Journal of Physical Education Research, Volume 11, Issue IV, December 2024, pp.11-22
ISSN: Print-2394 4048, Online-2394 4056

EFFECTS OF THE SCHOOL IN MOTION CONCEPT ON CONCENTRATION ABILITY IN PRIMARY SCHOOL CHILDREN

ANDREA DINCHER[1*], ANNIKA ZEYER[2]
[1]*Institute for Sports Sciences, RPTU Kaiserslautern-Landau, GERMANY.*
[2]*Sports Sciences Institute, Saarland University, GERMANY.*
***Email:** dincher@uni-landau.de*

How to cite this article: Dincher, A., & Zeyer, A. (December 2024). Effects of the school in motion concept on concentration ability in primary school children. Journal of Physical Education Research, Volume 11, Issue IV, 11-22.

Received: August 10, 2024 **Accepted:** November 21, 2024

ABSTRACT

*Exercise is of fundamental importance. As children today apparently do not get enough exercise in their free time, exercise programs should be offered at school in order to promote the development of children's overall personality. This study aims to show whether the School in Motion program has a positive effect on the ability to concentrate. A total of 35 children (14 in the experimental class, eleven in the control class) from a randomly selected German primary school took part in the study. In the experimental class, a program for School in Motion was carried out over four weeks. The concentration test for children KoKi was carried out before and after the intervention. An ANOVA with repeated measures was used to determine the effects for the factors group, time and the interaction time*group. The SPSS 29 program was used for this purpose. The significance level was set at $p<.05$. With the exception of the inability to be distracted, there were clear effects for the time factor in the experimental group and interaction effects for group*time. The improvement in the experimental class can be attributed to the movement program. The non-significant effects can be attributed to a test effect. Conclusions: The four-week program had a positive effect on the children's concentration performance.*
Keywords: *School in motion, learning in motion, concentration, attention, primary school children.*

1. INTRODUCTION

People still assume that learning works best when sitting quietly. Physical activities in connection with learning therefore hardly ever take place in the classroom as they are seen as a distraction. The reform pedagogue Maria Montessori (1971, p. 31) says: 'Of equal importance for the child's development is his own spontaneous movement. The child must always move and can only pay attention or think when it is moving.'

Movement

Movement is defined as a 'basic phenomenon of human life' and includes not only locomotion in everyday life and sporting activities, but also internal movement, such as the breathing of the lungs and the beating of the heart, even though the body is still (Zimmer, 2013). Through active movement, people explore the world and actively help to shape it. In childhood, movement, play and sport are not only a natural part of the living environment, but also form the basic framework for healthy development (Joisten, 2022). This gives rise to differentiated perceptions and diverse experiences, enabling children to gain knowledge about themselves and their environment (Müller, 2022). Movement also has a positive effect on the brain and supports cognitive learning. Movement increases blood circulation and thus

Correspondence: Andrea Dincher (Ph.D.), Scientific Assistant, Institute for Sports Sciences, RPTU Kaiserslautern-Landau, GERMANY, Email: dincher@uni-landau.de

transports more oxygen to the brain cells, which is necessary for optimal functioning (Genz, 2017). Every child has a natural urge to move. The environment in which children grow up is often not conducive to physical activity (Zimmer, 2013). Digital media have become an integral part of everyday life and are part of the reality of children's lives (Oppolzer, 2006). School, where children have to sit still for long periods of time, also restricts the amount of time they spend moving around in everyday life. Sprengeler et al. (2017) show that children spend an average of 69% of the day in a sitting position. The consequences of a lack of exercise are physical health problems such as cardiovascular impairment, postural and back problems, obesity, muscle weakness and coordination disorders, as well as psychosocial problems such as lack of concentration, aggression, depression, anxiety and communication disorders (Zimmer, 2013). It is recommended that children and adolescents between the ages of five and 17 should engage in at least 60 minutes of moderate to high-intensity exercise every day. Vigorous aerobic activities and activities that strengthen muscles and bones should be carried out at least three days a week (Bundeszentrale für gesundheitliche Aufklärung, 2022). However, only 27 to 33% of adolescents achieve this physical activity recommendation (Active Healthy Kids Germany, 2022). Even before the coronavirus pandemic, these recommendations were not achieved with only 26% (Finger et al., 2018). This shows that more exercise needs to be integrated into children's everyday lives.

Learning

According to Duden (2024), the word learning means acquiring knowledge, memorizing knowledge, acquiring skills and developing a certain attitude and behavior over time. Learning always involves interaction between people and their environment. Children should not be taught, but should learn in stimulating learning environments and real-life situations (Koditek, & Luther, 2021). Learning enables flexibility and also opens up access to different problems, new situations and tasks (Engel, 2008). It is therefore a continuous process that is made possible by our brain and leads to changes in its structure (Pfeffer, & Göppner-Pfeffer, 2005), which takes place when we interact with the environment. Sensory stimuli are perceived and a reaction is triggered. This process can lead to the formation of neuronal networks. With repeated use, neuronal connections are formed in the brain that enable access to the environment (Hannaford, 2013).

