Rudolf Steiner University College

Master Programme

Learn to move, move to learn.

Using movement integration to create joyful, inspiring and profound learning experiences for children.

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THESIS

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Abstract

Movement integration (MI) is a pedagogical approach that uses movement activities to support the teaching of curriculum subjects. It positively affects health and sensorimotor skills, concentration, social adaptation, cognition, and learning. MI has the potential to make subjects understood in an embodied, profound manner by involving the whole body and its senses in the learning process. This requires that the MI is adapted for the curricular content. However, there is a lack of literature describing the methods used to create engaging MI activities that are relevant to the curriculum subjects. Despite the numerous benefits that movement has for child learning and development, many teachers do not use MI in their practice.

This study aims to understand why teachers use MI and their methods to make it both engaging and relevant to curriculum subjects. The study also seeks to understand what causes some teachers not to use MI. Qualitative data were collected using semi-structured, in-depth interviews of six teachers experienced with MI. Five were Steiner (Waldorf) school teachers, and one was a public school teacher; all were German, except one Norwegian. Four teachers were interviewed on Zoom, one on the telephone and one in person. The empirical data were thematically analysed.

The study shows that the research participants consider MI fundamental for children's sensorimotor development and learning. The data show how teachers use MI to create relevant activities through practical and hands-on experiences, storytelling, play, improvisation, and collaboration. The findings indicate that teachers' reluctance to MI is grounded on irrational fear caused by insufficient knowledge about MI. The data show the importance of visiting classes that use MI and receiving proper guidance. Participants think classroom discipline becomes more manageable with MI and suspect conservative teachers and teacher education programs restrict the use of MI by not supporting it.

The study contributes to understanding MI and developing MI teaching methods to build meaningful and stimulating learning experiences for both students and teachers.

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"If we teach today as we taught yesterday, we rob our children of tomorrow."

John Dewey

1 Introduction

After spending 12 years as a student in two Steiner (Waldorf) schools in Norway, I know that school can be an extraordinary and golden period in life. It taught me to be inquisitive and creative and to enjoy making things with my hands. Most of my childhood friends who went to public schools never really liked it; many found it boring and meaningless. Education can be too cognition oriented and disassociated from practical applications and personal feelings, and often considered boring (Gatto, 2010; Picard et al., 2004). Children sit still on chairs behind desks in most schools using frontal teaching methods, listening to what the teacher says, day in and day out, for years. Then they sit on the way home and sit even more at home before going to bed (McWilliams et al., 2009). Too little physical activity limits physical, sensory and cognitive development (Beigel, 2012; Doherty & Forés Miravalles, 2019). Could it be that children feel a need for movement, which is why so many love physical activity in school (McMullen et al., 2019)?

How can children be allowed to move more in primary school without missing out on learning? One teaching method that lets children move more is movement integration (MI), an alternative to traditional, sedentary formal teaching. Rather than using physical exercises that are disconnected from academic content, MI uses movement to support the delivery of curriculum subjects through embodied cognition and experiences (Madsen & Aggerholm, 2020b). Physical activities can be integrated into the curriculum in many relevant and engaging ways. The Steiner school approach to MI, the *dynamic classroom*/*Bewegtes Klassenzimmer* (Auer, 2017; Schönherr-Dhom, 2014) and *Bewegte Schule* (Beigel, 2012) show how MI can be used and how active lessons can be much more than just hopping and clapping. This study aims to contribute knowledge about how MI can be used successfully in classrooms and understand why teachers perceive MI as important and why some teachers find MI challenging.

1.1 Background

Childhood is when the body and mind get their initial forms, limiting or empowering us through life. We are formed by love, care, rejection, fear, genes, nutrition, physical activity, play, etc. Children who grow up today are generally understimulated concerning physical activity and physical play, which have become increasingly rare in schools and at home (Ginsburg, 2007; McWilliams et al., 2009; Routen et al., 2017). Contemporary life is so sedentary that it restricts children's natural sensorimotor and social development resulting in developmental, behavioural, and learning difficulties (Auer, 2017; Doherty & Forés Miravalles, 2019). School subjects are often presented in ways that miss relevance or apparent practical application for the students, causing them to find school boring and useless. It can even cause teachers to suffer from boredom and demotivation (Gatto, 2010; Williams, 2017).

