

Improving Learning Abilities and Inclusion through Movement: The *Movi-Mente*© Method

Ivan Traina, Luigi Sangalli, Fabio Tognon, Angelo Lascioli

Abstract—Currently, challenges regarding preschooler children are mainly focused on a sedentary lifestyle. Also, motor activity in infancy is seen as a tool for the separate acquisition of cognitive and socio-emotional skills rather than considering neuromotor development as a tool for improving learning abilities. The paper utilized an observational research method to shed light on the results of practicing neuromotor exercises in preschool children with disability as well as provide implications for practice.

Keywords—Children with disability, learning abilities, inclusion, neuromotor development.

I. INTRODUCTION

THE objective of this paper consists of presenting the *Movi-Mente*© method [1], an intervention aimed to support the acquisition of basic skills for improving the learning abilities and processes through movement in order to prevent health risks in children with disability caused by lack of physical activities practice. The method has also the purpose to improve coaches, technicians, and teachers' skills for promoting inclusion and interconnections between formal and non-formal education.

Starting from background and need analysis, the paper highlights the outcomes achieved by the application of the method, and the implication for interventions focused on physical activities aimed to enhance the neuromotor development in children with disability in the stage from 3 to 6 years [2].

The method was elaborated in 2005 at the Judo Associazione "Le Sorgive" (Solferino, Italy), in collaboration with Judo Master Vittorio Serenelli and professionals in educational and motor fields including Fabio Tognon, Luigi Sangalli and Sara Fraccaroli, as a path of specific education and neuromotor activities considered as fundamental for the development of relational and intellectual skills for preschool children. It was born from the idea that any intellectual capacity has connections with the neurophysiological development of all areas of the brain. And thanks to the execution of some specific exercises based on judo, children can train and develop basic skills useful to reduce learning difficulties and disorders.

A. Background and Needs Analysis

Currently challenges regarding children are mainly focused

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on the sedentary lifestyle and the consequential increase of number of obese children in Europe that, as reported by the World Health Organization Regional Office for Europe [3], in some countries, nearly 50% of eight years old are overweight and over 25% are obese.

Focusing on preschooler children, research shows that in European society motor activity in infancy (0-6 years) is seen more as a tool for the separate acquisition of cognitive, social, and emotional skills; while less value is attributed to neuromotor development and skills, as tools for improving learning abilities [4]. Moreover, studies and research on children with disability attest that they are less likely to practice physical activities and attend sport clubs than non-disabled pupils [2], [6], [7], [9], [13], [15], [16], [21].

The Convention on the Rights of Persons with Disabilities stated that States have the obligation to take appropriate measures to make social inclusion in and through sports effective [5]. However, inclusion and participation in physical activities remain envisaged goals to be reached [16]. Also, the Communication "Developing the European Dimension in Sport"¹ and the EU Disability Strategy 2010-2020 emphasize that persons with disabilities have the right to participate on an equal basis with others in sport activities and being fully included in society and community [6].

The benefits of engaging in sport can empower youth to learn social and life skills, promote health and well-being, social inclusion, and community participation.

The background in developed countries is characterized by the fact that children with disability face some barriers that limit their access to and participation in physical activity. The development of interventions specifically addressed to preschool children with disabilities, using physical activity programmes as means to reach wider development goals (such as social inclusion, better health, and well-being), can reduce such barriers.

The needs analysis of the background briefly described allowed to identify three specific needs related to the themes of physical activities and disability:

- 1) To allow young people with disabilities to benefit from physical activity for having a positive impact on their health and well-being [7], [8].
- 2) To develop physical activities as interventions conducted by qualified professionals in order to enhance "physical activity goal achievement of individuals with movement limitations and societal restrictions, such as attitudinal and environmental barriers" [9].
- 3) To support participation in physical education and sports

¹ Adopted by the European Commission in 2011.

not only in special schools or special programs. Also, “when the sport is competitive rather than recreational, the training seems to be related mostly to development for or current participation in Special Olympics, Paralympics, and Deaflympics rather than inclusive settings” [9].