Learning is often associated with school, as a wide range of learning content is taught there. Learning in the school institution includes learning to read, write and do math, acquiring social skills and various areas of knowledge. Spitzer (2006) describes factors that can influence the learning process: Concentration, attention, motivation and emotions.

Attention is seen as a prerequisite for thinking and as a factor that influences the learning process (Sprenger, 2011). According to Böhme (2008), attention describes the ability to block out the unimportant and to focus on a specific area. Concentration is the measure of the duration and intensity of attention. Attention is regarded as a state, a property and a performance and is closely related to the selection of information. For Cohen (1992), selection is the central characteristic of attention. Selective perception is the process of focusing on a selected stimulus (Schachl, 2012), which can also be described as undistractibility, i.e. the ability to not be distracted by external or internal disturbances and to consistently direct attention to a task. When attention is focused on a specific task, it is automatically reduced in other areas. Information processing is automatically extended to irrelevant stimuli as soon as the capacity for a particular stimulus is no longer required. Focusing attention on selected information is therefore an important process in learning (Spitzer, 2006).

Oppolzer (2004) describes the highest form of attention as concentration. Concentration is ‘the ability to occupy oneself with a task over a longer period of time’. However, the concentration span is limited: For children aged five to seven, it averages around 15 minutes and increases to 20 minutes between the ages of seven and ten (Oppolzer, 2012). Breaks are therefore very important for an effective learning process (Oppolzer, 2004).

The ability to concentrate is the basis for learning and is therefore a basic prerequisite for the learning process. Selection, in which attention is focused on a specific stimulus, is particularly important (Schachl, 2012; Spitzer, 2006).

Learning and movement

Movement is regarded as a fundamental element for numerous human achievements and values, including intelligence, language and social skills (Greier, 2007). It also enables children and young people to explore their environment. Children explore their living environment with all their senses by feeling, smelling, seeing, hearing and tasting it. Learning with all the senses can improve knowledge retention, increase attention and boost motivation to learn (Zimmer, 1995). If, in addition to the usual acoustic and visual stimuli, the sense of movement is also stimulated during learning, the child has additional sources of information at its disposal. Therefore, in addition to the acoustic and visual sensory perceptions, greater importance should be attached to the sense of movement when absorbing information. Clancy (2006) emphasizes the positive influence of movement on the learning process, as movement can increase brain performance: Brain capacity increases and thinking ability is optimized. Cognitive information associated with movement is recalled more quickly.

Movement is seen as fundamental in the learning process, as it forms a learning object on the one hand, and on the other hand represents movement education in a social context and expresses purposeful action in interaction with the world (Laging, 2017).

With regard to the general positive effects of movement, physical activity increases the oxygen supply in the brain, which improves information processing during learning (Anrich, 2002). This also has a direct impact on attention, as an increased oxygen supply makes children more alert and therefore more receptive (Liebertz, 2009). Exercises that promote the interaction between the right and left hemispheres of the brain are suitable for this purpose (Oppolzer, 2004). The crossing movements across the center line of the body activate the brain and support the formation of nerve connections and synapses between the two hemispheres of the brain. This promotes learners' concentration and helps them to retain new information (Köckenberger, 2016). Children's natural urge to move therefore helps to maintain and expand nerve cells that support mental performance in later life (Dickreiter, 2000). Relaxation exercises can be used to prepare the brain for learning and to avoid stress in the classroom (Clancy, 2006).

The School in Motion

Today's concepts of the School in Motion have since found their way into schools, not across the board and evenly in all types of school, but nevertheless to an increasing extent. Almost all federal states in Germany have taken initiatives to integrate more movement into everyday school life. The overarching goal is to make not only everyday school life but also extracurricular life more active (Brägger et al., 2020).

Müller's concept of the School in Motion is presented below in figure 1. It aims to bring about a long-term change in the school and learning culture by establishing physical activity as an integral part of everyday school life. This distinguishes the concept from temporary and project-based approaches, which usually only achieve short-term effects. Movement is integrated into lessons, breaks, school life and leisure time. In addition to developing physical skills, it enables differentiated perceptions and diverse experiences, stimulates cognitive and social learning and supports the development of a positive self-concept in children. Movement time does not have to be lost time for cognitive learning, but can provide additional access to information and optimize information processing (Müller, 2022). The main aim of the concept is to enable children to develop individualized skills aimed at experiencing and shaping the environment through movement. It also aims to realize holistic movement education in an interdisciplinary, integrated approach. In order to achieve the wholeness of the School in Motion, partial aspects of the concept must be considered (Müller, 2022). Physical education pursues a holistic approach that is seen as an overall

connection between social, cognitive, motor and emotional experiences and experiential processes. Three main areas can be identified, taking into account content and organizational aspects as well as the different weighting of target aspects: Lessons, recess and extracurricular activities are interrelated, build on school sport as a foundation and have links to leisure time (Müller, 2022).

