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School Sports Practice and the Acquisition of Neuro-Leadership Concepts

Fatima Lghdaich[1*], Chaymaa Lotfy[2], Mohammed Sbaa[1,3], Mohamed El-Fatini[1]

[1]Faculty of Science, Partial Differential Equations, Spectral Algebra and Geometry Laboratory, Kenitra, Morocco
[2]Research Laboratory in Development Economics and Governance of Organizations (LAREDGO), Faculty of Legal, Economic and Social Sciences FSJES Ain-Chock, Hassan II University, Casablanca, Morocco
[3]Crmef Rabat-Salé-Kenitra, Rabat, Morocco
Email: *fatima.lghdaich@uit.ac.ma

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Abstract

This article on physical education and sport (PES) focuses on the principle of neuroleadership in students during the practice of physical and sports activities (PSA) in the school environment. Two types of data were collected: Data from collective observations of students on the conduct of PES sessions and the learning approaches proposed to develop various leadership skills, and qualitative data from focus group sessions, on their perceptions of the notions of autonomy, responsibility, decision-making, commitment and motivation. The results obtained in this research are manifested in the way students co-construct their leadership knowledge through school sport while emphasizing the crucial role of the teacher. It turns out that the approaches used by PES teachers should allow students to be active leaders in the realization of their learning. These notions will contribute to prepare them for the good functioning of today's and tomorrow's society.

Keywords

Physical Activity and Sport, Education, Leadership, Neuroscience

1. Introduction

Sports organizations in Morocco and in many countries rely on leaders with leadership skills. In this regard, several training sessions, literature reviews, and even workshop and conference offerings have been developed for people who are willing to acquire leadership skills. Guided by Sport for Development (S4D) programs and projects that contribute to the Sustainable Development Goals (SDGs), physical education and sport (PES) supports learning and capacity building for good

leadership and helps to improve leadership skills through sport activities for all age groups and genders. In spite of all these initiatives, teachers still notice the absence of leadership factors such as autonomy, commitment, decision-making and responsibility. In particular, PE teachers find that students are very passive with regard to their practices; their learning is limited to the directives requested. They consider that the teacher is the active agent of the session and are unconscious or even unable to engage independently.

A series of scientific studies on the functioning of the brain during learning explains the neural connections that are activated during the execution of leadership concepts. Since the birth of cognitive neuroscience, it has proven to be a tool that has allowed us to better manipulate the functions of the brain. Neuroscience deals with the physiology that explains every behavior and how humans interact with each other. It shows that our social behavior is motivated by minimizing threats and maximizing rewards (Al-Majed et al., 2000). Then, this concept uses the same brain network that the brain uses in primary needs (Lieberman et al., 2007).

Neuro-leadership is not only the presence of leadership principles, but it is also a progression through different criteria that brings together neuroscience with knowledge in certain measures of engagement. It is not wrong to say that learning based on leadership concepts can always be beneficial; it allows you to mobilize all your senses at the same time in order to work and practice better as PSAs contribute to healthy neurons and neurogenesis.

At the root of the problem observed in the participation of high school students in PSA, a specific sports program was implemented for a period of 6 months to train and empower young students to participate in PSA sessions in a school context. The purpose of this initiative was to make the participants leaders by overcoming shyness and developing self-confidence. It has been proven in several studies that education in general, and sports education in particular, provides a strong link for students to acquire essential leadership skills and thus initiate them to civic participation (Goetz, 2003; I Know Politics, 2007; UNESCO, 2015).

In this article, we investigate to what extent students demonstrate leadership through sport in schools, and how to use advances in brain research to explain some of the principles of neuro-leadership. The aim is to reinforce and evaluate the acquisition of leadership skills in PE that we need by taming our brains. As the brain is an organ of the body, anything that is done to improve general health will consequently improve brain health and the ability to think and contribute to the development of some tools, that will be useful in their personal lives through the practice of PSA (Physical and Sports Activity).

