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**Physical Education in Early Childhood
Education and Care
Researches – Best Practices – Situation**

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Bratislava 2019

Physical Education in Early Childhood Education and Care: Researches – Best Practices – Situation

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Introduction

You are holding a book that is one of the intellectual outcomes of the ERASMUS + project '590769-EPP-1-2017-1-TR-SPO-SSCP, Development of Preschool Physical Activity, Sports and Game Program for Strengthening of Grassroots Sports in EU. The project acronym is „LUDUS – Just Move and Have Fun“. This project, addressed in 2018 - 2019, is focused on supporting physical activity of preschool children. Six partner institutions are involved: Sport Volunteers Association and Hacettepe University in Turkey, University of Padua in Italy, Asterias Sports Club in Greece, Kindrgarden Mecho Pooh in Bulgaria and Comenius University in Bratislava, Slovakia.

The book is also part of the 4th Physical Education World Wide Survey, which is carried out by UNESCO in cooperation with FIEP and its partners. The publication is part of one of its lines, focusing on mapping the basic characteristics of physical education and physical activities of children and youth in the world at individual levels of schools, from pre-school education to universities. In 2017 the book "Physical Education in Primary School: Researches - Best Practices - Situation", edited by D. Collela, B. Antala and S. Epifani, was published by Pensa Multimedia in Italy and has 502 pages. 102 authors from 27 countries and 5 continents participated. In 2018, it was followed by a publication "Physical Education in Secondary School: Researches - Best Practices - Situation", published by the University of Montenegro in cooperation with the Montenegrin Sport Academy. The editors were S.Popovič, B.Antala, D.Bjelica and J.Gardašević. It had 343 pages and was prepared by 84 authors from 24 countries and 5 continents.

The publication "Physical Education in Early Childhood Education and Care: Researches - Best Practices -Situation" is published in Slovakia by the Slovak Scientific Society for Physical Education and Sport. Its editors are B. Antala, G. Demirhan, A. Carraro, C. Oktar, H. Oz and A. Kaplánová. It has 464 pages. The contribution of the international organization AIESEP, whose members of its Special Interest Group for Early Years, is also a significant part of the publication. A series of these 4th Physical Education World Wide Survey publications will be completed in 2020 with the publication of "Physical Education in Universities: Researches - Best Practices - Situation"

The book is divided into four parts. In the first part of "LUDUS - Just Move and Have Fun" we bring the results of the scientific part of the project focused on literary reviews in the individual participating countries of the project and the results of comparative research of the opinions of parents, teachers, directors of institutions and trainers in individual countries on selected issues of pre-school children participating in regular exercise activities at nurseries and kinder gardens. In the second part of the publication called "Researches", we bring the latest research findings aimed at exploring the physical activity of children in pre-school facilities. The third part, the “Best Practices” brings examples of good practice from different countries of the world and the last fourth part “Situation” is focused on presenting knowledge related to the characteristics of the state of the issue in various countries of the world.

120 authors from 32 countries and five continents participated in the book, of which 20 were European countries (Belgium, Bulgaria, Croatia, Czech Republic, Denmark, Finland, Germany, Greece, Italy, Ireland, Lithuania, Norway, Poland, Portugal, Serbia, Slovakia, Spain, Turkey, Ukraine, United Kingdom) 2 countries from America (Mexico, USA), 4 countries from Asia (China, Hong Kong, Malaysia, Singapore), 3 countries from Africa (Algeria, RSA, Senegal) and 3 countries from Oceania (Australia, New Zealand, Samoa). Therefore, the publication brings a broad international perspective on the issue of pre-school physical education and physical activities in pre-school facilities.

A thank you goes also to the reviewers who, through their comments and advice, helped the authors improve the quality of their contributions.

Branislav Antala
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Motor Skill Acquisition: from Affordances to Capabilities for Physical and Mental Health of Children

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Abstract

Motor skill acquisition is essential in motor and cognitive development. It requires time and practice and kindergarten teachers can limit, discourage or encourage actions. Italian children spend lot of their time in kindergarten, which may be a great opportunity to practice physical activity and develop motor skills. With this study we want to look at the affordances (possibility of action) of Italian kindergartens and at the capabilities (real actions) in kindergartens. After signing the informed consent 434 kindergarten teachers of 16 Italian kindergartens completed a questionnaire. Often, verbally, teachers refer lack of space for physical activity, but unexpectedly we found that 55,8% of them may use a gym and 83,3% a park or a garden, related to their kindergarten. Despite they have the affordances (possibility of action) and are aware of the advantages and needs of physical activity for children only few teachers use the environmental opportunities to provide children the capabilities to implement physical activity and to increase motor development. More research is needed to study how to implement physical activity in indoor and outdoor spaces of kindergartens and how to cross from affordances to capabilities for physical and mental health.