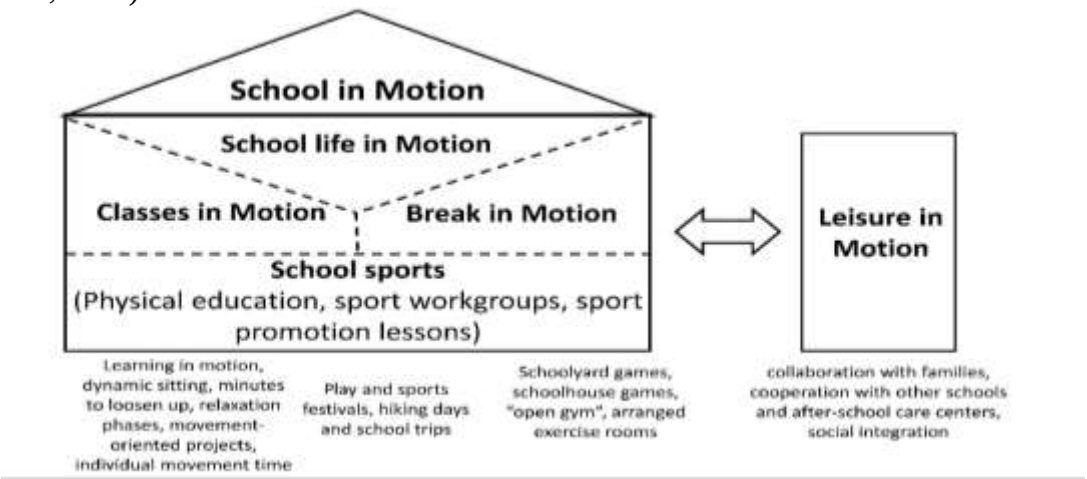

Figure 1: Parts of the School in Motion (Müller, & Petzold, 2002)

Classes in Motion

Classes in Motion are a consistent teaching principle in the School in Motion and are intended to integrate more movement into the teaching and learning process.

Learning in Motion: In order to enable learning with head, heart and hand, kinaesthetic stimuli are used for the acquisition of learning material, whereby children with cognitive, affective and motor skills are addressed simultaneously (Woll, & Hesse, 2004). Cognitive learning and movement take place simultaneously. Information absorption, processing and storage are facilitated by the additional access to information, which optimizes the learning process (Paulus et al., 2010). Content is better retained when it is combined with movement. Lessons are effective when learners become active themselves (Oppolzer, 2006). Changing learning methods and breaks for movement relaxes the body. During activities that involve restricted movement, such as sitting, the resting nerve works harder. This can lead to a lack of concentration, unwillingness to work, a slower pace and an accumulation of errors. Even light movements can overcome these symptoms. Learning with movement has an accompanying function. Due to the organizational openness, movement can be integrated into the lesson in between, as it enables the children to actively participate. In station mode, task cards can be used to encourage the children to move. Movement can also be the main medium through which the environment is perceived or experienced (Müller, & Schürmann, 2012). This means that learning content can be better understood through movement: Vocabulary can be better perceived through gestures or movements with the body, as can mirror-symmetrical representations or different types of angles in art or math. Furthermore, numbers and letters to be learnt can be laid out with a rope and then felt with the hands or feet (Müller, & Dinter, 2020).

Dynamic sitting: This means changing sitting positions frequently and adopting different postures. The aim is to enable children to react independently and in a self-determined manner to conditions that are unfavorable for their bodies with appropriate behavior. Rules must be agreed and adhered to so that learners do not disturb each other. The children learn not to maintain constant posture patterns, but to switch between different sitting positions, use relieving postures and alternative working postures and perform them independently (Müller, & Dinter, 2020). This also leads to mental relaxation, as learners do not have to sit still, which reduces stress and increases their enjoyment of school and learning as well as their ability to

concentrate. Learning can take place not only while lying or sitting, but also while standing or walking. Learners can also be made aware of the postures they should adopt when doing their homework (Müller, 2022). Furthermore, the seating conditions for learners can be changed by providing alternative seating, adapting school furniture and providing ergonomic workstations (Müller, & Dinter, 2020).

Movement break: The natural urge to move should not only be indulged during the yard break, but whenever learners request it. The movement break is a break in lessons to give learners an opportunity to move. Here, learners can recover from the concentration phase and recharge their batteries for subsequent teaching phases. The movement break is partly guided, but can also be carried out independently by the children. The exercises take place with the whole class or individually (Müller, 2022). This activates the sympathetic nervous system and stimulates the cardiovascular system, which leads to a better energy supply for the body. Symptoms of fatigue can thus be counteracted (Bockenmühl, & Pfister, 2009).

Relaxation phase: Relaxation is the body's ability to recover from exertion and stress. The opposite of relaxation is tension. In order to contribute to well-being and prevent the health consequences of stress, the poles must interact with each other. During recovery processes, the parasympathetic nervous system predominates within a state of balance. Exercise can not only activate, but also have a calming and stress-reducing effect. A relaxation phase is a break in lessons lasting approximately three to five minutes during which relaxation exercises are carried out. The activities are intended to activate the parasympathetic nervous system and direct thoughts towards people, objects, one's own body or mentally imagined phenomena (Kolb, 1995). According to Kolb (1995), attention is also focused. It is easier for learners to direct their perception outwards as an introduction to the relaxation phase.

Break in Motion

In addition to the lessons in motion, the break in motion is another important part of the School in Motion. The aim of the movement break is to promote the learners' ability to act so that they can organize the breaks, which are rich in play and movement, in a self-determined way (Müller, 2022).