2. Framing the Neuro-Leadership Concept

This part of the article is divided into two sections; the first one offers a presentation on neuroscience in sport and leadership while the second one is dedicated to pedagogical leadership in PES.

2.1. Neuro-Leadership

Neuroscience aims to highlight new research and findings about the brain in order to optimize the progress of individuals, whereas, neuro-leadership helps to explain its different facets. The latter brings together the advances of neuroscience with the concept of leadership. In addition, it generates new information that will allow us to better understand the functioning of decision-making, information processing, motivation, emotional management and relationships with others, and then use this to improve the work and performance of learners in various techniques such as leadership (Fouesnant & Jeunemaître, 2012). In this respect, neuro-leadership resorts to cognitive neuroscience, supported by Magnetic Resonance Imaging (MRI), to understand the parts of the brain that respond in emotions, motivation and attitudes that give the best cognitive performance (Caugant, 2020).

Neuro-leadership engages with its various principles in situations related to the proper use of its concepts: decision making which will make it easier to solve problems by capturing the necessary attention; then stress management which will help to keep calm under pressure. It also contributes to collaboration and group work which will facilitate changes and help in the good knowledge of the proper functioning of the brain.

The term neuro-leadership first appeared with David Rock in 2006 introducing the relationship between the brain and the elements of leadership namely; decision-making, motivation, and behavior of people in the workplace and more specifically in schools (Rock & Schwartz, 2007). Therefore, introducing leadership in sport will definitely improve the functioning of the brain and enable it to act in a coherent, appropriate and optimal way by improving decision-making skills.

2.2. Leadership through Sport in Schools

The practice of sport at school offers young people opportunities to develop their sports performance and improve their physical growth. But it also contributes to the development of their moral skills, helps them to control their emotions and supports their integration into society (Travaillot, 2015). A set of benefits that can be summarized in the words of Y. Bennis Bennani and C. Lotfy, who highlight four main aspects in the field of school sport: "Pupils acquire socio-cultural knowledge concerning all the sports activities practiced during the A.S.S. hours (Cultural contribution). Pupils learn the sense of belonging to a group or community through their membership of their respective teams (Social input). Pupils learn the political aspect through voting, since in the statutes of school sports associations, the members of the association in question are elected by their fellow pupils (political contribution). The students acquire physical abilities that enable them to be responsible and committed citizens, but above all, active and productive citizens (Economic contribution)" (Bennis Bennani & Lotfy, 2021).

Hence, PES stands out as a means of indirectly supporting values education,

including leadership through school sport. Therefore, it is important that PES teachers have good tools to promote sports leadership, focusing on specific academic programs to strengthen decision-making skills, responsibility, autonomy and commitment.

3. Research Methodology

If neuroscience and leadership consist of two concepts of great interest in academic research nowadays, it will be interesting to study them together in a Moroccan school sports setting. Indeed, clarifying the behavior of participants during physical education and sports sessions by adopting a special pedagogical program in leadership through sport is the only way to reveal the degree of acquisition of neuro-leadership concepts among Moroccan high school students.

In order to explain the impact of physical and sports activities on the degree of acquisition of neuro-leadership concepts, we rely on abductive logic which focuses on the possible causes of the fact that we have observed as a hypothesis, that the fact we are dealing with probably results from this cause (Nicolas Chevassus-au-Louis, 2014).

In our study, the qualitative approach is the most appropriate, "*a method of qualitative study based on the realization of individual or collective interviews during which the facilitator only dictates the different themes to be addressed, without practicing a precise questioning*" (Bathelot, 2017), given that the context of our research is directed towards the Moroccan public institution that has a large amount of knowledge and information to deal with the level of learning in sports leadership. The adoption of this approach requires a specific method of data collection, which has as objective the collection of data on the problem in question, and the verification of the hypotheses posed in order to obtain an answer from the results found and compare them with the reality of the problem.