1.2 Problem statement and research questions

Movement improves physical health, cognition, and concentration and positively impacts children's learning (Beigel, 2012; Doherty & Forés Miravalles, 2019; Madsen & Aggerholm, 2020b). Movement benefits child learning and development but is underutilised in modern pedagogy and often perceived as challenging to implement (Benes et al., 2016; Knudsen, 2019; Routen et al., 2017). Although research shows that physical activity benefits children's health and positively affects learning, MI is not used in all primary schools. A lack of educational material and support for MI might contribute to this. For example, I have struggled to find literature about the methods of adapting curriculum content to MI. Many books (e.g., Auer, 2017; Beigel, 2012; Schönherr-Dhom, 2014) provide excellent examples of MI in various forms and subjects. However, the rationale and methods behind these MI activities are not always clear. More knowledge about strategies for integrating MI would be valuable for understanding the didactic considerations teachers make when they create MI activities. Considering the many positives of MI, it would also be of value to know why many teachers are not using it.

Therefore, this study aims to acquire new knowledge about the use of MI in primary school education, the role movement plays in learning and why MI is perceived as challenging for some teachers. The study is focused on but not limited to 1st to 3rd grade. I have three research questions. The first question of this study explores why teachers believe MI is important for the learning and development of primary school children.

RQ1: How do the teachers perceive the role of movement integration in primary school learning?

The second question describes teachers' methods for making MI activities relevant to the curriculum subjects and engaging for children.

RQ2: How do the teachers create and integrate movement activities they perceive as engaging and relevant?

The third question asks the teachers to describe challenges that may cause teachers not to use MI.

RQ3: What do the teachers perceive to be why some teachers do not use movement integration in their practice?

For this study, I gathered data on the experience and reflections from teachers knowledgeable about MI to answer the above questions. I conducted a qualitative study consisting of in-depth semi-structured interviews with five Steiner school teachers and one public school teacher, five from Germany and one from Norway.

1.3 Organisation of Thesis

The thesis is divided into six chapters. This first chapter introduces the study. Chapter two presents the literature review, followed by chapter three, which explains the methodology used in this study. Chapter four presents the empirical findings based on the interviews. Chapter five discusses the study results based on both empirical data and the literature. The conclusion and the answers to the research questions are presented in the last chapter.

1.4 Terminology

Movement / Movement integration (MI)
Physical activities that are integrated into classroom lessons to support sensorimotor development and learning. MI differs from physical activities that are not related to the curriculum subjects.

Dynamic classroom
Also known as *Bewegtes Klassenzimmer or Bochumer Modell*, invented in the Steiner school in Bochum, Germany, in the late '90s and is primarily for younger children in classes 1-3. Classrooms have multi-purpose, movable, small benches and cushions used when sitting on the floor. The benches are typically placed in a circle during lessons but are easily rearranged to accommodate varied activities and are also used as low tables.

Children
Primary school children, typically 1st to 3rd grade when referring to the dynamic classroom. Older children and adolescents are mostly referred to as *students*.

Subject
The subjects that are taught as part of the educational curriculum.
The subjects covered in 1 -3 grade in Rudolf Steiner schools are primarily letters/write/read, numbers/basic maths, language/foreign language, music/singing, eurythmics, form-drawing/drawing/painting and fairy tales/fables/religion.

Steiner school (Waldorf school)
Schools that are based on Rudolf Steiner's pedagogical ideas and anthroposophy.
The schools represent a pedagogical alternative to public schools, with more than 1200 independent schools and almost 2000 kindergartens in 75 countries.