Key words: Motor skills, Kindergarten, Motor development, Affordances, Physical activity

Introduction

Karen Adolph (2019) highlights that motor skill acquisition is essential to motor and cognitive development. For a child learning to move requires basic psychological functions, it is modulated by fundamental cultural values and helps development across a wide range of domains. Motor development in children includes the acquisition of basic motor skills such as moving the head, grasping objects, running, kicking and throwing a ball.

Newell (1986) highlights the constraints of motor development, suggesting their dynamical, constantly changing interactions and emphasizing the influence of the experience (task) and of the environment (Haywood et al, 2011).

The constraints are aspects that limit and discourage but also allow and encourage actions (Haywood et al., 2011). Newell defines:

- 1) **Individual constraints:** a) *structural*, such as individual body structure, i.e. height, weight, muscle mass, leg length, that change with growth and aging; b) *functional*, related to functional behavior such as motivation, fear, experiences, inhibition, values, believes, running, walking, sitting and others, that change faster in the time.
- 2) **Environmental constraints** (outside the body): a) *physical* such as temperature, humidity, light, gravity, surfaces, clothes; b) *economical-social-cultural* such as encouraging or discouraging to be active, believes, values, cultural habits, education, economical possibilities, social relations.
- 3) **Task constraints** (external to the body): the goal of a movement, the rules, the equipment, the clothes.

The changing of one of these constraints provides different interactions and stimulates different movements, thus modifying motor development.

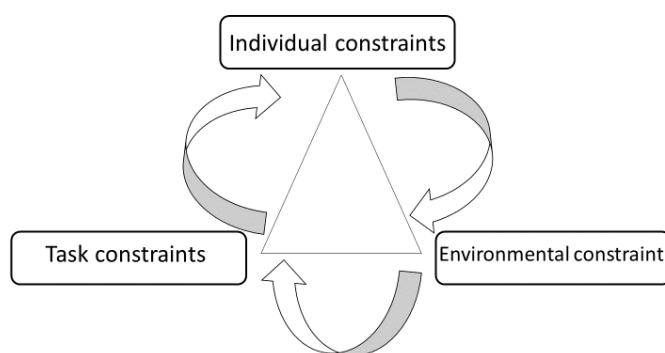


Figure 1 Newell's model of constraints
(adapted from the original picture in Haywood et al., 2011)

Adolph (2019) says that the movements are constrained by the current status of the body, are situated in an environment and shaped by the social and culture specific child-caring practices. The

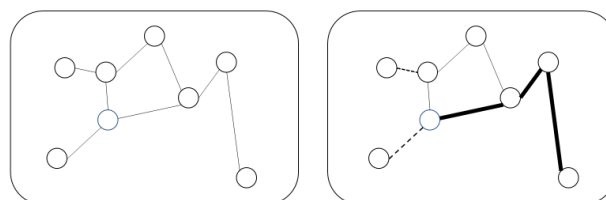
acquisition of new motor skills creates new opportunities for action and learning and produces cascades of developments far from the original accomplishment.

Epistemology

The specificity of learning

Since 1980 there were only few studies on motor development, compared with other fields, such as cognition, language, perception, emotion. Adolph (2015) highlighted that only 5,2% of 5.617 of journal articles were related to motor development and she supposed it was due to the fact that the early researchers described motor development as a normative sequence of behavior and consequently this did not require further research.

In his theory of Neural Group Selection Gerald Edelman (1987) argued that the human body is able to create complex adaptive systems. In his theory he argues: 1) the brain is controlled in the gross anatomy by genetic factors, but development and somatic selection during growth determine the neuronal organization and the connectivity between neurons (functional plasticity). 2) The experiences determine the synaptic selection and the neurons involved can be strengthened or weakened, dependently on the experience. 3) Spontaneous groups of neurons are forming re-entrant connections.



**Figure 2 The basis of the Theory of Neuronal Group Selection
(adapted from Sporn and Edelman, 1993, p. 116)**

Sporn and Edelman (1993), Sigmundsson (2017), Revie et al. (1993) argue that the process of skill learning is specific. This means that if a child wants to learn a specific task, he/she needs to train to strength the synapses involved in that task. Hebb's (1949) proposed that, depending on pattern of activation, specific groups of neural connections persist functionally while the more inefficient disassemble. Exercise and repetition promote strengthening of connections while the inefficient connections will become weakened and sometimes completely nonfunctional by time (Adams, 1998). This mechanism is called functional plasticity of the brain and is sustained by the flexibility or modifiability of neural connections and, at system level, by experience and environment that allow and/or promote the functional change of an organism (Bownds, 1999). Maennistoe et al. (2006) demonstrated that children trained in specific motor skills improved consistently their targeted skills compared with children trained in general skills.

Bidirectional influences

Gottlieb (2002) argues that the factors *environment, behavior, neural activity and genetic activity* are related by bidirectional influences within and between them. The genetic activity is influenced by neural behavioral and external environmental events.