3.1. Sampling

The aim of this study is to investigate the impact of school PSAs on the degree of acquisition of neuro-leadership concepts in physical education and sport. Validated by a teacher (A), and taught on five classes comprising students of the qualifying secondary cycle aged between 15 and 18 years of a total of n = 137, homogeneous composed of 67 boys and 70 girls of different levels (Common Core Science, First Baccalaureate Science, Second Baccalaureate Letters, Life and Earth Science and Physics Chemistry), where one will be the control class (n = 37) while the other classes (n = 100) will conduct the experiment. The research was carried out in Abdelkrim Lahlou High School, in Casablanca, Anfa provincial directorate, Casa-Settat academy (**Table 1**).

Control group (without interactions): one Common Core Science class taught by a teacher (B) who follows an ordinary approach; and on which the principles of neuro-leadership will be tested.

Experimental groups: Each class carried out 3 cycles of twenty-four PE sessions

in total, divided into 2 hours per week for each class, with the aim of learning the techniques of different activities in football, basketball and badminton using the principles of neuro-leadership. Systematic student observations will be collected during the months of experimentation.

Table 1. Number of male and female participants in Leadership PES courses.

	Classes	Sexes	Workforce		Total
			Nombre	%	
Control group	Commun Core curriculum: Science	Girls	19	56	34
		Boys	15	44	
Expérience group	2nd Baccalaureate: Science 2	Girls	17	57	30
		Boys	13	43	
	2nd Baccalaureate: Life and Earth Sciences	Girls	9	39	23
		Boys	14	61	
	2nd Baccalaureate: Physics Chemistry	Girls	11	48	23
		Boys	12	52	
	2ème Baccalauréate: Letters	Girls	10	43.5	23
		Boys	13	56.5	
	1ère baccalaureate: Science 1	Girls	18	58	31
		Boys	13	42	
	Total participants in the experiment	Girls	65		130
		Boys	65		

a. Source: Carried out by us using data from the qualitative data.

3.2. Materials and Methods

The learning targeted was specific to the five (5) classes as the program taught is based on the advancement of learning among each level of teaching which follows the pedagogical guidelines and the teaching contents of the qualifying secondary[1].

On this basis, the PE teacher introduced the concept of Leadership with its different variants (Motivation, Autonomy, Commitment, Responsibility, and Precision taking). The aim is to apply these principles effectively in the conduct of PE sessions in order to accomplish the targeted tasks and to help students show their abilities as leaders to others in order to develop their leadership skills through a variety of PSAs.

Based, first, on the awareness of leadership through observation of the roles of each student during the session, they learn what it means to be a leader and develop an initial awareness of their own concept and potential as leaders by taking on various responsibilities (leading a warm-up, helping colleagues…). Then, we focus more on interaction by allowing students to practice and see what works

[1]Pedagogical Orientation 2007 of EPS: They are specific to the teaching of sports in high school in order to follow a single frame of reference for teaching this discipline on a national scale.

and what does not work in terms of leadership in sport, leading them to successfully complete their own experiments (Voelker, Gould, & Crawford, 2011) under the guidance of their teachers. This will enable them to integrate these skills into their daily lives such as communication, decision-making and stress management.

The choice of the three activities determined to measure the acquisition of the principles of leadership (Football, Basketball, and Badminton) took into consideration the infrastructure of the school; the tools available as well as the cyclical distribution designated by the pedagogical team at the beginning of the year. The experiment started in November 2021 and ended in April 2022 (see the average of 2 months in each cycle).

Concerning the measurement tools used, the teacher used 1) an evaluation grid before and after the pupils' experiment, 2) a report for each session completed by the teacher, and 3) a focus group at the end of the cycle. The pupils, in turn, produced self-evaluation sheets and group sheets. An evaluation grid was used to assess the learners' achievements at the end of each cycle and at the end of the experiment.

3.3. Data Collection

Focusing on the level of students' acquisition of the notions of leadership in the school environment through learning situations in PES is considered as a methodological approach that will be treated on the basis of the following fundamental elements:

- The role of the teacher in teaching PSA;
- The difficulties students face in acquiring the qualities required in leadership (decision-making, responsibility, commitment, motivation and autonomy);
- Strategies adopted to inculcate the principles of Leadership;
- The benefits that students can derive from the transfer of leadership knowledge.

