and a combination of strong rhythmic music, so it can better improve the coordination ability of practitioners, and fully exercise the small joints and small muscle groups that the body does not often move to (Mota et al., 2011). This process requires the participation of sensory, motor systems, and integrated brain regions, and involves advanced cognitive processes. So, street-dance can improve both physical and mental well-being, bringing countless benefits to practitioners (Shen et al., 2020).

The results of a study conducted by Lakes et al. (2016) show us that the experienced dancers achieved significantly greater physical, social and cognitive benefits than beginners. These findings suggest that engaging in dance styles is associated with perceived improvements in psychomotor skills, with benefits potentially increasing with regular and prolonged periods of time. There are enough studies supporting this, highlighting that dancing offers many benefits in the life of any person. Salihu et al. (2021) further assert that dance can be used as an intervention against depression in adults, alleviating stress and anxiety, and propose 150 minutes of dance per week to reduce depressive symptoms. According to a study conducted by Zahiu et al. (2020), it appears that currently, there is a multitude of competitive festivals for children and juniors 'dance formations in Romania, primarily organized by private dance clubs. However, the lack of a structured methodological training background makes poses challenges to the teaching process.

Street Dance can be a very good tool to use in the fight to improve well-being both mentally and physically. Whether we are talking about children, teenagers, young or old people, various avenues exist to introduce street dance to people. When we refer to children, we believe this study could be a step towards establishing an optional Street Dance program, through which we could reach schools. Such a program would allow children to engage with this beautiful Hip Hop culture, facilitated by physical education and sports teachers.

In a 2019 study conducted in Colorado, the technological aspect we discussed was addressed, with the specialist proposing a Street Dance Toolkit. This toolkit aims to support teachers by providing them with materials to incorporate Hip Hop culture into their activities (Tarajal, 2020). El-Sherif (2016) asserts that physical education teachers have limited knowledge regarding dance. She even teaches specialists in physical education how to choose music or even some dance steps, given the use of these skills in lessons. Specialists can find various ways to introduce dance into the lessons they lead. This interesting topic, creativity, often addressed in literature, as Kaplan (2019) did in a study called „Teaching for creativity development“ (emphasizing the importance of fostering creativity and its role in the learning process), can be integrated into physical education lessons in various ways.

Roco mentioned in 2004 that psychologists support the idea that creativity entails to create something new, even original, and ensuring its relevance to reality. To assess the level of a person's creativity, extensive studies have led to numerous tests and creativity games. They differ by the special characteristics that they contain to assess the different forms of creativity, relating to fluency (which represents a dimension of the quantitative type of creativity), originality (a dimension of qualitative creativity), flexibility (ability of the individual to move as quickly as possible from one direction of thinking to another), sensitivity to problems (an individual's ability to capture irregularities of different types) and last but not least, elaboration

(a person's capacity to provide as many details as possible about a new idea). ” Creativity involves the convergence of cognition and emotion, two mental processes that influence the creation of dance and how it is received” (Thomson, 2020, p. 306). Surely, dance and music could represent useful tools in the development of creativity.

Researchers have studied extensively various dance-related issues in schools in Scotland. Maclean & Simmons (2018) discussed challenges related to physical education and sports programs, highlighting the difficulties that teachers face in this regard.

Regarding dance's inclusion in physical education and sports programs across several countries, Mattsson & Lundvall (2015) noted that the position has been contested, resulting in minimal time allocated for dancing. In Romania, dance is part of the physical education and sports curriculum but as an alternative discipline. However, it is very much underutilized in lessons despite its potential to improve students' creativity and more. Engdahl et al. (2022) argue that teaching dance in physical education is an important pedagogical framework for fostering young people's creativity.

Moreover, Pickard and Maude (2014) argue that including dance in the school curriculum, gives students opportunities to engage in activities that promote embodied cognition. This type of cognition has been associated with executive functions (particularly cognitive control, flexibility, and improvisation skills), all known to underlie creativity.

According to Fadel and Trilling (2012), as a result of exposure to hip-hop education, students and specialists will be able not only to embrace this genre of creativity, but also the additional skills of the twenty-first century that encompass this culture, such as critical thinking, problem-solving, communication, collaboration and innovation.