The children are given the opportunity to test their strength in a playful way. Breaks full of movement can help to reduce aggression. Breaks help to structure the school day and thus promote well-being. Their importance in the overall concept of physical education can be characterized by intrinsic motivation and spontaneity. Play itself and the joy of it become the goal of the activity and serve no external purpose (Müller, 2022). Additional space for movement can also be created by opening up the sports hall during breaks. Necessary measures include assigning a break supervisor, discussing rules for behavior during physical activity breaks in the hall and changing footwear (Müller, 2022).

Physical education lessons

Physical education lessons (PE lessons) and physical activity education should not compete with each other, but should work together in terms of objectives, content and methods. The content of physical activity education can be expanded and supplemented in PE lessons. At the same time, PE offers the opportunity to provide a variety of impulses for individual areas of the School in Motion, as activities from both areas flow together in School Life in Motion (Müller, 2022).

In turn, the stimuli have a positive effect on the PE lessons themselves. If teachers take responsibility for a play and movement-orientated design, there is a chance of a transfer from PE lessons to the break. In addition to promoting games during breaks, PE lessons can also serve to stimulate the organization of free movement times (Müller, 2022).

PE in primary school is geared towards the needs of the children and is designed to be experience-orientated and open to new experiences. The children's interest and enthusiasm for movement, games and sport should be awakened and maintained through various movement opportunities. At the same time, the foundation should be laid for sporting leisure

activities, which includes an interest in improving their own performance and targeted practice. In addition, fundamental aspects of sport should be taught (Müller, 1991).
PE in the first two grades builds on a varied education in movement and play. Learners collect and expand their experiences of movement and play with various objects, equipment and materials in partner and group activities. They try out different forms of movement and improve their movement abilities as well as their confidence in using basic motor skills such as walking, running, jumping, throwing, catching and more. This allows them to feel their own body's possibilities for movement and to enjoy being active together. The exploration of new things and the variation of familiar things are typical sporting activities (Müller, 2022).
In first and second grade, children can acquire mathematical concepts related to orientation in space, such as right, left, up, down, front and back, in PE lessons. With a view to the whole area of school sport, there are interfaces between primary schools in motion and sports activities such as play and sports festivals and parent-child sports lessons.

State of Research

Müller and Petzold (2002) evaluated the pedagogical concept of the School in Motion in a four-year longitudinal study and control group arrangement. Longitudinal evidence of the effects was obtained by repeating the measurements five times at different points in time. In the development and testing phase (1995-2005), the focus was on the effect of the concept on the cognitive, emotional, social and physical-motor development of the learners.

With regard to emotional development, the study results show that the majority of learners perceive the relaxing and stress-reducing effect of movement activities within the framework of a School in Motion. The positive influence of movement on enjoyment of school and learning is evident in primary school children, as at the end of the project 70% of boys and girls confirm that they enjoy learning in motion more (Müller, & Petzold, 2002; Müller, & Petzold, 2006).

In the area of cognitive development, the hypothesis that movement activities in the School in Motion have a positive influence on school performance and the ability to concentrate is confirmed. In grades one to four, the results indicate a higher processing speed in the experimental group, without the frequency of errors differing significantly from the comparison group (Müller, & Petzold, 2002; Müller, & Petzold, 2006).

When examining attention performance during the school morning, in the first, second and fifth periods, significant differences were found between school classes whose school day is organized with different levels of physical activity. If there is a lack of movement in the school day, the above-average attention performance in the first lesson drops so sharply by the fifth lesson that concentrated learning hardly seems possible. However, if movement is offered during the breaks, not only can attention be maintained, but it can even be increased during the morning. There is a greater improvement in attentiveness among students who learn in a moving school. The importance of ergonomically designed, child-friendly workstations and the teaching of appropriate working postures should be emphasized in particular. It can be assumed that children will integrate the behaviors they learn at school into their everyday lives wherever possible.

This is all the more successful if the family and the environment are also familiar with the idea of active learning. In comparison to the control group, the learners in the study group show a greater improvement in coordination, better concentration and therefore a better working speed as well as a positive subjective well-being. In the course of the longitudinal study, the children in the study group also showed an improvement in social behavior (Breithecker, & Dordel, 2003).

The results of the studies support the realization of the concept of the School in Motion. Although the concept of the School in Motion is constantly being developed and has been around for years, there is still room for improvement in the state of research. Few and

outdated studies make it difficult to make a precise statement about the current state of research.

For this reason, the aim of this study is to examine the effect of the School in Motion concept on primary school children's ability to concentrate.

2. MATERIAL AND METHODS

2.1 Sample of Individuals

In a randomly selected primary school in Rhineland-Palatinate, parts of the concept of the School in Motion are implemented in a first class. There are 14 children (two boys, 12 girls) with an average age of 6.41 years in the experimental class and eleven (three boys, eight girls) with an average age of 6.24 years in the control class. No child has medically diagnosed cognitive, social or psychological problems or a mental or physical disability. There is no significant age difference between the two classes.

