



Teacher education is a deeply pedagogical process rooted in values, ethics, and the social purpose of schooling. Globally, it sits at the core of educational quality and fairness, as research in comparative and international education demonstrates: the training of teachers directly influences students' learning chances, social inclusion, and the democratic aims of schools. Teachers are not simply transmitters of curricula, but active professionals whose convictions, reflective skills, and ability to manage the complexities of classroom life give shape and substance to the educational experience itself.

The pedagogical dimension of teacher education frames teaching as a relational, context-aware, and ethically grounded profession rather than just a set of procedural skills. From a research perspective, this demands robust research methodologies that can critically examine the complex realities of schools and inform evidence-based policies. Equally important is the connection between theory and practice, which helps to bridge the persistent gap between universities and schools.

The contributions gathered in this volume reflect the richness and diversity of experiences showcased during the ATEE Spring Conference 2024, held at the University of Bergamo from May 29 to June 1, 2024. The volume presents 70 selected papers out of more than 300 presented by researchers representing over 40 countries.

This broad spectrum of studies highlights promising directions that can inspire renewed inquiry and concrete proposals aimed at improving contemporary educational systems.

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Teacher education research in Europe: trends, challenges, practices and perspectives

May 29th – June 1st, 2024
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Edited by Nicole Bianquin and Francesco Magni





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BOOK OF PROCEEDINGS

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Integration of the Synchrony method in physical education during school age in the digital era

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Abstract

Excessive screen exposure during childhood may impair attentional processes and motor development, particularly by reducing peripheral vision and movement diversity (Clayton et al., 2015; Bozzola et al., 2022). To address this issue, the Sincrony method integrates structured motor activities with targeted visual stimulation to enhance cognitive and physical skills. This study assessed the effectiveness of this approach in 36 pre-adolescent girls (mean age 12) with high digital exposure (10+ hours/week). Participants were divided into three groups: Sincrony, coordinative activities without visual focus, and control. A 12-week protocol was implemented with pre/post testing using the Trail Making Test, VFCT, Stork, Sargent, and Cooper tests. Results showed significant improvements in sustained attention and motor skills in the Sincrony group compared to others ($p < 0.05$). These findings support the potential of integrative methods to counteract the cognitive-motor effects of digital overexposure and promote balanced development during critical growth stages (Donnelly et al., 2016).

Keywords: physical education; screen devices; didactics; attention; synchrony method.