Starting from the needs mentioned above, the project has tried to elaborate a method of intervention to enhance the role of physical activities as a mean to support education and inclusion. In particular, the method tried to answer these needs through:

- Definition of a set of exercise for the acquisition of basic skills for improving learning process through movement.
- Improvement of coaches, technicians, and teachers’ skills for promoting interconnections between formal and non-formal education.
- Prevention of health risks in children, caused by lack of movement.

II. METHODOLOGY

The methodology used in this paper consists of a non-participant (naturalistic) observation that allows to collect information on changes as result of the intervention [10], [11]. The adoption of this methodology has permitted to analyze the insights generated through practical experiences and find evidence in study and research on the topics of physical activities and disability.

The elements gathered through the observation of this case study and the evidence collected analyzing the literature on the topics of neuromotor activities, learning skills development and disability have led to define an organic description of the method’s foundation [12].

A. Method’s Assumptions

The Movi-Mente© method is composed by a set of neuromotor activities for the development of learning prerequisites addressed to preschool children, included in a path of specific motor exercises aimed to develop relational and intellectual skills. It stemmed from the work of Etnier & Chang [13] and from the assumption that within 6 years children reached the potentiality of an adult, and the neurophysiological structures mature through motor experience. These stimulate the growth of higher cognitive functions, such as writing, reading, and calculating. In addition, different scientific studies attest that early motor activity allows better maturation of spatial, vestibular, visual perception [14], understanding [15], attention [16] and language competences [17].

As all abilities that play a crucial role for learning, well-being, and health need to be developed since early age. Therefore, encouraging child to move, through a “tailor-made” educational proposal, means not only offering movement experiences, but also increasing intellectual growth.

As stated by Pascual-Leone et al. [18], the acquisition of a motor skills is associated with the reorganization of the motor cortex where the individual muscles involved in the exercise are represented. Furthermore, synaptic reorganizations through the execution of a motor act require training. And training and

repetition lead to a better execution of the tasks, due to the variation of the relative motor or somatosensory cortical map, activated by the activity itself. So, if the neuronal cells recognize a constant and repeated stimulus, they activate the synapses necessary for their functional synergism [18]. If this sensory integration is stimulated by the environment and motor experiences with increasing frequency, intensity, and duration over time, it allows to organize in a more sophisticated and effective way the neuronal connections. This impacts also on the development of learning abilities and skills. Moreover, through neuromotor activities it is possible to support the enhancement of the personality as well as socialization and fun [19]. Therefore, the method proposes opportunities for movement and experimentation through the own body, that allows to transform and encourage the intellectual development of child, enhancing the improvement of neuro-motor prerequisites functional for the acquisition of instrumental learning skills [20]. Also, the method embraces the notions of neurophysiology, pedagogy, and kinesiology, according to which any intellectual capacity is due to a neurophysiological development of all areas of the brain, that develops from 0 to 6/7 years [21]. These neurophysiological structures mature through motor experience. Therefore, the method stimulates the growth of brain structures responsible for higher intellectual functions, such as writing, reading, and calculating, through the specific movements proposed.

B. Achievements

In the last 15 years the Movi-Mente© method was tested and adopted in many primary schools located in different parts of Italy, as intervention for developing prerequisites functional for enhancing learning through motor exercises. It involved over 4.000 children between 3 and 6 years (with and without disability), 150 schools (primary and elementary), 28 judo clubs (associations and gyms), and 112 including judo coaches, teachers, and port professionals² and it was recognized as a highly educational activity for the growth of preschool children.

The main achievements observed are:

- To have encouraged physical activity among children between 3 and 6 years, as a habit of a healthy lifestyle that can impact on the cognitive development and promote well-being.
- To have developed a set of physical activities based on judo such as rolling, sliding, running, overturning, crawling, and leaping as well as force grips and hugs. All these movements demonstrate to encourage the improvement of motor coordination.
- To have strengthened coaches and preschool teachers’ skills, by promoting the application of the method, as an easy strategy addressed to early childhood.
- To have increased the awareness of the importance of providing educational strategies, based on movement, to promote social inclusion by strengthening children’s skills and their level of self-esteem acquired through training

² Pre-Covid data

and play activities.