Children are living in an environment and have more or less experiences, i.e. different opportunities to growth their potentials. In biological terms, experiences activate synapses and synaptic circuits thus leading to their maintenance and strengthen while not used synapses/circuits are eliminated. The different experiences and the nature of the brain activity determine which synapses/circuits/functions will survive (Miller, 2011).

In line with the biology sustaining brain plasticity, motor development can be seen as a: a) continuous process of change in functional capacity; b) related to age but not dependent; c) involving sequential and irreversible changes as the result of the interactions within the individuals and between the individual and the environment (Haywood et al., 2009).

Motor development is embodied, embedded, enculturated and enabling

Motor development has unique properties which spread on “nonmotor” domains. These properties have been classified by Karen Adolph (2015, 2019) as: a) *Embodied* - children grow in their own physical body, acting in a real world; b) *Embedded* – motor development is influenced by the physical environment; c) *Enculturated* - referring to the social norms, beliefs, cultural practices; d) *Enabling* – the development of new skills enables new movements and new development also of “non motor” domains (Adolph, 2019).

Learning is perceiving new affordances

The affordance is the fit between the body and the environment that makes a particular action as possible (Franchak & Adolph, 2014). The actions are possible on the body environment fit. The children need to learn what is possible and what is not possible to do. At the beginning they lack this capacity. New sitters lean forward to retrieve objects beyond their reach or fail in actions within their reach (Yonas & Hartman, 1993). Adolph (2000) demonstrates that the children can precisely distinguish between distances only after weeks of sitting experiences. Experience allows children to immediately adjust their sitting posture when the conditions are changing. Learning does not transfer from a skill to another: in a series of studies, Adolph (2008) shows that a child, who is able to crawl perceives a too large gap on the floor and stops, but when he is just a beginner for walking he does not perceive the affordances and attempts to cross the same too large gaps.

Capabilities

Infants first actions are performed in interaction with caregivers. Social and cultural factors are influencing the activity of a child and of the caregiver. Depending on their beliefs and believes, parents and caregivers can influence motor behavior of the child and thus support or constrain motor development. They can structure the physical environment in a not enabling way and by

following cultural norms, they may influence children practices and social interactions, provide or not scaffolding and feedback for motor skill acquisition.

Scaffolding is a support that an adult or an expert peer can give to a child who is doing something in “zone of proximal development” (Vygotsky, 2013). The term refers to the condition when a child is trying to perform a very difficult task, outside his possibilities. The zone of proximal development is the distance between a child’s independent level and the potential development under adult guide or collaboration with expert peers.

When a child acquires new affordances, he is involved in a process of learning to learn. What is in these circumstances the role of motivation in the zone of proximal development?

Some examples in practice

Tortella, Tessaro & Fumagalli (2011) demonstrated that the location of the objects in a room is fundamental in providing affordances on physical activity in kindergarten children. Fifty-three children of 3 years old of a kindergarten in northern Italy were divided in 4 groups and left without instructions in a playroom without furniture. Circles of 50 cm diameter were spread on the floor (A) or piled in a corner (B). The groups were left in the room for 30 minutes. The children were video-recorded to see the time they spent in different activities. A pedometer for each child was also used to measure individual movement in the different conditions. In condition A the children run on and around or jumped in the circles for most of the time; in condition B the same children used the circles for symbolic play with little or not moving inside the room. Thus, space/environment organization (by the adult) influences the pattern of movement in children.

We report results from another study showing that motor learning is specific with little transfer between different skills. The study was conducted in the playground “Primo Sport 0246”, a specifically designed park to promote motor development in 0-6 years old children (Tortella et al., 2016). The playground was specifically designed to promote gross motor skills in the area of mobility, dexterity and balance. The results show that the experimental group improved in 4 out of 6 analyzed gross motor tasks and in none fine motor task. This study confirms the specificity of motor skill development.

Question of the current study

With this study we wanted to investigate thinking and practice of Italian kindergarten teachers about physical activity in the different environments of kindergarten.

Method

Questionnaires were administered to 434 kindergarten teachers of some Italian regions participating to a national training project organized by Association Laboratorio 0246 of Treviso, University of Verona and CONI. After consent and ethical approval each teacher received the questionnaire through Survey Monkey. We analyze the answers using a qualitative and quantitative methodology.