Not least, Miura et al. (2013) argued that during street dance, there are two coordination patterns when an individual synchronizes their knee movements to a musical beat in a stance: down-on-the-beat and up-on-the-beat. The down-on-the-beat is the pattern in which an individual flexes their knees on the beat, while the up-on-the-beat is the pattern in which the dancers extend their knees on the beat. This task is familiar to street dancers because it is a basic technique. Miura et al. (2011) found that both street dancers and non-dancers showed an unintentional phase transition from the up-on-the-beat to the down-on-the-beat pattern when they were performing the up-on-the-beat at high beat rates. However, the critical frequency where the phase transition occurred was significantly higher in the street dancers (2.8 Hz) than in the non-dancers (2.1 Hz). In addition, when the dancers were asked to resist the unintentional phase transition to the down-on-the-beat, a skilled street dancer did not show an unintentional phase transition and maintained the up-on-the-beat pattern at 3.0 Hz. These findings imply that street dancers have altered their intrinsic coordination tendencies through dance practice. As a result, they demonstrate the ability to sustain the up-on-the-beat pattern even at high beat rates.

Methodology

Purpose

The aim of our research is to scientifically highlight the improvement resulting from practicing Street Dance, both in terms of psychomotor capacity and cognitive skills, among secondary school students.

Our goal is to create a set of tools that include research-based best street dance practices, including terminology, history, music education, linguistic elements and, of course, examples of lesson plans to expand the knowledge of students and specialists about street dance.

Research hypothesis

H1: The implementation of a program proposed by us - based on means specific to Street Dance - lead to a significant improvement in psychomotor skills.

H2: The intervention using a program based on Street Dance means fosters the development of students' creativity.

Participants

Table 1. *Experiment Participants*

Participants	Gender	Age
1.	M	14
2.	F	14
3.	M	14
4.	F	14
5.	M	15
6.	M	14
7.	M	15
8.	F	14
9.	M	14
10.	F	14
11.	M	14
12.	M	14
13.	M	14
14.	F	14
15.	F	14
16.	F	15
17.	M	15

The participants in the study were 8th-grade students from Gymnasium School No. 86, Bucharest. During physical education and sports lessons, they engaged in activities prepared by us, structured in the form of lesson plans incorporating elements of Hip Hop culture.

Measures

RCMV computerized test offers the possibility of highlighting important aspects of the psychomotor behaviour: correctness, accuracy, speed, fluency, consistency – by determining motor learning skills, self-regulation of psycho-motor dynamics, motion-foot coordination, psychomotor organization in various and demanding situations, self-control and activation of vigilance state.

The device, along with the laptop containing the software, was utilized following instructions provided by psychologist PhD. Predoiu Radu. Subsequently, we administered the test to the 17 students, with each assessment lasting approximately 10 minutes per student. During this test we were able to observe the following dimensions: Operating memory, The ability to learn, Perceptive field inspection, Perceptive motor efficiency, Performance,

Complex reaction time, Autotempo (tempo) and the Optimum Personal Rhythm coefficient, Disruptive factor resistance and Time pressure resistance. The RCMV test for intersegmental coordination was used in previous studies with athletes (Predoiu, 2015; Cojocaru et al., 2015).

For assessing creativity, we used the figural and verbal creativity test adapted by Guilford et al. (Roco, 2004). In this test, participants were presented with 7 geometric shapes in the first section, followed by another 7 figures in the second section. In the third section, they were given 2 prompts requiring them to list several examples. Participants were provided with a booklet to record all potential answers that came to mind, thus engaging their creativity.

They had two minutes per subject for this task (the answers could not be unimaginable).

We chose this time frame to align with the duration of a freestyle test or a dance routine, which typically lasts around two minutes. The test aimed to assess fluency, as a component of creativity, by measuring the quantity of ideas generated by participants within the given time frame. Participants had to generate as many ideas as possible during the mentioned time frame, separately for figural and verbal creativity.

Procedure

The experimental research was conducted during modules 3 to 5 of the 2022-2023 school year, involving 17 students from a class at Secondary School No. 86, Bucharest. The study comprised two stages: initial and final tests, with a program of exercises implemented between them during an optional physical education and sport lesson.

Before starting the initial tests, we discussed with the students and provided a brief introduction about the research objectives. The students showed keen interest in the planned activities, being particularly excited about incorporating music and dance into physical education and sports lessons.