C. Implication for Practice

The lessons learnt are following summarized as implication for practice, emerged during the observation of the method's application in different education contexts, such as primary schools and sport clubs:

- Positive Impact in Creating Inclusive Relationships

The physical activities proposed allowed to practice exercises within group of peers, providing concrete opportunities of increasing social inclusion and gain greater self-confidence in terms of self-perception. This reduces the risk of developing disorders or experiencing discomfort that can lead to exclusion from the group of peers. Also, physical contact encourages bonds of closeness, trust, and reliability, all aspects that contribute to create effective inclusive relationships.

- Strengthening Connections with Inclusive Education:

Inclusive education means fostering a process that considers the multiple and different needs of all students. This presupposes the transformation and modification of contents, approaches, and strategies to be able to educate everyone. For these reasons, the role of teachers becomes fundamental, as they need to overcome traditional teaching (frontal lesson, textbooks, individual questions, etc.), getting towards a plurality of diversified approaches. These approaches should be based on unconventional solutions for the consolidation of fundamental skills to improve learning abilities.

- Working on Body and Mind, Producing Good Health and Well-Being

Study and research clearly shows that preschool children risk to increase physical and psychological diseases linked to a sedentary lifestyle [3], [6], [9], [13], [17]. To prevent such risks is important to practice sport, as moving in harmony and in balance, training for reaching better performances, trying to overcome limits, making mistakes, repeating, and improving are benefits that can be experienced since an early age. Also, physical activity can contribute to fight depression, irritability, and aggression, as it helps to release tension, fears, and anxieties. Moreover, movement is a fundamental to discover the world and acquire motor skills, balance, and other abilities to perceive themselves and physical-social world, establishing positive connections between well-being and movement. In this way, positive outcomes can be the improvement of cardiorespiratory and muscular system, blood pressure, glucose, and insulin resistance, as well as reduction of symptoms of depression.

- Provision of Inclusive Alternative Strategies for Sport Technicians and Teachers

To train coaches, sport technicians, and teachers in using alternative strategies for teaching physical activities can improve their competences in promoting inclusion through interconnections between formal and non-formal education.

The training of "socio-motorial" operators is fundamental to

guarantee a healthy, beneficial, and adequate physical activities. Therefore, they should not limit their training to a "just to move" approach, predetermined exercises or interventions of specialists focused exclusively on sports techniques.

Since physical activities are taught through inclusive approaches, it is possible improve the opportunities to meet with others, participate, make movement, and have fun.

- Encouraging Enthusiasm and Fun

The method was presented to coaches and teachers giving advises on how to encourage enthusiasm in children for all motor activities. This aspect is important for promoting participants' fun and not transform the exercises proposed into a sort of therapy.

III. FUTURE RESEARCH

Future research could explore the effects of the intervention on larger group samples. Research could explore the use of Movi-Mente© method in other countries.

What is needed is to carefully examine and replicate features of the method that builds capacities for learning skills. For these reasons, the method should be validated through a methodology based on a mixed-method research design (qualitative and quantitative), including the collection of statistical data, focus groups, interviews, and questionnaires addressed to coaches, teachers, families, and other stakeholders in the fields of sport and education.

IV. CONCLUSION

This paper provides suggestions for future trajectories of research on topics such as physical activities, motor skills, neuromotor development and its impact on the acquisition of learning competences. To conclude, Movi-Mente© method demonstrated its usefulness as intervention aimed to improve learning abilities of preschool children with disability through physical activities. Also, it resulted easily to be adopted and successful in supporting inclusion within formal and non-formal education environments.