2 Literature review

This chapter will present a review of research and theory relevant to the research questions. I have organised the literature according to which research question I consider the most related, although much of the literature cannot be that easily categorised. The review is divided into the following three sections, based on the research questions outlined in Section 1.2:

2.1: The role of movement in learning
2.2: Teaching with movement
2.3: Challenges with movement integration

2.1 The role of movement in learning

Modern children generally receive insufficient amounts of exercise. For example, some children sit 50-70% of the time in school and 7-9 hours of sitting per day, including after-school sedentary activities such as watching TV (Routen et al., 2017). In their study, McWilliams et al. (2009) show that the physical activity offered by North American childcare is *insufficient* when viewed according to national guidelines. The study shows that children in many US states spent 89% of their time in sedentary pursuits, 8% in light activity, and only 3% of their time in moderate or more significant physical activity" (p. 1656). Children in one study found the movement activities in school were the best part of the day, one 2nd grade girl exclaiming, "I want to do it all day!" (Mc Leroy et al., 1988, as cited in McMullen et al., 2019, p. 13).

Understanding the connection between physical activity and cognitive development cognition is a central topic in this thesis. Why and how movement benefits learning is a field of research also called embodied cognition that has seen tremendous progress and exciting results in recent years. Children who are more physically active show a more developed hippocampus (where learning is stored as memories in the brain) and more volume of grey and white brain matter. This results in more significant brain activity and better learning (Chaddock et al., as cited in Doherty & Forés Miravalles, 2019). A study of 1400 children showed the connection between less physical activity in younger years (age 6), leading to significantly weaker results as adolescents in terms of memory than children who were more active at age 6. This indicates that physical activity is significant in younger, developing years as it forms the brain and has implications for life. This interconnectedness between corporeality and cognitive

processes has been shown in many studies. (Lopez-Vicente et al., as cited in Doherty & Forés Miravalles, 2019).

Recent research by Webster et al. (2020) registers a consensus in the large sample of teachers as to whether movement intervention positively benefits concentration and academic performance, showing that simple physical exercise can stimulate class moods and motivation. Movement affects the brain in various ways. One explanation for increased attention and brain capacity is the result of more oxygen and nutrients becoming available to the brain. When students simply stand up and do stretching exercises, their brains receive 7% more oxygen. (Doherty & Forés Miravalles, 2019). There are significant benefits for self-efficacy, learning, and healthy behaviour when physical activity (and healthy eating) is part of the school program. The length of time students must be sedentary with passive, static sitting at school can be reduced with more options for standing time by offering simple interventions such as standing desks (Minges, 2015). Although not the most extensive study, McMullen, MacPhail and Dillon (2019) found that children greatly appreciated and understood the benefit of movement integration on health and even called it "to exercise". "You are doing your subject; you are moving about and having fun while doing it" (p. 13). They thought it would significantly benefit same age, less fortunate children who lacked exercise at home and that it would be a good thing if everyone could enjoy the same fitness level. Said a 9-year-old girl: "There's a big difference in our class, so I'd like if that kind of difference is closed more. There was a smaller difference between the less athletic people and the sportier people" (p. 23). The study showed that students favoured the parts of the school day that had movement elements, such as breaks, physical education, and recess. It made everything more fun, an excellent way to learn (compared to sitting) and gave them exercise.

It is worth noting that the early primary school years are important for children to stimulate and improve their motor skills. The improvement becomes increasingly difficult later in the adolescent years, which is a clumsier period in life due to the fast growth rate. If motor proficiency is not established, it results in reduced physical activity participation and less social interaction with peers (Bouffard et al., 1996, as cited in Morgan, 2005).

There are many variants of how physical activity can be integrated into teaching: Movement Integration (MI), Physical Activity (PA), Physically Active Learning (PAL), Physical Education (PE), Brain Breaks (BB), Integrated movement-based activities (IMBA),

classroom-based physical activity (CBPA), the list goes on. Nalder and Northcote (2015) have organised the many types of movement intervention into three categories:

1) Discrete physical, sport-like activities.

2) Integrated movement-based activities (IMBA) reflect or involve concepts of the subject being taught, similar to MI in this thesis.

3) Brain break activities are simple movement interventions that are not directly related to the lesson's content.