Before the practical implementation begins, the learners in the test class and their everyday school life are observed for a week. The behavior of one child is conspicuous because he frequently gets up during lessons to wash his hands, throws paper or tissues in the bin or fills up his drinking bottle at the sink. The parallel class was used as a control class, which is taught without additional movement. The furniture in the classroom consists of wooden tables of the same height arranged in a U-shape and wooden chairs with rigid and hard seats without upholstery. The height of the chairs cannot be adjusted. At the back of the classroom there is a carpet on the floor and a wooden bench against a bookshelf. Work takes place exclusively at the table. In the observed week, a sitting circle takes place on Monday at the beginning of the lesson. Most movement takes place in music and PE lessons. In the other subjects, the children move when they have completed their task and go to the teacher's desk, when they go to the toilet during the lesson or when they are assigned to a specific task, such as handing out books or worksheets.

2.2 Treatment

In addition to lessons in motion, breaks in motion take place in various exercise areas in the schoolyard, which change daily. Movement breaks are organized during lessons. After a movement unit, relaxation-promoting movement takes place at the beginning of the second, third and fourth/last lesson. The weekly movement plans based on Oppolzer (2006) are used for this. Furthermore, rituals are introduced that include movement, such as the welcome ritual in the morning. A clapping rhythm is also used to attract the learners' attention.

Unfortunately, it is not possible to replace the school furniture. However, the children are given an introduction to alternative seating positions on the chair. Three seat cushions were purchased for the study. Depending on the subject, learning takes place in a circle or a cinema table facing the blackboard. There are also two workstations for lying down on the carpet. Two further workstations for standing are created at the windowsill.

Books, exercise books and loose-leaf binders are laid out on the floor in front of the blackboard. Before the quiet work phase, each child must get up from their chair, collect their materials and return to their workstation. When working on worksheets, learning counters are set up. After completing two or three tasks, the path leads to the next learning counter, where another task awaits.

The task can be completed at their own workstation or the alternative workstations, if still free. The children can check their work independently at self-monitoring stations.

- Week 1: Painting letters on the back, letter dance, jumping syllables, syllable king station. Math race track, number sport, movement games for the number range, math story. Yard break: memo relay, movement box with motivating material, music break and movement course. Movement breaks: movement songs about healthy eating, pantomime, fantasy journey, moving art, hands up.

- Week 2: Letter learning stations, syllable king stop, syllable run, sneak dictation, addition movement story, clapping rhythm for addition. Yard break: jumping box, movement box, music break, small games. Movement breaks: movement song about healthy eating, hands up, fantasy journey.
- Week 3: Station work on new letters, pantomime, sneak dictation, flock of birds, jumping words. Movement stories and clapping rhythm for subtraction. Yard break: throwing stations, movement box, music break, balancing stations. Movement breaks: Food pyramid movement song, fruit or vegetables, hands up, snowman.
- Week 4: Stations to introduce letters, pantomime, sneak dictation, frog king. Number sport, back painting, math hunt, number clapping rhythm. Yard break: relay race, movement box, music break, small games. Movement breaks: Movement sliders on healthy eating and sugar, dream journey, hands up, snowman.
- Physical education: In the first and second week, the focus is on balancing. The activities are designed to gradually introduce learners to complex movements. In the third and fourth weeks, the focus is on jumping. After the warm-up, a jumping course is set up with various stations before jumping from a springboard onto a soft floor mat is introduced. If there is time for a final game towards the end of the sports lessons, running or catching games are introduced, which can also be played in the yard breaks.

Unfortunately, due to the unfavorable location, exercise activities cannot take place in the gym during the yard breaks.

2.3 Variable Sample

The Concentration Test for Children (KoKi) is a cross-out test for children aged six to 12. The KoKi provides information on concentration, working speed and accuracy. The duration of the test is five minutes and 20 seconds. The objectivity of implementation, scoring and interpretation is guaranteed, internal consistency and retest reliability can be described as very good, validity as average to good, only the subscale of undistractability scores are low (Schmidt-Atzert, & Funsch, 2023). Standard values between 95 and 105 are described as average, from 106 to 110 as in the upper average range, from 111 to 120 as above average and above 120 as well above average. Standard values from 90 to 94 are considered to be in the lower average range, from 80 to 89 as below average and below 80 as well below average (Schmidt-Atzert, & Funsch, 2023).

2.4 Procedure

After the study was reported to the responsible authority, a primary school in Rhineland-Palatinate was randomly selected. Test dates were arranged with the consent of the school management and parents. The tests always took place on a Friday at the same time. After several concentration phases in the first and second lesson, the test was carried out by the test administrator before the first break at the end of the second lesson. Allocation to the test class was randomized. The experimental class received four weeks of lessons in the spirit of the School in Motion, while the control class was taught as before without movement.

2.5 Statistics

Mean values and standard deviations of the individual subscales were calculated. For comparison, an ANOVA with repeated measures was calculated for the factors time, group and interaction time*group. The significance level is set at $p<.05$. SPSS 29 is used for this.

3. RESULTS

The following table 1 provides an overview of the mean values and standard deviations of the individual KoKi subscales for the experimental and control classes in the pre-test and post-test as well as their inferential statistical assessment.