The treatment of this fundamental element has led us to identify the purpose of different types of data and, subsequently, of several sources of information. The essential data was collected through the teacher's collective observation sheets on the degree of acquisition of each leadership concept on the basis of several measured variables as well as the students' self-evaluation sheets on which the latter assess their performance.

The complexity of our research problem does not allow for a single methodological approach to collect the desired results. In this case, it was essential to use the focus group method to understand the various perspectives and make the results representative. We approached all the students in the experiment to get a deep explanation of their thinking in terms of leadership through school sport.

3.4. Analysis of the Data

To better frame our research, we drew on a literature review from several electronic sources and media that allowed us to gain a real understanding of the neuro-leadership exercised by students in the school environment through

physical activity and sport.

Our approach included a detailed reading of the students' actions through observation and self-evaluation sheets, and then focus group interviews in order to give interpretations and explanations of their thoughts about leadership and compare them with the control class (independent sample test). The data analysis was carried out by Excel software (Version 2010), which allowed us to draw histograms (tables and graphs) from the frequencies, percentages and averages of the collected data.

4. Results and Discussion

4.1. Result

Throughout this work, we wanted to highlight the acquisition of leadership concepts in teaching and more specifically in physical education and sport. According to the observation results, we noticed a significant development rate of 32% in decision-making, 18% in autonomy, 14.5% in responsibility, 9% in commitment and 4% in motivation hence, the variation of the 5 parameters between the experimental classes and the control class (Figure 1).

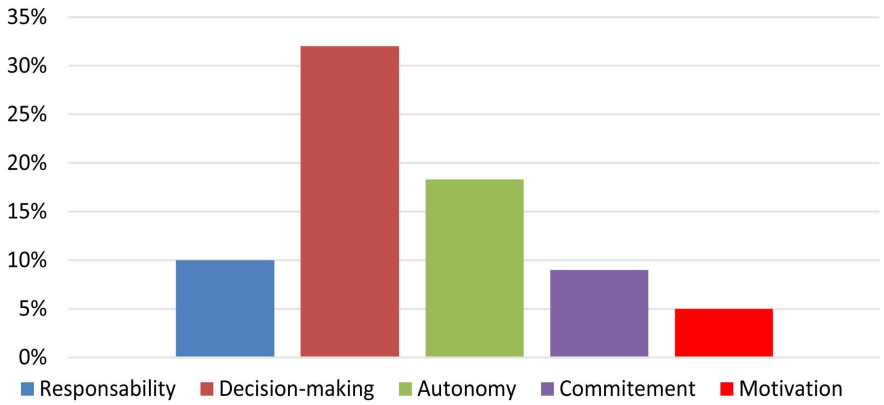

Figure 1. Rate of development of each concept between the control class and the experimental classes.

To support this work, we discussed these results in the focus groups of the experimental classes. On the basis of the responses, we can explain the evolution of the decision-making principle by the translation from a teacher-based teaching mode to a decision-oriented approach of the students in order to direct the activities, which results in satisfying their psychological needs such as the need of belonging which represents the third level of Maslow's pyramid. This need allows for individuality to be felt through decision making. It also relates to the concept of responsibility by offering learners the possibility to feel important through various opportunities by acting autonomously. This will allow the reinforcement of the principle of autonomy since a student who decides freely about his actions has a high self-efficacy that allows him to move forward. According to Bandura (2006) autonomy is important in the engagement of individuals in their work. This links

us to the fourth principle of leadership which is commitment that is already present in learners due to institutional monitoring which encourages students to persevere in order to achieve a favorable grade as one of the major extrinsic motivators noting that sport is already a motivating discipline from which the rate of its development is the least.