These approaches differ in what degree they connect activities to academic content. This thesis focuses on the second type, MI, in which curriculum content is combined with physical activities. This can help children learn with more joy, concentration and engagement and support social adaptation, self-confidence, self-motivation, and curiosity (Auer, 2017; Beigel, 2012; Fedewa & Ahn, 2013; Doherty & Forés Miravalles, 2019; Gao et al., 2013; Madsen & Aggerholm, 2020b; Martin & Murtagh, 2017; McMullen et al., 2018; Singh et al., 2019; Watson et al., 2017; Webster et al., 2020). It is worth noting that when activities are done voluntarily and joyfully, it has a more positive effect on brain function and learning than involuntary ones. Studies of the hippocampus, a part of the brain associated with learning, show that voluntary physical exercise increases its size and function. It increases neuron growth, known as *neurogenesis* and the connections between them, *synaptogenesis* (Van Praag, 2005, Voss et al., 2017, Suzuki, 2017, as cited in Doherty & Forés Miravalles, 2019). In other words, "when exercise is collaborative, unthreatening and fun (vs. a boring obligation), brain function is enhanced" (Diamond & Ling, 2015, as cited in Doherty & Forés Miravalles, 2019, p. 3). Physical activity (PA) combined with cognitive challenges (planning, memory, adaptation) makes it mindful. It contributes to better executive function, whereas mindless PA without a goal, concentration, and meaning does not apply to the same extent (Diamond, 2012, as cited in Doherty & Forés Miravalles, 2019). Although PA's benefits seem solid, a dose of caution is recommended. There are many variables, so making a general conclusion is difficult. For example, particular brain dispositions could lead to a more active lifestyle and not vice versa. Remaining somewhat critical of the apparent clear effects of PA could lead to what is called "neuromyths", inconclusive and vague conclusions that are popularised and can lead astray (Diamond and Ling, 2015, Dekker et al., 2012, as cited in Doherty & Forés Miravalles, 2019).

The idea that children go through a specific sequence of complex, cognitive-developmental stages from the point of infancy was an idea that was new and became the focus of study in the early1900s. The study of each psychological stage needs to be catered for. Otherwise, the subsequent stages will not develop normally. According to Jean Piaget (Ginsburg, 1982), the stages cannot be sped up but are tied to the child's total cognitive development, including fantasy, attachment, impulse, and feeling. According to Steiner and the anthroposophy tradition he founded, the four lower senses, or the *basic senses* (touch, life/well-being, movement, and balance), are essential for a child to become coordinated, strong, agile, and grounded. Only by adequately developing these senses can the child be at home in their own body (Auer, 2019).

In exploring the physical world, the hands are essential tools with unique importance to the evolution and functioning of our species, which are under-involved in most public primary schools of today. Neurologist Frank R. Wilson (2010), the author of *The Hand*, states in an interview in 1998 that modern education misses manual dexterity and learning with the hand. The hands are essential for learning, but the role they play in children's lives is limited by contemporary culture. This does violence to the child, he says, and "divorces the child from the physical world when the child has to know what the world is really about" (3:00) since the body and the mind are inseparable at a young age. He explains how important the hand is as a "learning machine":

> "You can't really separate what is in the mind from what is in the body. Knowledge really is the whole behaviour of the whole organism. We have made the mistake of thinking that you can educate the mind by itself. You can't really skip this experience. It is important for children to have hands-on experiences when they are young." (Wilson, 2010, 3:40)

If you have seen a Cortex Man or a *cortical homunculus* figure, you will remember the enormous size of the hands. They are sized according to how much sensorimotor brain processing they require compared to other body parts, providing Dr. Wilson's statements with a good illustration of the role the hands should play in education.

2.2 Teaching with movement integration

Since this thesis partly aims to build knowledge around how MI can be made *engaging* and *relevant* to curriculum subjects, I have organised the literature in this section accordingly. Both qualities are contained in the second research question.