1. Introduction

In today's educational context, characterized by the widespread use of digital tools, increasing concerns are being raised about the potential negative effects of excessive screen exposure on children's cognitive and motor development (Panjeti-Madan et al., 2023). Recent studies show that prolonged use of screen-based digital devices can impair peripheral vision, thereby limiting the harmonious development of both basic motor skills and the ability to sustain attention over time (Clayton, Yeung, & Kadosh, 2015; Jourdren et al., 2023). In this sense, excessive visual focus on screens may be associated with selective attention as a preferred channel, reducing sustained attention and negatively affecting the ability to process information from broader contexts (Reed et al., 2017). The American Academy of Pediatrics, in this regard, has recommended controlled screen exposure time: no more than 90 minutes per day for adolescents, and no more than one hour per day for younger children (AAP, 2016). These effects, however, do not only concern cognitive and attentional abilities but also motor development. Children who spend too much time in front of screens tend to reduce the time spent on physical activities, which are essential for their harmonious development. Movement plays a fundamental role in the development and consolidation of motor skills, such as postural balance and hand-eye coordination, which are essential for children's interaction with their environment and functional autonomy. The reduction in movement, combined with a decrease in diffuse attention capacity, can lead to weaknesses in the development of both fine and gross motor skills, with potential negative consequences for the musculoskeletal system, including postural issues such as neck and back pain, and even adolescent idiopathic scoliosis (Priftis & Panagiotakos, 2023). In this regard, in addition to the indirect inactivity caused by prolonged use of screen-based technologies, research suggests that certain types of fast-paced or overstimulating digital content may hinder attentional control and reduce the ability to maintain focus in cognitively demanding situations (Madigan et al., 2020; Bozzola et al., 2022). To support the harmonious growth of young people in light of the modern context, new motor skills methodologies have been developed. The Sincrony movement education methodology, for example, integrates correct biomechanics with targeted neuro-motor training tools that go beyond traditional physical activity. While peripheral vision is naturally engaged in many sports, the Sincrony method trains it deliberately and systematically through specific visual and motor stimulation exercises, within structured protocols that include a clear progression of phases (warm-up, core activity, cool-down) and gradually increasing levels of complexity. The aim is to improve attentional flexibility and body awareness through an integrated and pedagogically grounded approach (De Bernardi, 2008; Fogliata & Ambretti, 2023; Cabeza & Nyberg, 2000). This motor-pedagogical approach aligns with the theories of psychomotricity and embodied cognition, offering a solid theoretical foundation for a practical and applicable methodological framework (Wulf & Su, 2007). This integrated approach could indirectly help counteract prolonged screen exposure by promoting a balanced development of both motor and cognitive skills, which are fundamental during critical stages of growth. Through practices that involve the entire body and specifically peripheral vision, the Sincrony method could encourage children to develop spatial awareness and the ability to respond to complex visual and motor stimuli. Furthermore, by exposing children to an environment rich in stimuli and varied physical activities, this pedagogical approach aims to mitigate the potential negative effects of digitalization on children's learning and physical health (Donnelly et al., 2016; Tremblay et al., 2016). In this context and with this perspective, teachers in general, and physical education teachers in particular, could play an important educational role. Their expertise could indeed help integrate physical movement with cognitive stimulation to emphasize a healthy, balanced growth. In an era dominated by digital technology, physical education teachers could use new tools to promote a counterbalance. The present study aims to evaluate the effectiveness of the Sincrony method in improving sustained attention and motor skills in pre-adolescent girls who are highly exposed to screen-based technologies.

2. The guidelines from the American Academy of Pediatrics

The guidelines from the American Academy of Pediatrics regarding the use of digital devices and screen time for children emphasize the need to limit exposure to protect and promote healthy development. For children under 18 months, the use of digital media should be avoided. However, a study found that by the age of 12 months, 45% of children had already been exposed to digital media (Durham et al., 2021). For children aged 18 to 24 months, a maximum screen time of less than 1 hour is suggested, with careful selection of programs to view together (Sainani, 2022). For children aged 2 to 5 years, it is also recommended to limit screen time to a maximum of 1 hour per day of high-quality programming. Studies show a significant negative correlation between screen time exceeding the guidelines and cognitive-motor development scores in young children (Zaky et al., 2024). For children aged 6 years and older, although no specific limit is set, it is emphasized that screen time should not interfere with sleep and physical activity, thus remaining within a threshold of two hours (Manuja et al., 2024). Although a notable percentage of parents are aware of these recommendations, only a minority are able to apply them effectively (Lammers et al., 2021). Therefore, raising awareness becomes very important, as well as promoting healthy habits and tailored integrations at the school level (WHO, 2019; Canadian Paediatric Society, 2017). It is essential for parents and educators to work on finding useful strategies to ensure a balanced lifestyle.