Results



Figure 3 Number of teachers of the Italian regions participating at the training project and at the study (Survey Monkey, 2019)

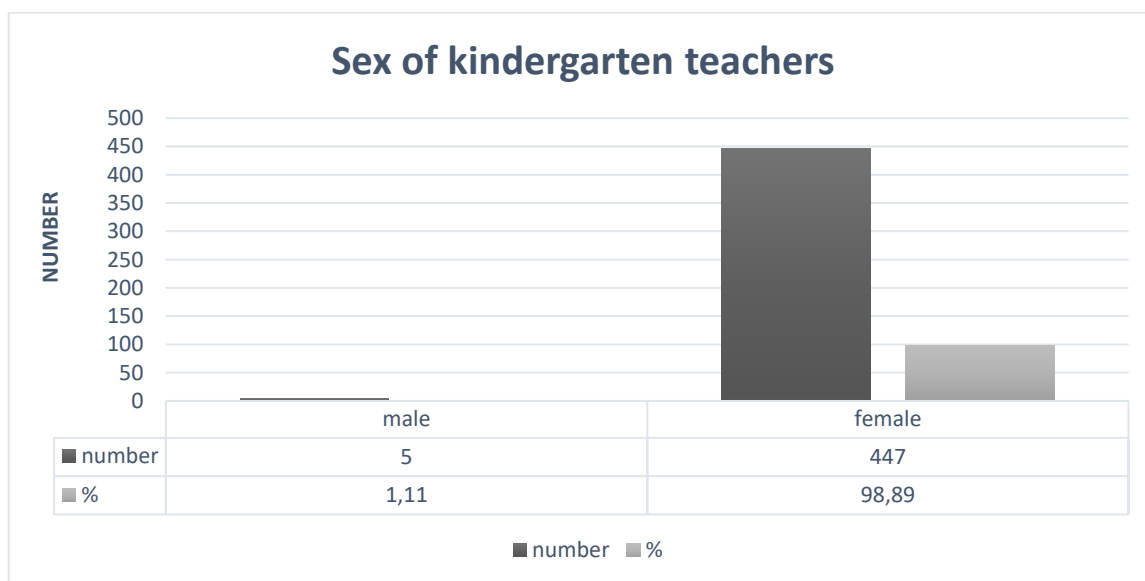


Figure 4 Number and percentage of male and female teachers involved in the training project (2019)

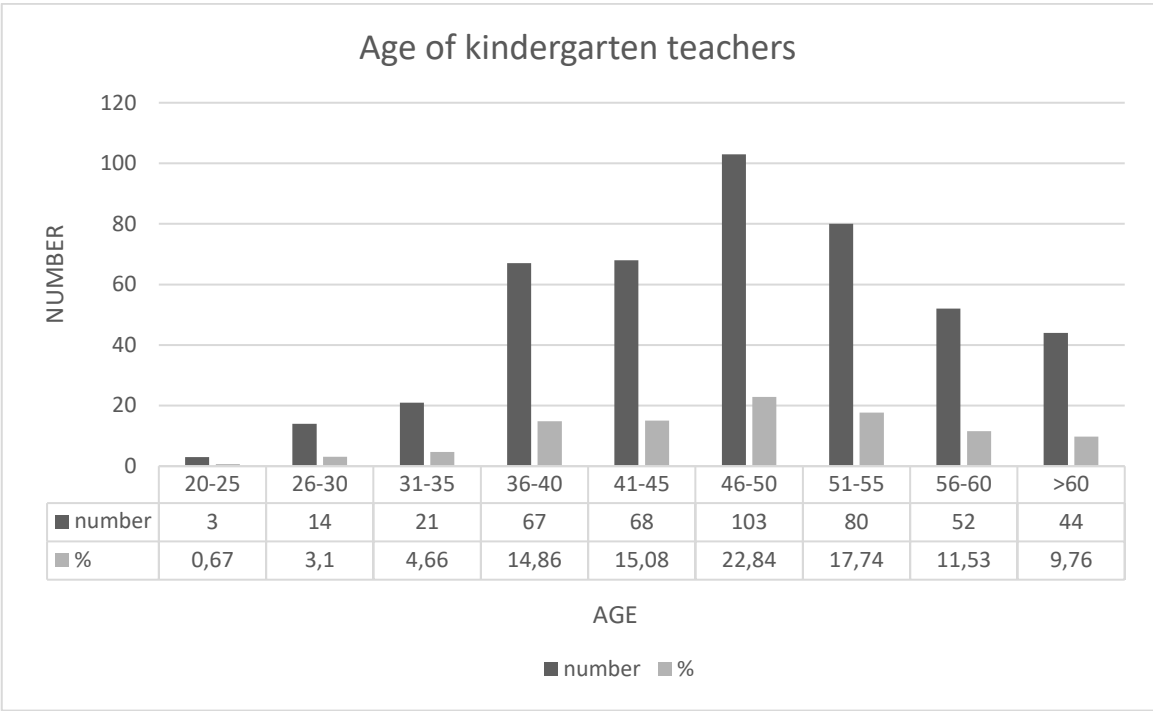


Figure 5 Age of kindergarten teachers involved in the training project (2019)