Creating engagement

I am starting with the topic of *engagement* as I consider it essential for making students get involved in a subject out of free will. Free will makes learning more effective (Doherty & Forés Miravalles, 2019). If children are not inspired and do not find activities and topics meaningful, challenging or stimulating, they will get bored and lose interest (Gatto, 2010). Problem-solving skills have improved if the person's mood is positive. It not only makes you feel better but changes your cognitive capacity. Our emotional state changes the way we think: "Too much emotion is bad for rational thinking; recent findings suggest that so too is too little emotion" (Isen, as cited in Picard et al., 2004, p. 253). This supports the growing acceptance in the educational research that emotion, active participation, and interest impact learning. One powerful tool to create engagement and improve learning is thorough group activities. Group work offers social interaction and is appreciated by many students. German Steiner school students have expressed frustration with the concept of the *Klassenlehrer* (one primary teacher until 8th grade). They think it is not keeping up with the times, with too little group work and too much frontal teaching (Randoll, Graudenz & Peters, 2014). A transition from a teacher-dominated teaching structure to more teamwork would afford more independence and social interaction and allow for a natural way to integrate movement and use of spatial and material components in the upper classes of Steiner education.

An important aspect of Brain-Based Learning (BBL) theory is social interaction and discussion in the learning process. The learning environment needs to instil mutual trust and respect, making the students feel secure and unstressed, supporting alertness and learning. The brain learns better when feeling safe in the immediate context and in a positive emotional state. BBL also focuses on the active engagement of the entire body in the learning process. Offering rich immersion in the topics with complex hands-on tasks is essential because it helps internalise what has been experienced (Jensen, 2008).

Play is an integral and vital activity for children and youth that enables cognitive, social, physical, and general well-being development. There are many different types of play, such as object play, pretend play, physical play and guided or free play, which are critical for academic skills (Hirsch-Pasek & Golinkoff, 2008). The Swiss psychologist Jean Piaget (Besio, 2016) describes ways to involve the child in activities that meet their broader developmental needs and capabilities. Active education enables them to engage in everyday

reality, socialising, and perception, and with *play* as the golden key to unlocking interest in children:

> "This is why play is such a powerful lever in the learning process of very young children, to such an extent that whenever anyone can succeed in transforming the first steps in reading or arithmetic, or spelling, into a game, you will see children become passionately absorbed in those occupations, which are ordinarily presented as dreary chores" (Piaget, as cited in Besio, 2016, p. 36).

Play also has more purposes, not just as a motivator to achieve some academic goal. As physical activity and exercise are under threat from the modern hurried and tense lifestyle, so is play. To a large extent, the reason is the narrow focus on *academic performance* in education (Ginsburg, 2007). 30.000 schools have skipped recess to allow for more educational activities, outdoor play fell 50% from 1997 to 2003 and children's playtime has been reduced by over 8 hours per week in the last 20 years as of 2008 (Elkind, as cited in Hirsch-Pasek & Golinkoff, 2008). "Given the findings linking play and learning, it is perhaps shocking that play has been devalued in our culture. Play has become a 4-letter word that often represents the opposite of productive work", but it is the opposite, "play and learning are inextricably intertwined" (Hirsch-Pasek & Golinkoff, 2008, p. 3).

Child-initiated play is one significant type of play that also is under threat and might eventually be eliminated due to the belief that play does not benefit academic learning. Even adult-initiated movement activities are deficient (McWilliams et al., 2009). Ginsburg (2007) points to the need for free play that is *entirely child-driven* because it supports unique developmental benefits such as increased psychological resilience. More active and child-driven play is better for learning than less playful, teacher-driven play (Hirsch-Pasek & Golinkoff, 2008). Play provides an alternative to "normal" life. It provides an alternative setting that the child can engage in, explore, and use to understand the world. It is a way to learn to know others and yourself and essential for the socialisation of the brain, so crucial in fact that too little social play might contribute to ADHD (Panksepp, 2007).

Play may seem like a pastime that can provide little benefit to standardised tests and PISA rankings, which measure learning quality these days. According to the insights above, this could hardly be farther from the truth. Bringing play into teaching can make it more natural to use movement and create a more profound learning experience.

A fundamental quality in playing is the freedom it allows for trying new roles, exploring new and imaginary realities, and bending the rules that apply to the world outside of the world of play, "the imposition of one's concept and images without regard to environmental realities" (Kolb, 1984, p. 23). It is a greenhouse for curiosity because it lets you try things out since you are "just playing". Play and curiosity is the tool that will enable you to expand your world. Dr. Kristin Neff (2011), associate Professor of Educational Psychology at the University of Texas at Austin, says curiosity functions like an engine for growth.