To prepare for the practical component, we delivered a brief theoretical overview of Hip Hop culture, with a focus on Street Dance.

Following this, we proceeded with the initial tests at the beginning of module 3 of the school year 2022-2023. These tests were conducted in the school gym, using the equipment and instructions provided by psychologist PhD. Predoiu Radu for the RCMV computerized testing and the creativity test.

Intervention - Teaching strategy

We have used specific methods, like explanation and conversation as verbal methods, repetition as a training method, and demonstration and observation as intuitive methods.

✓ For the development of coordination, we used dance steps specific to Street Dance styles, variation of steps and segmental movements like flexion - extension, raising up - lowering, twists.

✓ For the development of rhythmicity, musicality, psycho-motor dynamics, self-control, self-calibration, fluency and accuracy we listened to various musical styles and used simple movements performed by the upper body or lower body, where each gesture has a well-defined duration that corresponds to the value of a musical note – double, quarter, eighth, whole note.

✓ For the development of creativity, we used elements of improvisation by creating small sequences of step combinations, akin to mini choreographies. Additionally, we incorporated

elements of freestyle, which significantly enhances creativity development. During freestyle sessions, students engaged in spontaneous dancing to musical rhythms, performing learned movements or allowing any movement to emerge naturally in response to the beat's influence.

In Romanian gymnasiums, physical education and sports lessons typically last for 50 minutes and are divided into six segments, each with specific objectives. This structure allows for the observation of physiological principles inherent in sports activities (Dragnea et al., 2006).

As is commonly known, training lessons typically comprise three parts: an introductory part, a fundamental one, and a concluding part. In our teaching projects using Street Dance methods, we aimed to establish a connection between these two forms of organization—the physical education lesson plan and the training lesson plan. Below, we outline the methodological guidelines incorporated within this strategy.

Introductory part – aimed to prepare the body for exercise with variations of walking and running, segmental movements, synchronized with the beat.

Fundamental part – with exercises to learn and reinforce coordination skills or abilities specific to Street Dance. Choreographic structures and exercises aimed at developing freestyle entries.

Concluding part with cool-down – breathing exercises, stretching and lining-up, discussion, conclusion, recommendations, greetings.

Here are some examples of didactic projects for lessons and variations of exercises used during the experiment:

Table 2. *Didactic Project – Coordination and Creativity Lesson*

Lesson Topics	Students will be able to:	Content	Activity Tasks
Improving coordination and creativity with some Breakdance moves	<p>I. Motor: Perform 3 Top Rock elements. Make a short combination of steps to become a choreography.</p> <p>II. Cognitive: Learn information about important breakdancing basics.</p> <p>III. Socio-affective: Collaborate with peers and teacher. Encourage peers in their work. Show interest in the content of the lesson.</p>	<p>We discuss about Break Dance and find out the differences between Top Rock, Footwork, Power Moves and Freeze. We study the biomechanics of Top Rock moves: Cross Step, Salsa Rock, Indian Step. We perform the respective steps and then create a choreography with them, 4x8 times.</p>	<p>Warm up Breaking information Basic Top Rocks Partner Practice Duo Choreography Stretching and recovery</p>

Table 3. *Didactic Project – Rhythm, Musicality and Creativity Lesson*

Lesson Topics	Students will be able to:	Content	Activity Tasks
Improving rhythm, musicality and creativity with some Hip Hop grooves	I. Motor: Learn two separate grooves mechanics. Use them in a short freestyle.	We discuss about Hip Hop style and find out the differences between basic steps and grooves. We study the biomechanics of two grooves. We make a short cypher where every kid will get in the middle and use the grooves.	Warm up Hip Hop information Grooves Cypher Entries Stretching and recovery
	II. Cognitive: Learn information about important components of Hip Hop dance. Difference between choreography and freestyle.		
	III. Socio-affective: Collaborate with peers and teacher. Encourage peers in their work. Show interest in the content of the lesson.		

Table 4. *Didactic Project – Creativity Lesson*

Lesson Topics	Students will be able to:	Content	Activity Tasks
Improving creativity through street dance battles	I. Motor: Combine known steps. Use them in freestyle.	We discuss about choreography and freestyle and learned about battles. Make some freestyle exercises. Creating freestyle entries and competing with friends.	Warm up Hip Hop information's Freestyle Exercises Battle Time Stretching and recovery
	II. Cognitive: Make difference between choreography and freestyle.		
	III. Socio-affective: Collaborate with peers and teacher. Encourage peers in their work. Show interest in the content of the lesson.		