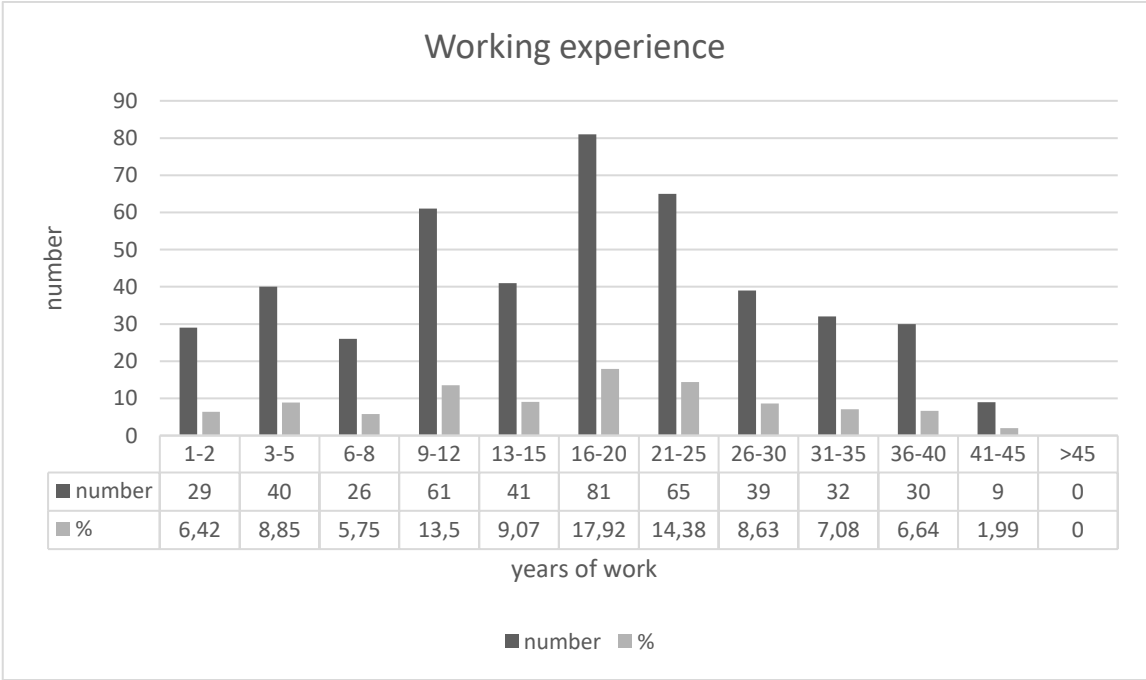


Figure 6 Work experiences of kindergarten teachers involved in the training project (2019)

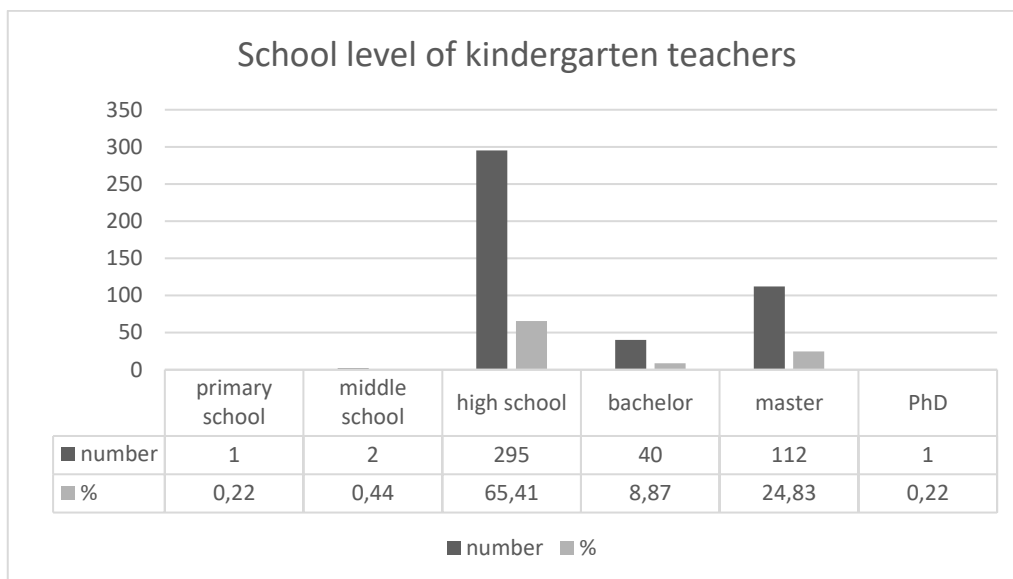


Figure 7 School level of kindergarten teachers (Numbers and percentage of teachers involved in the training project (2019))

Kindergarten teachers were mostly females (98,89%), mean age 48 years old, with education at high school level (65%) working experience of 16 years (17,92%). All educators report to be aware of the relevance of physical activity (PA) for child development and of the impact that PA and physical fitness have on health. Several kindergartens have a gym (55,8%) and a garden/outside space (83,33%) that could be used by children.