3 Materials and methods

The study assessed the effectiveness of the Sincrony method, an innovative motor education model, aimed at improving sustained attention and motor skills in a sample of 36 pre-adolescent girls (mean age 12 years, SD = ± 0.4). The participants were selected based on specific criteria, including high exposure to digital devices, defined operationally as more than 10 hours per week. Although current pediatric guidelines for children aged 6 and above do not prescribe a strict upper limit, exposure above this threshold has been associated in the literature with a higher risk of negative impacts on attention, physical activity levels, and posture, particularly in pre-adolescents (Bozzola et al., 2022; Zaky et al., 2024) and general good health, with no pathologies that could hinder the execution of exercises in the gym. The homogeneity of the sample, consisting exclusively of female subjects, was a methodological choice to ensure greater uniformity in this pilot study. The program lasted for 12 weeks, with two weekly sessions of 30 minutes each. Group 1 (Sincrony method - 13 participants): the girls in this group followed the Sincrony method, an integrated approach combining playful-motor exercises with a specific focus on improving peripheral vision, concentration, and body awareness. Each session started with a 5-minute warm-up, consisting of dynamic stretching exercises and walking with varying rhythms. The central part of the session (20 minutes) focused on activities such as throwing colored balls, to which participants had to respond visually using peripheral vision, as well as balance exercises on unstable surfaces to promote body centering. The final 5 minutes were dedicated to breathing and relaxation exercises aimed at improving body awareness and reducing muscle tension. Group 2 (coordinative activities without visual focus-12 participants): this group performed similar playful-motor activities as Group 1, but without the element of peripheral vision awareness and body centering. In this case as well, the sessions began with a 5-minute warm-up, followed by 20 minutes of obstacle courses, coordination games in pairs or small groups, focusing on improving general motor coordination. However, no emphasis was placed on specific cognitive or visual components. The final 5 minutes were dedicated to cooling down with light breathing exercises and static stretching. Group 3 (Control-11 participants): the control group did not participate in any structured movement programs but used teams game. The participants continued their normal school activities without engaging in specific exercises for motor or cognitive development. Table 1.

Group	Participants	Activity	Duration	Frequency	Main Objectives
Group 1	13	Warm-up, exercises for peripheral vision and body centering	30 min	2 times per week	Improve sustained attention and motor skills through visual stimuli and body awareness
Group 2	12	Warm-up, coordination exercises without visual focus	30 min	2 times per week	Improve general motor coordination through similar exercise to Group 1 without visual focus
Group 3	11	Warm-up, teams game, without visual focus	30 min	2 times per week	Teams game

Table 1: Activities in the different groups.

The training sessions for all groups were conducted in the school gymnasium, a familiar and safe environment for the participants. The sessions were delivered by two expert physical education teachers with specific training in the Sincrony methodology. Both trainers followed a standardized protocol to ensure consistency in the delivery of the sessions across the 12-week intervention. For Group 1 (Sincrony), the structured protocol included a progressive complexity model: each session started with basic visual-perceptive and coordination drills and gradually evolved toward more integrated visual-motor activities involving spatial awareness and divided attention. The content of Group 2 was designed to parallel the Sincrony group in duration and movement intensity, but excluded visual or attentional stimuli. The control group participated in unstructured physical games supervised by a teacher but without specific cognitive or postural focus. In this study, a series of standardized tests were administered both before (T1) and after (T2) the intervention to assess cognitive and motor improvements among the participants. One of the primary assessments was the Trail Making Test (TMT), used in both Part A and Part B. This neuropsychological tool is designed to evaluate visual attention and cognitive flexibility (Reitan, 1958). In Part A, participants are required to connect a sequence of numbered circles as quickly and accurately as possible, testing basic visual processing speed and attention. Part B adds a more complex task, where participants alternate between numbers and letters (e.g., 1-A-2-B), which introduces a cognitive load and requires greater task-switching and executive function. The second one, the Visual Focus and Concentration Test (VFCT) used in this study was adapted from classroom-based assessments commonly employed in educational settings to evaluate sustained visual attention. This test was not standardized but was specifically designed to measure the ability to maintain visual focus over time through timed discrimination tasks involving visual stimuli.) This test requires participants to focus on a series of visual stimuli over an extended period, assessing their ability to maintain attention and avoid distraction. However, motor skills were evaluated through a combination of standardized tests, including the Stork Test (Johnson & Nelson, 1986); the Sargent Test (Sargent, 1921); and the Adapted Cooper Test (Cooper, 1978). The Stork Test assesses balance by having participants stand on one foot for as long as possible, testing their postural control and ability to maintain equilibrium. This test provided a clear measure of the participants' stability and motor coordination. The Sargent Test was used to evaluate explosive leg power by measuring the vertical jump height of participants, offering insights into their muscular strength and overall motor performance. Finally, the Adapted Cooper Test, a validated version of the traditional Cooper Test used in Italian school settings, was employed to assess endurance and cardiovascular fitness. This protocol, described by the Italian Ministry of Education (Ministero della Pubblica Istruzione, 2009), requires participants to walk or jog for 12 minutes at a self-selected pace, with the total distance covered serving as an indicator of aerobic capacity.