- The lessons were performed one day per week (for 20 weeks, 50 minutes per lesson);
- The training took place in the gym of the Secondary School No. 86, Bucharest;
- The materials used during the lessons: speakers, specific music, a blackboard, coloured markers, video projector, sketches.

Some examples of exercises used (all exercises are performed to music):

1. Breakdance (Cross Step)

Initial position: Stand (You want to be light on your feet and be able to quickly change directions and bounce up and down).

T1: clapping the palms forward at chest level while lifting the chest slightly upwards.

T2: spreading the arms sideways and cross your right leg over and in front of your left leg and stopping it on tiptoe diagonally.

T3: hop to uncross your legs back to a resting position.

T4: spreading the arms sideways and cross your left leg over and in front of your right leg and stopping it on tiptoe diagonally.

T5-T8: repeat it on the beat.

1.Hip Hop (Bounce)

Initial position: Stand with your knees slightly bent.

T1: we bend our shoulders and lean our back slightly forward left.

AND: back to initial position, but don't stop, it's like a transition to the next move.

T2: we bend our shoulders and lean our back slightly forward right.

T3-T8: repeat it on the beat.

Results

RCMV Test

Table 5. Example for one of the 10 dimensions assessed by the RCMV test (Learning Capacity) - initial and results

Participants	Coefficient	Class		
		I	F	
1	0,85	1,00	3	5
2	0,08	0,09	1	1
3	0,54	1,00	2	5
4	0,85	1,00	3	5
5	0,69	0,92	3	4
6	0,92	1,00	4	5
7	0,62	0,77	2	3
8	0,46	0,92	2	4
9	0,69	1,00	3	5
10	0,54	0,85	2	3
11	0,39	0,92	2	4
12	0,77	0,92	3	4
13	0,77	1,00	3	5
14	0,23	0,69	1	3
15	0,54	0,92	2	4
16	0,77	1,10	3	5
17	0,85	0,92	3	4

Note. Class 5 represents the highest performance, while Class 1 means a very poor result.

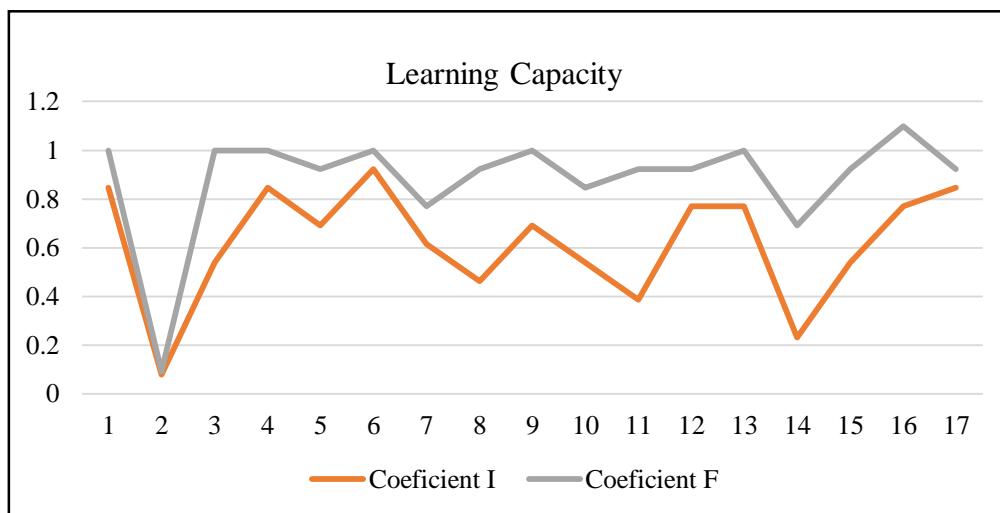


Figure 1. Results for the RCMV Test (Learning Capacity)

Figure 1 highlights that the results of the final coefficient results surpass those of the initial coefficient obtained through the RCMV test, particularly in terms of learning ability dimension.