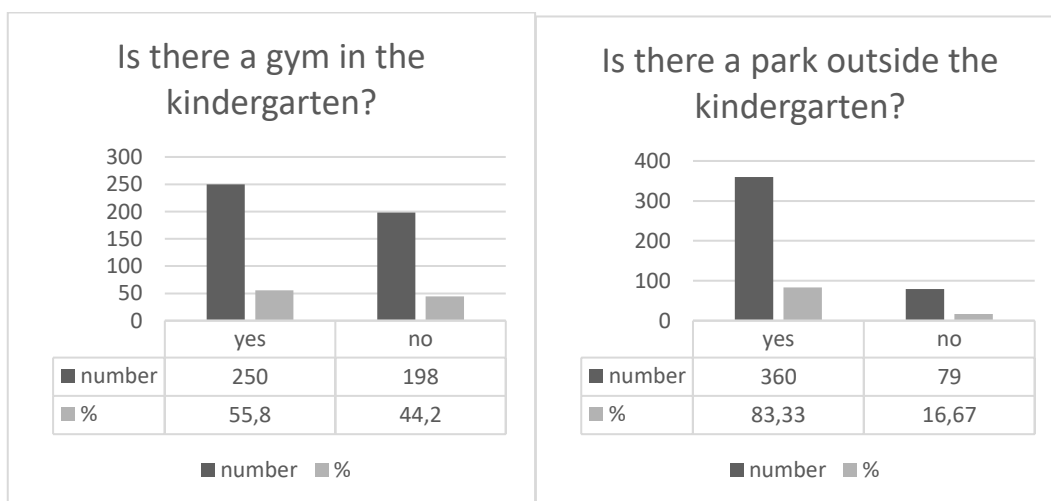


Figure 8 Answers from kindergarten teachers about the availability of gym and space outside the kindergarten (2019)

Despite these facilities and the apparent knowledge on the role of PA for child development, activities were very limited. Indeed, in 54,52% of the cases children were involved PA (free play or structured) only once per week with a total time of 60-90 minutes per week; in 18,33% of the schools PA was organized twice a week and time dedicated to PA was 2-3 hours/week in a minority of schools.

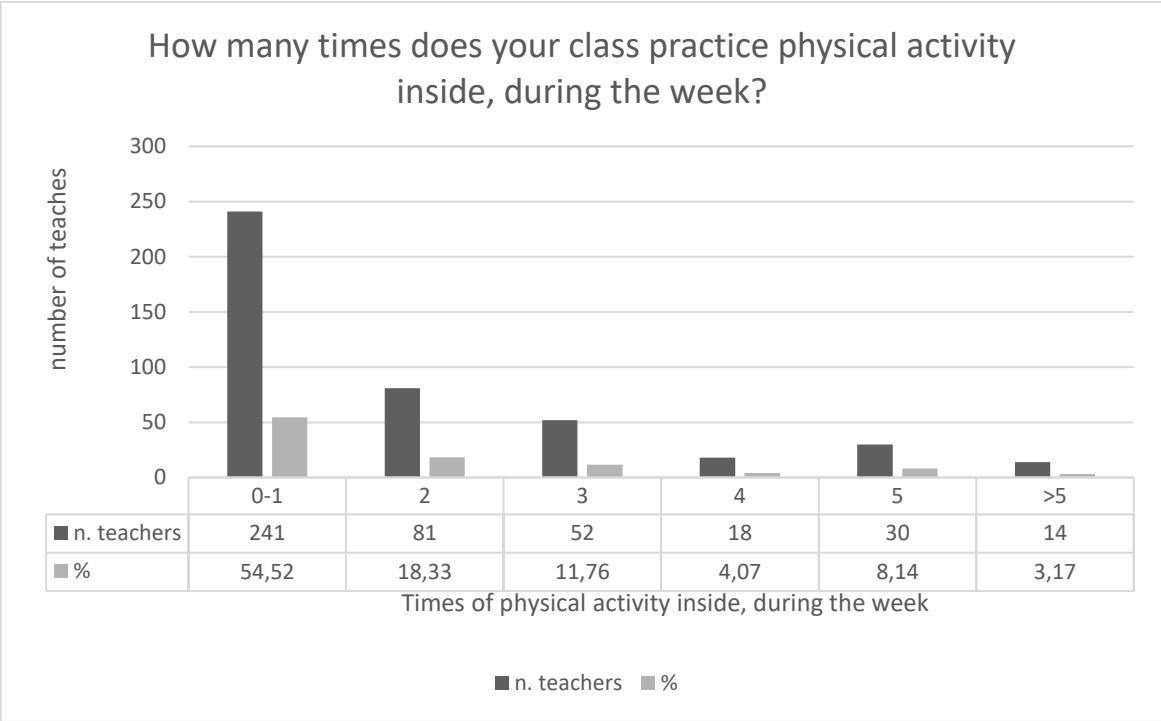


Figure 9 Answers from kindergarten teachers about physical activity inside during a week (2019)