Table 1: Results of the experimental and control classes in the pre-test and post-test in the KoKi subscales in mean values and standard deviations (M ± SD; BZO = processed target objects, KL = concentration performance, R% = accuracy, UABL = undistractability)

	Experimental		Control		F time	F group	F interaction
	Pre-test (M ± SD)	Post-test (M ± SD)	Pre-test (M ± SD)	Post-test (M ± SD)			
BZO	94.85 ± 9.17	102.79 ± 9.46	98.82 ± 9.94	102.09 ± 12.60	25.95***	.17	4.48*
KL	97.79 ± 9.54	107.43 ± 10.47	100.00 ± 9.43	101.82 ± 10.93	17.98***	.20	8.38**
R%	104.29 ± 7.03	112.14 ± 7.26	102.09 ± 6.71	103.18 ± 8.45	8.24**	4.89*	4.71*
UABL	102.50 ± 8.03	101.07 ± 7.64	102.55 ± 7.29	102.82 ± 5.13	.19	.12	.41

The experimental class scored more points in the post-test than in the pre-test, with the exception of the undistractability variable. The control class also scored higher in all variables, although this was much lower than in the experimental class. With the exception of undistractability, there are significant effects for the time factor and for the interaction time*group. A group effect is also visible for accuracy.

3. DISCUSSION

The aim of the present study was to examine the effect of School in Motion on the concentration performance of primary school children after an intervention period of four weeks.

In the pre-test, both classes consistently showed values that were in the lower average and below average range. In the post-test, these values improved to an average to above-average range in the experimental class (Schmidt-Atzert, & Funsch, 2023). With the exception of undistractability, there are very significant differences between the pre-test and post-test, although these only apply to the experimental class. This may be due to the less favorable psychometric properties of this subscale (Schmidt-Atzert, & Funsch, 2023), which means that no reliable statement can be made about irreducibility. A significant group difference can only be determined in terms of accuracy.

It can therefore be concluded that it is very important to make changes to lessons and the school day that led to an improvement in performance and concentration.

Some teachers feel that additional movement time is time-consuming and that teaching time is lost as a result. The previous statement can be refuted if we take a look at how both classes deal with the subject matter. After the four weeks, an exchange took place with the class teacher of the control class. As the learners in both classes covered the same topics in the individual subjects during the intervention period and worked in the same books and workbooks, it was possible to compare labor productivity. Both classes made the same progress in all subjects. The only difference between the experimental and control classes was in math lessons. In the experimental class, it was not possible to fully complete the learning center on the topic of the number range up to 20. In general, exact adherence to the weekly plans is rarely possible when working with children. The physical activities, which provide additional access to information or optimize information processing, were well received and enjoyed by the learners in the experimental class, as were the movement breaks. The breaks in motion for various movement areas caused difficulties during implementation. As all pupils at the primary school spend the break together in one schoolyard, it was difficult to offer the breaks in motion exclusively to the experimental class. The exercise programmers aroused

the interest of the other children and they also wanted to take part. With the exception of Wednesday, the activities were only organized by the experimental class. Here, during the music break, however, it was not possible to prevent the other learners in the playground from taking part. On the one hand, it is very positive that the children are happy to take part in exercise programmers. On the one hand, it is very positive that the children are happy to take part in exercise programmers. On the other hand, the results are partially falsified, as the control class was also motivated to do more physical activity during the breaks. Furthermore, not all children in the experimental class always took part in the physical activity programmers, as they were voluntary. A matched parallel class from another school should have been acquired as a control group to avoid this situation. The physical education lessons, which are decorated with warm-up games that tie in with the topics covered in math and German lessons, were able to take place as planned. In the second week, a transfer effect from physical education to recess and all-day school was observed.

There are wooden beams in the schoolyard that divide the schoolyard into two areas. Some of the children in the experimental class started balancing on the wooden beams and practiced the exercises from PE lessons. The math race track game, which the children played in the first week as a warm-up, was picked up again the following Monday in the yard break and played after the memo relay.

The implementation of the sub-areas within four weeks at a normal primary school involved some additional work, but was possible without further financial support.

4. CONCLUSION

The concept of the School in Motion was developed from criticism of the so-called ‘sitting schools’. More movement should be integrated into the school, as well as into the afternoons and leisure time of the learners, and become an integral part of everyday life. The importance of movement for children’s development is recognized in the concept. The aim of the concept is not only to get learners moving, but also to make changes to the school concept. The process is not always easy.

Changes have to be made to the school concepts in order to meet the needs of the children. The interplay of movement and learning should support the ability to learn and concentrate, enable differentiated perceptions and diverse experiences and thus also facilitate the transition of growing children from kindergarten to primary school. The introduction of the Lessons in Motion, Breaks in Motion and Physical Education sections of the School in Motion concept have offered the children in Year 1 more opportunities for movement in their everyday lives.

In conclusion, it can be said that the implementation of Lessons in Motion, Breaks in Motion and Physical Education supports learning success. The ability to concentrate can be maintained through physical activity on school mornings and can even lead to an increase in the ability to concentrate during the school morning.