4 Results and Discussion

The results were analyzed using non-parametric tests in SPSS software. The Wilcoxon signed-rank test was employed to assess pre- and post-intervention differences within each group, while the Kruskal-Wallis test was used to compare changes between the groups. The Wilcoxon signed-rank test revealed a significant improvement in sustained attention and motor skills in Group 1 (Sincrony method), with $p < 0.005$ for both attention (TMT) and motor performance (Stork Test, Sargent Test). Group 2 (coordinative activities) also showed improvements, but these were less pronounced ($p < 0.05$), while Group 3 (control) did not exhibit any statistically significant changes. The Kruskal-Wallis test confirmed that the improvements in Group 1 were significantly greater than those in Groups 2 and 3 ($p < 0.01$), indicating the effectiveness of the Sincrony method in enhancing both cognitive and motor skills. A post-hoc power analysis based on the sample size and a medium effect size ($f = 0.25$) yielded an estimated power of 0.23. These results are consistent with the exploratory nature of the study. These findings highlight the dual benefits of integrating motor activities with cognitive focus, as in the Sincrony method, especially in countering the negative effects of high digital exposure. Group 1's superior results suggest that the cognitive component is key to maximizing improvements in both attention and motor performance, while unstructured or purely physical activities, as in Group 2, yield less significant outcomes. Detailed results for all tests and groups are reported in Table 2.

Test	Group	Pre (Mean \pm SD)	Post (Mean \pm SD)	Test statistic
TMT-A	Group 1	45.2 \pm 8.1	37.5 \pm 7.9	$z = -2.98$
TMT-B	Group 1	89.3 \pm 9.5	75.8 \pm 8.2	$z = -3.12$
Stork	Group 1	12.1 \pm 2.3	18.4 \pm 2.5	$z = -3.01$
Sargent	Group 1	28.4 \pm 4.2	34.2 \pm 4.7	$z = -2.85$
Cooper	Group 1	1020 \pm 110	1160 \pm 105	$z = -2.76$
TMT-A	Group 2	44.8 \pm 7.9	41.9 \pm 7.6	$z = -2.12$
TMT-B	Group 2	88.5 \pm 8.7	84.6 \pm 8.3	$z = -1.97$
Stork	Group 2	11.9 \pm 2.5	14.3 \pm 2.4	$z = -2.20$
Sargent	Group 2	27.9 \pm 3.9	30.8 \pm 4.3	$z = -2.05$
Cooper	Group 2	1005 \pm 115	1070 \pm 112	$z = -1.99$
TMT-A	Group 3	45.4 \pm 8.3	45.1 \pm 8.2	$z = -0.55$
TMT-B	Group 3	90.2 \pm 9.6	89.8 \pm 9.5	$z = -0.49$
Stork	Group 3	12.2 \pm 2.2	12.0 \pm 2.3	$z = -0.66$
Sargent	Group 3	28.3 \pm 4.1	28.5 \pm 4.0	$z = -0.42$
Cooper	Group 3	1015 \pm 108	1020 \pm 110	$z = -0.50$

Table 2: Pre- and post-intervention performance in cognitive and motor tests for each group.