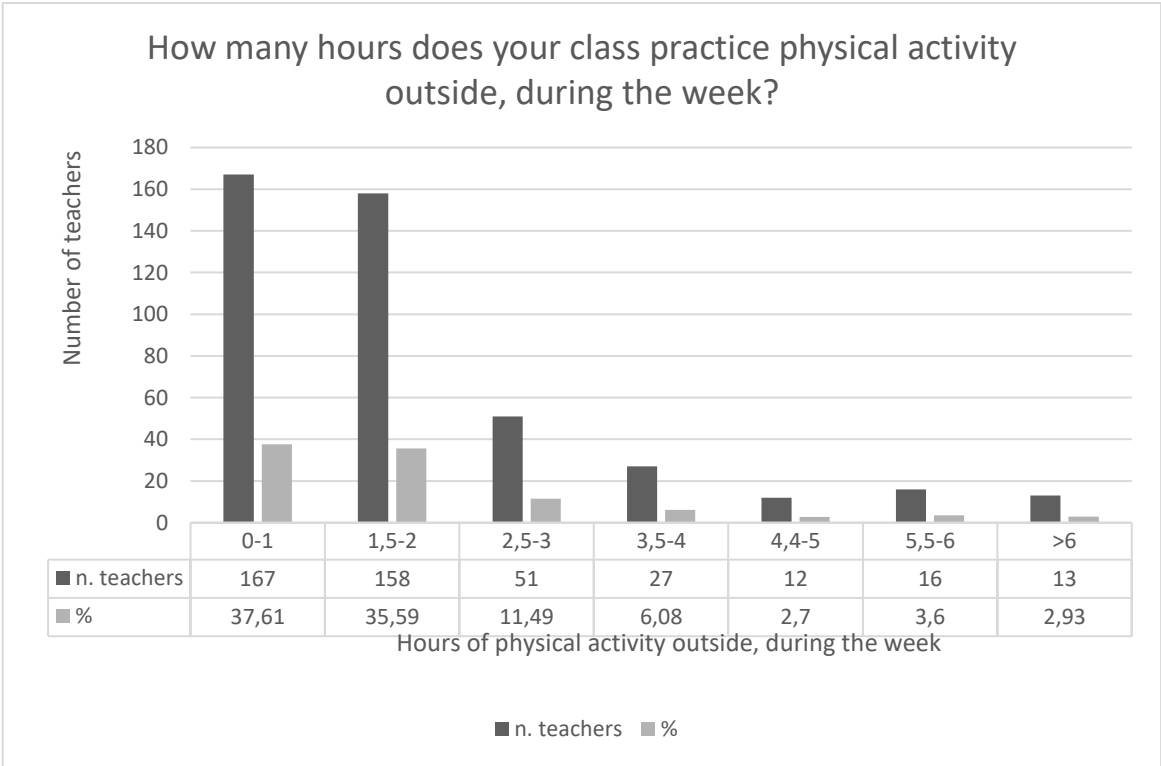


Figure 10 Answers from kindergarten teachers about physical activity outside during a week (2019)

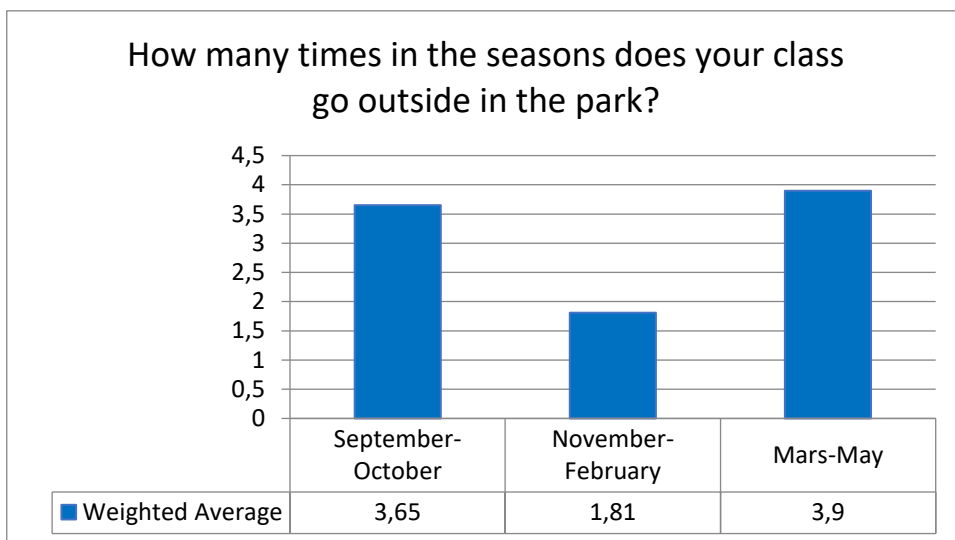


Figure 11 Answers from kindergarten teachers about physical activity outside in the different seasons

Note that children are allowed to play in the garden 3 days/week in spring and early fall and almost never in winter or when weather conditions were not perfect. Most teachers say that physical activity is very important especially for the development of fundamental motor skills (83%) and for health (82%), then to play (77%), to socialize with other children (75%). Only 45% of teachers recognize physical activity as very important for increasing of vigorous and intense activity.