4.2. Discussion

Throughout the time devoted to our research, we have highlighted the degree of acquisition of the principles of neuro-leadership among learners, specifically in Physical Education and Sport. We notice that the results achieved are satisfactory. In this sense, we have been able to conclude that students have a great possibility to adapt to new situations while modifying their behaviors and skills. Indeed, every learner has the possibility to change through persistence and repetition, but this requires enough effort, will and practice (Gkintoni et al., 2022).

Several articles present the benefits of sport that can be applied to the school sphere, helping regular practitioners to perform better and gain leadership skills. This allows young people to integrate these acquired notions in an educational framework on the one hand, and in the contribution of everyday life on the other hand. Educational leadership, for example, aims to shed light on students' behavior based on advances in cognitive neuroscience (Balconi & Venturella, 2017). This scientific knowledge is a tool that offers a solid support to clarify and improve the studied concepts: decision making, autonomy, commitment, motivation, responsibility. Nevertheless, the school is the best place to foster the character of the leader in the learners while taking into consideration the theoretical and practical progression.

From the neuroscientific point of view, learning initially requires a great deal of concentration on the work, as in the acquisition of leadership concepts in our research, but little by little automatisms are created thanks to neural connections (Gocen, 2021). This is explained by a shift from the main use of the front of the brain to the back, the seat of automatism, which characterizes the stage of the expert, the students also make a lot of effort at the beginning to acquire the notions of leadership which becomes automated later and with time, especially in sport, which is a motivating discipline that allows to experience positive emotions that promote autonomy, learning and creativity. Motivation is the driving force behind successful learning and is linked to emotions. It enables the human organism to act as an emotional component in a certain way (Organisation for Economic Co-Operation and Development, 2007).

With regard to decision-making, the contribution of neuroscience is multiple. Philippe Allain has grouped them into three main points, namely; "the role of emotions", "brain structures involved in decision making" and "paradigms for evaluating decision making" (Allain, 2013). Several neuroimaging studies show that decision making uses the brain network including several cortices: "orbitofrontal cortex", "anterior cingulate cortex", "dorsolateral prefrontal cortex",

"thalamus", "parietal cortex and caudate nucleus" (Krain et al., 2006). Our results show significant acquisition of this principle, which links several cortices that coordinate harmoniously and take advantage of the brain's neural circuits.

Learner autonomy, in turn, consists of very limited teacher support during sessions, which improves activities related to cognitive tasks, attention, concentration and working memory as examples (Watanabe, 2008). Also, the results recorded in the level of engagement of the learners which increased although sport is already a motivating discipline and in which students become more engaged and develop several postures that provide a sense of self-efficacy (Bandura, 2006).

New knowledge about the brain has allowed us to optimize and find different ways to include the assets of school leadership. Subsequently, the Ministry of National Education, Pre-school and Sports should highlight programs that include the most relevant educational processes.

4.3. Limits

Although the results of this study are satisfactory, it is important to address the limitations that will be explored later in other articles, such as the sample being limited to secondary school only and not including primary school or university, and the observations being limited to teacher feedback.

5. Conclusion

The findings of the evaluation suggest that the school leadership program, which was followed by the PE teacher, had the capacity to contribute substantially to overcoming the imbalance evident in the students' acquisition of the characteristics of a good leader (El Wafiq et al., 2021). The results of our experimental study show an interesting progression in leadership roles in school sport, which are increased by 32% in decision making, 18% in autonomy, 14.5% in responsibility, 9% in commitment and 4% in motivation. Certainly, this will positively influence our learners in the long run in their other professional fields and in their future public life (EY, 2013).

Neuro-leadership sheds light on some of the learners' attitudes through the explanation of behaviors and suggestion of principles that will help the teacher to understand and, thus, positively modify his/her behavior, to know how to act in certain dysfunctional situations when performing the tasks of leadership (Elouafi et al., 2021). This will also give the ability to get better scores and to improve the skills of our students to a more advanced stage as it was shown by our study. It is worth mentioning that, this will be the focus of our future article, in which we would like to follow the students in the practical application of leadership (questioning, assessment…) in the school setting and through the different subjects taught.

Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

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