6. REFERENCES

Active Healthy Kids Germany. (2022). Nicht sitzen bleiben – komm in Bewegung! Bewegungs-Zeugnis 2022 zur körperlichen Aktivität von Kindern und Jugendlichen in Deutschland. [Don't stay seated - get moving! Physical Activity Report 2022 on the physical activity of children and young people in Germany]. Villingen-Schwenningen: vivida bkk. Available at https://stiftung-gesundarbeiter.de/wp content/uploads/2022/10/bewegungszeugnis_2022_final.pdf. (Accessed 30 October 2024).

Anrich, C. (2002). Bewegung bringt Leben in die Schule. [Movement brings life into school]. Stuttgart: Klett.

Bockenmühl, P. B., & Pfister, U. (2009). Die allerbesten Bewegungspausen. Originell – sofort einsetzbar – schülergetestet. [The very best movement breaks. Original - ready to use - pupil-tested]. Augsburg: Brigg Pädagogik.

Böhme, M. (2008). Konzentration. Voraussetzungen und Stellschrauben für geballte Aufmerksamkeit. [Concentration. Prerequisites and adjusting screws for concentrated attention]. Berlin: Cornelsen.

Brägger, G., Hundeloh, H., Posse, N., & Städtler, H. (2020). Bewegung und Lernen. Konzept und Praxis Bewegter Schulen (2. Aufl.). [Movement and learning. Concept and Practice of Moving Schools (2nd ed.)]. Weinheim: Beltz.

Breithecker, D., & Dordel, S. (2003). Bewegte Schule als Chance einer Förderung der Lern- und Leistungsfertigkeit. Haltung und Bewegung, 23(2), 5-15.

Bundeszentrale für gesundheitliche Aufklärung (2022). Nationale Empfehlungen für Bewegung und Bewegungsförderung. [National recommendations for physical activity and the promotion of physical activity]. Available at https://www.bundesgesundheitsministerium.de/fileadmin/Dateien/5_Publikationen/Praevention/Broschueren/Bewegungsempfehlungen_BZgA-Fachheft_3.pdf. (Accessed 30 October 2024).

Clancy, M. E. (2006). Besser lernen durch Bewegung. Spiele und Übungen fürs Gehirntraining. [Better learning through movement. Games and exercises for brain training]. Mühlheim an der Ruhr: Verlag an der Ruhr.

Cohen, J. (1992). Statistical Power Analysis. Current Directions in Psychological Science, 1(3), 98-101. Doi: 10.1111/1467- 8721.ep10768783.

Dickreiter, B. (2000). Bewegung zur Förderung der geistigen Entwicklung im Kindes- und Jugendalter mit dem Ziel des stressfreien Lernens. [Exercise to promote mental development in children and adolescents with the aim of stress-free learning]. Dresden: TU Dresden.

Duden (2024). Lernen. [Learning]. Available at https://www.duden.de/rechtschreibung/lernen. (Accessed 30 October 2024).

Engel, A. (2008). Ruhe und Konzentration im Klassenzimmer. Die Lernumgebung der individuellen Förderung Arbeitserleichterung für Kinder und Lehrkräfte durch Sozialkompetenz und Disziplin. [Peace and concentration in the classroom. The learning environment of individual support makes work easier for children and teachers through social skills and discipline]. Offenburg: Mildenberger.

Finger, J. D., Varnaccia, G., Borrmann, A., Lange, C., & Mensink, G. B. M. (2018). Körperliche Aktivität von Kindern und Jugendlichen in Deutschland – Querschnittergebnisse aus KiGGS Welle 2 und Trends. Journal of Health Monitoring, 3(1), 24-31. Doi: 10.17886/RKI-GBE-2018-006.2.

Genz, U. (2017). Gehirn und Lernen: Neurodidaktik und Neurokompetenzen. [Brain and learning: neurodidactics and neurocompetencies] In H. Reiter (ed.), Handbuch Hirnforschung und Weiterbildung (S.106-122). Weinheim: Beltz.

Greier, K. (2007). Bewegte Schule. Bewegungsorientierte Gesundheitsförderung in der Volksschule. Ergebnisse eines vierjährigen Präventionsprojektes. [School in motion. Movement-oriented health promotion in elementary school. Results of a four-year prevention project]. Purkersdorf: Brüder Hollinek.

Hannaford, C. (2013). Bewegung das Tor zum Lernen (8. Aufl.). [Movement the gateway to learning (8th ed.)]. Kirchzarten: VAK.

Joisten, C. (2022). Bewegungsmangel und mögliche gesundheitliche Auswirkungen der Covid-19-Pandemie auf Kinder und Jugendliche. [Lack of exercise and possible health effects of the Covid-19 pandemic on children and adolescents]. Köln: Deutsche Sporthochschule Köln.

Köckenberger, H. (2016). Bewegtes Lernen. Lesen, Schreiben, Rechnen mit dem ganzen Körper in Kita, Schule und Therapie (8. Aufl.). [Learning in motion. Reading, writing, arithmetic with the whole body in kindergarten, school and therapy (8th ed.)]. Dortmund: Verlag Modernes Lernen.

Koditek, T., & Luther, C. (2021). Praxismanual Situationsansatz. Ein Bildungskonzept für Pädagogik, Wirtschaft und Gesellschaft. [Situational Approach Practice Manual. An educational concept for pedagogy, business and society]. Wiesbaden: Springer VS.