Table 6. *Descriptive statistics for Learning Capacity*

Descriptive Statistics				
Initial Results		Final Results		
Mean	0,61	Mean	0,88	
Standard Error	0,05	Standard Error	0,05	
Median	0,69	Median	0,92	
Standard Deviation	0,23	Standard Deviation	0,22	
Sample Variance	0,054	Sample Variance	0,052	
Range	0,84	Range	1,02	
Minimum	0,07	Minimum	0,07	
Maximum	0,92	Maximum	1,1	
Sum	10,536	Sum	15,022	
Count	17	Count	17	
Confidence Level (95,0%)	0,119	Confidence Level (95,0%)	0,117	

Table 7. *Inferential statistics - Wilcoxon Test for all 10 dimensions testing with RCMV*

No.	ANALYSED COEFFICIENT	Z	W	P < 0.01
1	Learning capacity coefficient (RCMV)	-3.624	0	0.0003
2	Operating memory coefficient (RCMV)	-3.624	0	0.0003
3	Perceptual motor efficiency coefficient (RCMV)	-3.624	0	0.0003
4	Performance coefficient (RCMV)	-3.624	0	0.0003
5	Complex reaction time coefficient (RCMV)	-0.497	66	0.61
6	Resistance coefficient to disturbance factor (RCMV)	-1.301	49	0.19
7	Personal best pace coefficient (RCMV)	-3.100	11	0.0019
8	Pressure time resistance coefficient (RCMV)	-3.479	3	0.0005
9	Perceptual field inspection coefficient (RCMV)	-2.958	14	0.003
10	Self-time coefficient (RCMV)	-3.624	0	0.0003

The calculated values (W) are less than or equal to the critical value for the RCMV dimensions (except for the Complex reaction time and Resistance to disturbance factor coefficient), hence the null hypothesis is partially rejected.

The application of a program proposed by us, based on specific Street Dance means, can lead to the improvement of psychomotor skills, by developing accuracy (operating memory coefficient, personal best pace coefficient), rapidity (self-time coefficient), general performance at the test (performance coefficient), motor learning skills, resistance to time pressure in tasks requiring intersegmental coordination.

Table 8. *The Results of figural and verbal creativity test*

Results Creativity Fluency						
No. Sub.	Subject 1+2		Subject 3		Total	
	I	F	I	F	I	F
1	21	30	15	18	36	48
2	37	32	24	27	61	59
3	26	36	19	20	45	56
4	37	49	18	29	55	78
5	20	35	19	17	39	52
6	16	21	10	8	26	29
7	30	30	26	25	56	55
8	28	35	15	19	43	54
9	21	26	13	13	34	39
10	29	23	23	29	52	52
11	18	28	9	19	27	47
12	24	26	14	13	38	39
13	34	44	23	22	57	66
14	33	50	28	30	61	80
15	32	42	23	25	55	67
16	27	40	20	25	47	65
17	27	18	25	17	52	35

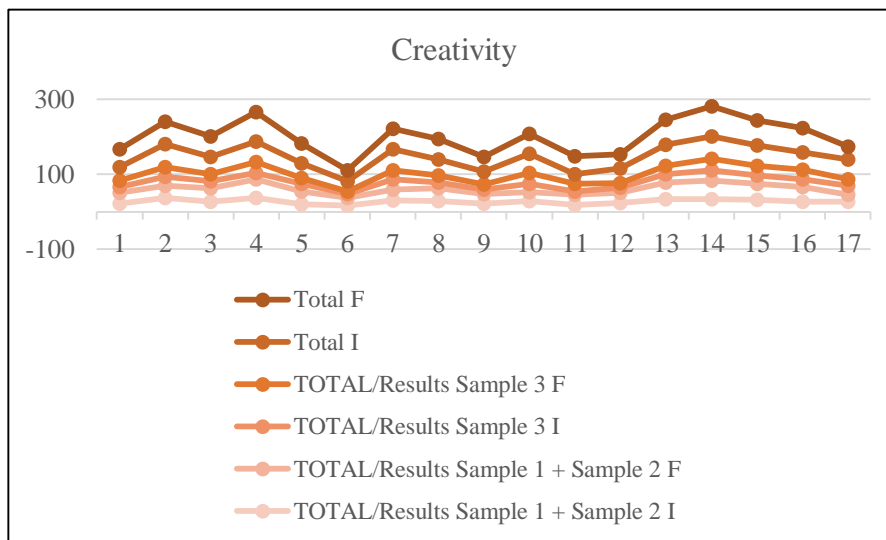


Figure 2. Results of the Creativity Test

Table 9. *Descriptive statistics for Creativity*

Initial Results	Descriptive Statistics		Final Results
Mean	46,11	Mean	54,17
Standard Error	2,73	Standard Error	3,45
Median	47	Median	54
Standard Deviation	11,27	Standard Deviation	14,24
Sample Variance	127,11	Sample Variance	202,77
Range	35	Range	51