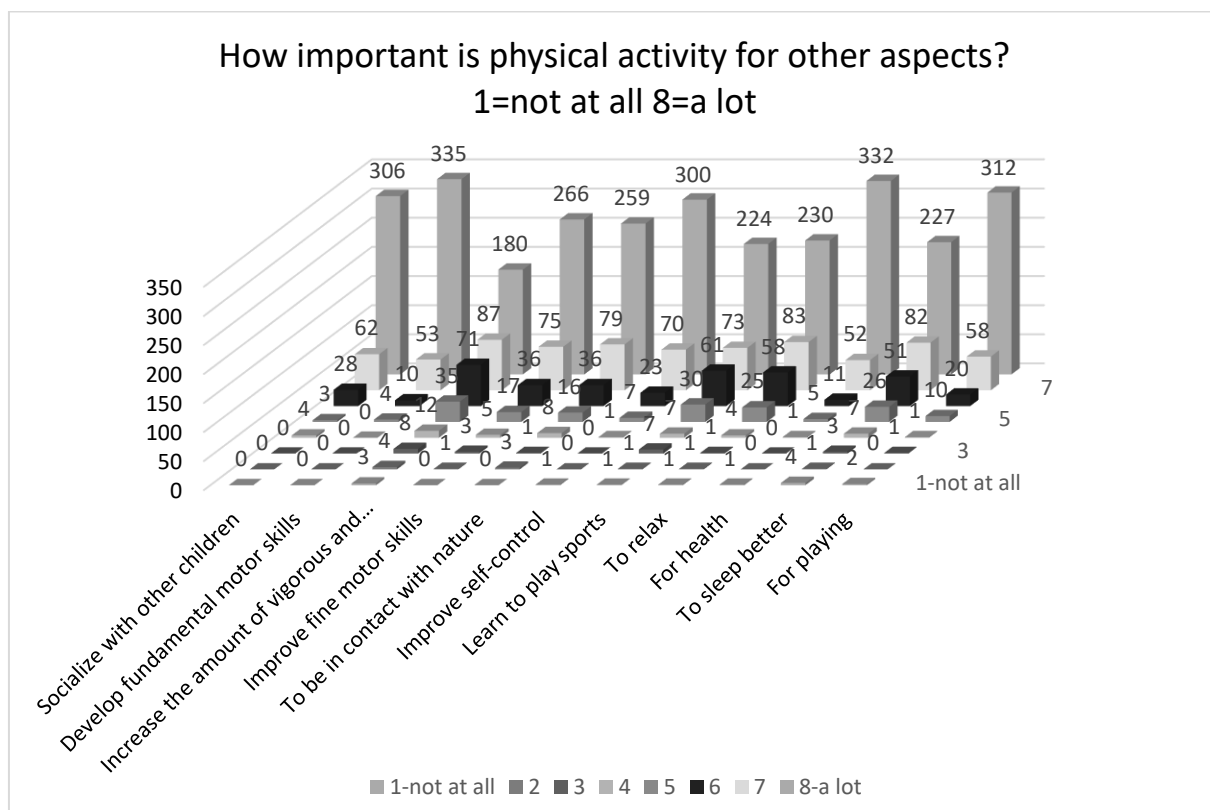


Figure 12 Answers from kindergarten teachers about the importance of physical activity for children

Conclusion

From these preliminary data of the Italian regions it emerges an insufficient use of the spaces (gym, parks). The affordances are not enough to increase physical activity. It seems necessary to focus on capabilities, to move from possibility of action to practice. Research to understand how to allow the passage from an opportunity of action (affordance) to its realization (capability) would be fundamental.

We conclude that believes, cultural background and lack of training about practical aspects of PA with children limit willingness/capacity/interest of Italian educators to provide adequate physical education to children. Considering that more than half of the Italian preschoolers attend the kindergarten also for 8-9 hours a day, our data underline the problem of a lack of culture toward education to an active life style in childhood. In addition, data on Italian preschoolers/children motor skills are totally missing. Adult and teacher training appear to be the primary and absolute requirement for the Italian educational system to encourage practice of physical activities in kindergartens and promote motor development in Italian children.

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