REFERENCES

- [1] Available at: <https://www.propatriajudo.it/presentazione-progetto-judogiocando>
- [2] Bertozzi, L., Montanari, L., & Mora, I. (Eds.). (2002). *Architettura delle funzioni: lo sviluppo neuromotorio del bambino fra normalità e patologia*. Springer Science & Business Media.
- [3] World Health Organization Regional Office for Europe. (2021). WHO European Childhood Obesity Surveillance Initiative (COSI). Report on the fourth round of data collection, p. 2015–2017.
- [4] Napoli, A. S. L., & Nord, N. (2018). Favorire gli apprendimenti nella scuola primaria con l'utilizzo di tecniche di attivazione del sistema attentivo-esecutivo. *Iprase*, 135.
- [5] UN. (2006). *Convention on the Rights of Persons with Disabilities*.
- [6] Lorenzo, T., McKinney, V., Bam, A., Sigenu, V., & Sompeta, S. (2019). Mapping participation of disabled youth in sport and other free-time activities to facilitate their livelihoods development. *British Journal of Occupational Therapy*, 82(2), p. 80-89.
- [7] Van der Ploeg, H. P., Van der Beek, A. J., Van der Woude, L. H., & van Mechelen, W. (2004). Physical activity for people with a disability. *Sports medicine*, 34(10), p. 639-649.
- [8] Knop, P. D., & Oja, P. (1996). Sport for all. *Sport for all.*, 8, p. 15-43.

- [9] Sherrill, C. (2004). Young people with disability in physical education/physical activity/sport in and out of schools: Technical report for the World Health Organization. ICSSPE/CIEPSS, p. 4 and p.17.
- [10] Morgan, S. J., Pullon, S. R., Macdonald, L. M., McKinlay, E. M., & Gray, B. V. (2017). Case study observational research: A framework for conducting case study research where observation data are the focus. *Qualitative health research*, 27(7), p. 1060-1068.
- [11] Furlong, M. (2010). Clear at a distance, jumbled up close: Observation, immersion and reflection in the process that is creative research. In P. Liamputtong (Ed.), *Research methods in health: Foundations for evidence-based practice* (pp. 153–169). South Melbourne, Australia: Victoria Oxford University Press.
- [12] Rowley, J. (2002). Using case studies in research. *Management Research News*, 25, p. 16–27. doi: 10.1108/01409170210782990.
- [13] Etnier, J. L., & Chang, Y. K. (2009). The effect of physical activity on executive function: a brief commentary on definitions, measurement issues, and the current state of the literature. *Journal of Sport and Exercise Psychology*, 31(4), p. 469-483.
- [14] Kretch, K. S., Franchak, J. M., & Adolph, K. E. (2014). Crawling and walking infants see the world differently. *Child development*, 85(4), p. 1503-1518.
- [15] Haghshenas, S., Hosseini, M. S., & Aminjan, A. S. (2014). A possible correlation between vestibular stimulation and auditory comprehension in children with attention-deficit/hyperactivity disorder. *Psychology & Neuroscience*, 7(2), p. 159-162.
- [16] Moghadam, S. F., Haghgoo, H. A., Pishyareh, E., Bakhshi, E., Rezazadeh, N., Rostami, R., & Sadeghi, V. (2018). Vestibular therapy improved motor planning, attention, and balance in children with attention deficit hyperactivity disorders: a randomized controlled trial. *Phys Med Rehabil Res*, 3(2), p. 1-6.
- [17] Taylor, L. J., & Zwaan, R. A. (2009). Action in cognition: The case of language. *Language and cognition*, 1(1), p. 45-58.
- [18] Pascual-Leone, A., Nguyet, D., Cohen, L. G., Brasil-Neto, J. P., Cammarota, A., & Hallett, M. (1995). Modulation of muscle responses evoked by transcranial magnetic stimulation during the acquisition of new fine motor skills. *Journal of neurophysiology*, 74(3), p. 1037 and p. 1039.
- [19] Martin, J. J., & Smith, K. (2002). Friendship quality in youth disability sport: Perceptions of a best friend. *Adapted Physical Activity Quarterly*, 19(4), p. 472-482.
- [20] Sangalli, A. L., (2021). *L'attività motoria compensativa*, Trentouno, Trento.
- [21] Oberman, L. M., Pascual-Leone, A., & Rotenberg, A. (2014). Modulation of corticospinal excitability by transcranial magnetic stimulation in children and adolescents with autism spectrum disorder. *Frontiers in Human Neuroscience*, 8, 627.