Minimum	26	Minimum	29
Maximum	61	Maximum	80
Sum	784	Sum	921
Count	17	Count	17
Confidence Level (95,0%)	5,79	Confidence Level (95,0%)	7,32

Table 10. *Inferential statistics - Wilcoxon test for Creativity*

Wilcoxon		
Z	W	P < 0.01
-2,66	16,5	0.007

The p-value is 0.007, the result being significant at $p < 0.01$. The value of W is 16.5, while the critical value for W, for 17 participants and $p = 0.05$, is 23. The calculated value is lower than the critical value, the null hypothesis (considering creativity) being rejected. Therefore, the application of the program proposed by us, based on specific Street Dance means significantly developed fluency (as a component of creativity) in the case of secondary school students.

Discussion and Conclusion

Analysis of the results at the initial and final tests shows improvements in the values for almost all indicators investigated. The training program used was effective for both the development of psychomotor abilities (intersegmental coordination) and creativity (fluency), and we want to continue the research in this direction in order to expand the area of documentation.

The pedagogical experiment yielded a positive evolution in the results. The Wilcoxon test was used to assess the significance levels by calculating p-values, with the differences between the final evaluation and the initial test being statistically significant in most cases.

Through this research, significant progress has been made toward shaping the desired curriculum. Furthermore, the proposal to introduce Street Dance as an optional discipline for the school year 2023-2024 was presented to the teachers' council. The impact exceeded expectations, as all nine secondary school classes at Secondary School No. 86, Bucharest opted for our optional discipline for the upcoming academic year.

At the same time, we also achieved what we set out to do, we observed the evolution of psychomotor capacity and the development of cognitive skills of secondary school students through the practice of Street Dance.

Tomescu et al. (2023) demonstrated, also, the benefits of dancesport practice in schools. Authors concluded that the proposed program significantly improved students' academic interest and learning strategies.

Integrating more arts into the school curriculum would only benefit education, new tools and approaches could help teachers to improve the lessons they deliver, aspect supported by Buck and Snuck (2017). The authors advocate for this concept through a study on "Arts in the Curriculum," which involves integrating one or more arts subjects to enhance student performance not only in the arts but also in other subjects. Their research offers valuable

guidance for teachers seeking to initiate the implementation of this approach in their classrooms..

The implementation of dance in physical education and sport lessons can be a useful tool for specialists in the field, and Rustad (2012) concluded that the variation of dance styles manifested by students can signal a change in physical education with a focus on dance teaching. This process may be influenced by dance programmes on television and the popularity of genres such as hip-hop among young people.

The current study a significant stride towards the generation of a curriculum that will encompass not only the practical aspects but also incorporates specialized terminology, historical context, lesson plans, and specialized knowledge. This comprehensive approach renders it a valuable resource for specialists, ultimately leading to its potential to greatly benefit students.

We conclude by saying that only further research can confirm whether our assumptions are true and whether future teachers will link the content of their teaching to the content of the national curriculum and use dance as part of physical education.

Authors' Contributions: All authors have equally contributed to this study.

Acknowledgements: We express our gratitude to the students, physical education teachers, and the management of Secondary School No. 86 in Bucharest for their invaluable participation in this research.

Funding: This study did not receive any external funding.

Institutional Review Board Statement: The research was conducted according to the principles stated in the Declaration of Helsinki. Written informed consent was obtained for the children to participate in the research. The study was approved by the Ethics Committee of the National University of Physical Education and Sport in Bucharest (ID: 57/SG).

Informed Consent Statement: The written informed consent for the children to participate in this study was obtained.

Data Availability Statement: Data can be made available upon request to the contact author.

Conflicts of Interest: The authors declare no conflicts of interest.

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