Storytelling is as old and rich as humanity itself and is interesting in this context is its ability to create engagement and interest in the movement integration activities. Stories and fairy tales can have a tremendous impact on children: "A good story draws us into its spell as we predict what is coming, and we anticipate its unfolding, with joy and excitement. All children want to know, 'What's going to happen next?'" (Creswell, 2007, p.91). Using this force as motivation is a good strategy because the child can then merge reality with the enchanting fantasy the story offers; they want to act the story out through movement (Auer, 2017). This can carry experiences and meaning that lasts for a lifetime: "Deeper meaning resides in the fairy tales told to me in my childhood than in the truth that is taught by life" (Friedrich Schiller, as cited in Bettelheim, 2010, p. 5). Although children can learn much through fairy tales, they should not be told with didactic ambitions, nor should the meaning of a story be explained. Fairy tales have value as a moment when an adult and child share a unique experience. Child and adult might appreciate different things at that moment; the child might be absorbed in the fantasy aspect, the adult in the joy of the child's excitement (Bettelheim, 2019).

Stories should ideally be *told* from memory and not *read* from a book. Telling from memory allows for more flexibility, and the story can easier be adapted to the audience. The narrator can respond to questions and adjust the tone and elements of the story according to reactions from the audience. Reading a text can take much of the magic away and reduce the feeling that the child and adult (narrator) enter the story on equal terms. "The telling of a story to a child has to be an interpersonal event, shaped by those who participate in it" (Bettelheim, 2010, p. 151).

Stories are also helpful in memorising content. Humans tend to use stories as a way to organise memory. Therefore, it is easier to remember details in an analogue story than to recall the various parts if they are not connected in the form of a story (Bopp, 2008).

The Storyline model described by Creswell (2007) is unique because the story being told is flexible; it invites the children to take part in its forming. It gives children a sense of control and lets them contribute to how the story unfolds and thereby becomes a powerful motivator.

Creating relevant MI activities

When it comes to relevance, physically experiencing theory and concepts enhances learning, it engages more regions of the brain and the sensory system (Madsen & Aggerholm, 2020a; Michael et al., 2019). Movement activities can relate to or manifest characteristic elements of curriculum subjects. This can help the body and sensory systems develop healthy sensorimotor skills and spark moments of illumination or simply subconscious experiences in the student (Beigel, 2012). Some teachers find MI meaningful only when the activities are related to the academic subject and only then beneficial for the students. If they feel the movements have little to do with the subject, the MI can be perceived as a burden (Knudsen, 2019). Many books and articles show how movement can be integrated into curriculum topics, from brain breaks and other physical exercises to the dynamic classroom seen in Steiner schools (e.g., Auer, 2017; Beigel, 2012).

They offer many examples of MI activities, but there is still a unison demand from practising teachers for more education, guiding material and overall support for the preparation and delivery of MI (Benes et al., 2016; Knudsen, 2019; Madsen & Aggerholm, 2020a; Michael et al., 2019). Rather than mapping out and analysing these examples, I looked for methods for integrating academic content. There was little in the literature which might be contributing to what is called "integration difficulty" (Knudsen, 2019, p. 106).

There are two active traditions of movement integration that particularly influenced my thinking about movement integration: *Bewegte Schule* (Beigel, 2012) and the *Bewegtes Klassenzimmer/das Bochumer Modell* (Auer, 2017), which I have given the English name *dynamic classroom.* Steiner schools adopt the dynamic classroom concept. Three publications describe the *dynamic classroom* approach found in many Steiner schools today. It is mostly known as *Das Bochumer Modell, Schule 2000* and *Das bewegte Klassenzimmer* (Auer, 2017; Kaliski, 2014; Schönherr-Dhom, 2014) and developed in the Steiner school in Bochum,