5 Conclusion

In conclusion, a modern educational context increasingly dominated by digital technology, concerns regarding the negative impacts of excessive screen exposure on children's cognitive and motor development are growing. This pilot-study provides that the Sincrony method can be an effective tool to counteract these effects, offering a balanced approach that integrates motor activities with cognitive awareness. In fact, the study show that the group trained with the Sincrony method showed significant improvements in both sustained attention and motor skills suggesting that exercises aimed at enhancing peripheral vision and body awareness not only improve physical abilities but also stimulate cognitive processes. These results are in line with theories of psychomotricity and embodied cognition, which emphasize the interconnectedness of physical movement and cognitive development. However, the study highlights the importance of developing educational methodologies that address the challenges posed by the pervasive use of digital devices. Physical education teachers, in particular, could adopt this approach to foster balanced development

in young people, helping to mitigate the negative effects of excessive screen exposure while promoting overall well-being. By integrating peripheral visual stimulation and body-centered motor tasks, the Sincrony method targets two domains commonly impaired by excessive screen use sustained attention and postural control. These elements, grounded in both psychomotor and cognitive development theories, provide a structured response to the health and cognitive challenges raised in the introduction.

Bibliography

- American Academy of Pediatrics. (2016) *Media and young minds: Policy statement*. Pediatrics, 138(5), e20162591. <https://doi.org/10.1542/peds.2016-2591>
- Bozzola, E., Spina, G., Agostiniani, R., Barni, S., Russo, R. (2022) *The Use of Social Media in Children and Adolescents: Scoping Review on the Potential Risks*. International Journal of Environmental Research and Public Health, 19(17), 9960. <https://doi.org/10.3390/ijerph19169960>
- Cabeza, R., & Nyberg, L. (2000). *Imaging cognition II: An empirical review of 275 PET and fMRI studies*. Journal of Cognitive Neuroscience, 12(1), 1-47. <https://doi.org/10.1162/08989290051137585>
- Canadian Paediatric Society. (2017) *Screen time and young children: Promoting health and development in a digital world*. Paediatrics & Child Health, 22(8), 461-468. <https://doi.org/10.1093/pch/pxx123>
- Clayton, M. S., Yeung, N., & Kadosh, R. C. (2015) *The roles of cortical oscillations in sustained attention*. Trends in Cognitive Sciences, 19(4), 188-195. <https://doi.org/10.1016/j.tics.2015.02.004>
- Cooper, K. H. (1968) *A means of assessing maximal oxygen intake: Correlation between field and treadmill testing*. JAMA, 203(3), 201-204. <https://doi.org/10.1001/jama.1968.03140030033008>
- De Bernardi (2008) Movement educational. Red edition.
- Donnelly, J. E., Hillman, C. H., Castelli, D., Etnier, J. L., Lee, S., Tomporowski, P., & Szabo-Reed, A. N. (2016) *Physical activity, fitness, cognitive function, and academic achievement in children: A systematic review*. Medicine & Science in Sports & Exercise, 48(6), 1197-1222. <https://doi.org/10.1249/MSS.0000000000000901>
- Durham, K., Wethmar, D., Brandstetter, S., Seelbach-Göbel, B., Apfelbacher, C., Melter, M., Kabesch, M., & Kerzel, S. (2021) *Digital Media Exposure and Predictors for Screen Time in 12-Month-Old Children: A Cross-Sectional Analysis of Data From a German Birth Cohort*. Frontiers in Psychiatry, 12, 737178. <https://dx.doi.org/10.3389/fpsy.2021.737178>