Kolb, M. (1995). Ruhe, Konzentration und Entspannung. Sportpädagogik, 19(6), 61-66.

Laging, R. (2017). Bewegung in Schule und Unterricht. Anregungen für eine bewegungsorientierte Schulentwicklung. [Movement in schools and lessons. Suggestions for movement-oriented school development]. Stuttgart: Kohlhammer.

Liebertz, C. (2009). Das Schatzbuch ganzheitlichen Lernens. Grundlagen, Methoden und Spiele für eine zukunftsweisende Erziehung. [The treasure book of holistic learning. Basics, methods and games for a forward-looking education]. München: Don Bosco.

Montessori, M. (1971). Die Entdeckung des Kindes. [The discovery of the child]. Wien: Herder.

Müller, C. (1991). Integratives Schulsportkonzept für die Primarstufe -Grundlagen und Lösungen. [Integrative school sports concept for the primary level - basics and solutions]. Zwickau: PH.

Müller, C. (2022). Bewegte Grundschule: Anregung für mehr Bewegung in der Grundschule. [Moving primary school: Encouraging more movement in primary school]. Baden-Baden: Nomos Verlagsgesellschaft.

Müller, C., & Dinter, A. (2020). Bewegte Schule für alle (2. Aufl.). [School in motion for all (2nd ed.]. St. Augustin: Academia.

Müller, C., & Petzold, R. (2002). Längsschnittstudie bewegte Grundschule. [Longitudinal study on primary schools in motion]. St. Augustin: Academia.

Müller, C., & Petzold, R. (2006). Wirkung der bewegten Schule auf die kognitive und emotionale Entwicklung der Schüler. Leipziger Sportwissenschaftliche Beiträge, 47(1), 27-45.

Müller, C., & Schürmann, V. (2012). Bewegung als Medium und als Mittel – Zur Bildungsdimension der bewegten Schule. Leipziger Sportwissenschaftliche Beiträge, 53(1), 9-22.

Oppolzer, U. (2004). Bewegte Schüler lernen leichter. Ein Bewegungskonzept für die Primarstufe, Sekundarstufe I und II. [Moving pupils learn more easily. A movement concept for primary, lower and upper secondary schools]. Dortmund: Borgmann.

Oppolzer, U. (2006). Bewegte Schüler lernen leichter. Ein Bewegungskonzept für die Primarstufe, Sekundarstufe 1 und 2 (2. Aufl.). [Moving pupils learn more easily. A movement concept for primary, lower and upper secondary schools (2nd ed.)]. Dortmund: Borgmann.

Oppolzer, U. (2012). 99 Tipps. Konzentration und Lernfähigkeit. [99 tips. Concentration and learning ability]. Berlin: Cornelsen.

Paulus, I., Gigout, F. J., Kaczmarek, C., & Wydra, G. (2010). Bewegte Schule. Leitfaden zur Bewegungsförderung für Schulen im Saarland. [School in motion. Guide to promoting physical activity for schools in Saarland]. Saarbrücken: Saarland Ministerium für Bildung.

Pfeffer, S., & Göppner-Pfeffer, M. (2005). Lust auf Lernen. Lernfreude und Motivation spielerisch fördern. [A desire to learn. Encouraging the joy of learning and motivation through play]. Freiburg: Herder.

Schachl, H. (2012). Was haben wir im Kopf. Die Grundlage für gehirngerechtes Lehren und Lernen (3. Aufl.). [What's in our heads. The basis for brain-friendly teaching and learning (3rd ed.)]. Linz: Veritas.

Schmidt-Atzert, L., & Funsch, K. (2023). KoKi Konzentrationstest für Kinder. [KoKi Concentration test for children]. Göttingen: Hogrefe.

Spitzer, M. (2006). Lernen. Gehirnforschung und die Schule des Lebens. [Learning. Brain research and the school of life]. Heidelberg: Spektrum Akademischer Verlag.

Sprengeler, O., Wirsik, N., Hebestreit, A., Hermann, D., & Ahrens, W. (2017). Domain Specific Self-Reported and Objectively Measured Physical Activity in Children. International Journal of Environmental Research and Public Health, 14(3), 242. Doi: 10. 3390/ijerph14030242.

Sprenger, M. (2011). Damit was hängen bleibt! Hirnforschung konkret: Wie Sie so unterrichten, dass Ihre Schüler mehr behalten. [So that something sticks! Brain research in practice: How to teach so that your students retain more]. Weinheim: Beltz.

Woll, A., & Hesse, S. (2004). Bewegungsförderung in der Grundschule. 2. Fitnessbausteine – Bewegter Unterricht – bewegtes Lernen (Bewegung, Spiel und Sport in der Schule). [Promoting physical activity in elementary school. 2. fitness modules - moving lessons - moving learning (movement, play and sport at school)]. Stuttgart: Ministerium für Kultus und Sport.

Zimmer, R. (1995). Leben braucht Bewegung. Haltung und Bewegung, 15(3), 4-14.

Zimmer, R. (2013). Handbuch der Bewegungserziehung. Grundlagen für Ausbildung und pädagogischer Praxis (12. Aufl.). [Handbook of physical education. Fundamentals for education and pedagogical practice (12th ed.)]. Freiburg: Herder.