- Fogliata, A., & Ambretti, A. (2023) *Advanced motor-sport pedagogy: Embodied (artificial) and peripheral vision*. Journal of Inclusive Methodology and Technology in Learning and Teaching, 3(4), 1-9. <https://www.inclusiveteaching.it>
- Johnson, B. L., & Nelson, J. K. (1986) *Practical measurements for evaluation in physical education* (4th ed.). Macmillan.
- Jourdren, M., Bucaille, A., & Ropars, J. (2023) *The Impact of Screen Exposure on Attention Abilities in Young Children: A Systematic Review*. Pediatric neurology, 142, 76-88. <https://doi.org/10.1016/j.pediatrneurol.2023.01.005>
- Lammers, S. M., Woods, R., Brotherson, S., Deal, J., & Platt, C. (2021) *Explaining Adherence to American Academy of Pediatrics Screen Time Recommendations With Caregiver Awareness and Parental Motivation Factors: Mixed Methods Study*. JMIR Pediatrics and Parenting, 4(2), e29102. <https://dx.doi.org/10.2196/29102>
- Manuja, R., Pattankar, T., Yadavannavar, M., & Udgiri, R. S. (2024) *Impact of Elevated Screen Time on School-Age Adolescents During the COVID-19 Pandemic: An Analytical Study*. Cureus. <https://dx.doi.org/10.7759/cureus.64689>
- Madigan, S., McArthur, B. A., Anhorn, C., Eirich, R., & Christakis, D. A. (2020) *Associations Between Screen Use and Child Language Skills: A Systematic Review and Meta-analysis*. JAMA Pediatrics, 174(7), 665-675. <https://doi.org/10.1001/jamapediatrics.2020.0327>
- Ministero della Pubblica Istruzione. (2009) *Protocollo di valutazione motoria nella scuola secondaria di primo grado*. Direzione Generale per lo Studente.
- Panjeti-Madan, Vaishnavi N., and Prakash R. (2023) *Impact of Screen Time on Children's Development: Cognitive, Language, Physical, and Social and Emotional Domains* Multimodal Technologies and Interaction 7, no. 5: 52. <https://doi.org/10.3390/mti7050052>
- Reed, P., Hirsh-Pasek, K., & Golinkoff, R. M. (2017) *Learning on Hold: Cell Phones Sidetrack Parent-Child Interactions*. Developmental Psychology, 53(8), 1428-1436. <https://doi.org/10.1037/dev0000292>
- Priftis, N., & Panagiotakos, D. (2023). *Screen Time and Its Health Consequences in Children and Adolescents*. Children (Basel), 10(10), 1665. <https://doi.org/10.3390/children10101665>
- Reitan, R. M. (1958) *Validity of the Trail Making Test as an indicator of organic brain damage*. Perceptual and Motor Skills, 8(3), 271-276. <https://doi.org/10.2466/pms.1958.8.3.271>
- Sainani, A. (2022) *Commentary: Screening of screen time in children*. Indian Journal of Ophthalmology, 70(3), 898-899. https://dx.doi.org/10.4103/ijjo.ijjo_381_22
- Sargent, D. A. (1921) *The physical test of a man*. American Physical Education Review, 26(4), 188-194.
- Tremblay, M. S., Carson, V., & Chaput, J. P. (2016) *Introduction to the Canadian 24-hour movement guidelines for children and youth: An integration of physical activity, sedentary behaviour, and sleep*. Applied Physiology, Nutrition, and Metabolism, 41(6), iii-iv. <https://doi.org/10.1139/apnm-2016-0203>
- World Health Organization (WHO). (2019) *Guidelines on physical activity, sedentary behaviour and sleep for children under 5 years of age*. Geneva: World Health Organization. <https://www.who.int/publications/i/item/9789241550536>
- Wulf G, Su J. (2007) *An external focus of attention enhances golf shot accuracy in beginners and experts*. Res Q Exerc Sport. Sep;78(4):384-9. doi: 10.1080/02701367.2007.10599436. PMID: 17941543.
- Zaky, E. A. M., Maher Deif-Allah, S. A., Abdelaziz, A. W., Mohammed, M. Z. R., Ibrahim, A. M. S., & Abd Elhamid, S. A. (2024) *Screen Time and its Relation to Toddlers' Development*. QJM: An International Journal of Medicine. <https://dx.doi.org/10.1093/qjmed/hcae070.466>