Germany 25 years ago. The method was a pedagogical reaction to children's needs, much like Beigel's (2012) work *Bewegte Schule* but is less oriented toward the motopedagogical aspects of movement integration. It focuses more on the development of the entire child as a person, including social adaptation. It was developed for the younger children in 1. and 2. /3. grades and rests on *five pillars.* These involve abilities such as social competence, the feeling of time, balance and movement control, the awareness of own senses and the awareness of own bodily needs. The characteristic low, mobile benches placed in a circle are just one way to accommodate these qualities. The main feature of these benches is that they are easy to rearrange, even for the children. They can form the typical circular seating arrangement, a core feature of the dynamic classroom concept. Or be built into "landscapes" and trails for play, fantasy, and balance challenges. Some books offer lots of examples of activities but not methods for how to create activities, but Auer (2017) expresses that the pedagogical model would benefit from more exchange of ideas between teachers and others to keep developing.

Die Bewegte Schule (School in motion) promotes movement integration for classes 1-13 and is used mainly in Germany and also Austria, and Switzerland. It was started by the pedagogue Dorothea Beigel who wrote the ground-breaking book *Beweg dich, Schule!* in 2005 (Beigel, 2012). She describes the purpose and benefits of movement integration and ways to do it and focuses on meeting the sensorimotor needs that children have today, which also benefits learning. The book explains in detail what those needs are and how they can be helped by integrating movement into education. There are many examples of activities and games used for most curriculum subjects. The activities are synched to the academic content, not in form and concept but more as activities that run "parallel" to the subject matter. The learning process seems to be supported mostly by physical activity that creates alertness and increases concentration rather than activities that reflect or conceptualise the content itself. Although rich in examples and ideas, the book does not provide a straightforward method for rationalising when making new movements or how a curricular content is "translated" into movement.

Martin Carle (2018) refers to Coenraad van Houten's seven steps of a holistic learning process: 1. becoming aware of the subject, 2. connecting with it mentally, 3. roughly processing it, 4. adapting it to suit oneself, 5. practice it sufficiently, 6. make it a manageable skill, and 7. to become creative with this newly acquired competence. Steps 1-3 could benefit from a hands-on, body engaging learning situation. Carle explains that a more in-depth and

practical approach to fewer subjects (by limiting the number of forms in form drawing and geometry classes, for example) can create not only a more profound, independent mastery of the subject but also be more "economical" than when many subjects are worked on but in a more superficial and unengaging manner by just replicating what the teacher does on the blackboard.

Madsen and Aggerholm (2020b) discuss Klafki's three categories of Bildung from 1983: formal, material and categorial in physical activity and movement integration. Accordingly, categorial teaching can include movement into the academic content. Rather than having many fragmented topics, a selected few could be more effective. Instead of using exercise as hopping and running, the categorial Bildung helps "pupils encounter the world, which opens new ways of recognition" (p. 161). Madsen and Aggerholm (2020b) explain:

> When pupils experience the world, it awakens their intellectual curiosity and desire to understand it. The result is a double-sided opening, where the pupil engages with the content, and the content opens the pupil's mind. Consequently, embodied actions become part of the teaching methodology. They are inherently related to didactic considerations of the academic content, the pupils and their interactions with each other and the community (p.162).

Kolb (1984) describes the central characteristics of his seminal work on the *Experiential Learning Model* (ELM) that "learning is best conceived as a process, not in terms of outcomes" (p.26). Kolb's experiential learning model involves four different modes of activity that the learner must practise: 1) Concrete experience, 2) Reflective observation, 3) Abstract conceptualisation, and 4) Active experimentation, which starts the cycle anew. Experiential learning requires that the learner is both encouraged and involved in an experience and reflects and analyses the experience by using analytical skills. The resulting conclusions and conceptualisations that form the basis for future actions and experiments and are therefore iterative as the learning continues. This creates a deeper understanding of the subject matter, which helps to retain that information longer. The idea that knowledge continues to grow and adapt, partly through dialogue and reflection, is also important for Freire (1997). He says education should open people to the possibility that knowledge is in transformation, not static and finite. The latter is caused by what he calls the banking concept of education, which happens when education presents and distributes knowledge as something fixed. The result is a deterministic view of the future as something that cannot be influenced or changed.

Learning should rather be problem-posing and educating students in the process of inquiry, dialogue, and critical thinking (Freire, 1997).

The *experimental* and *reflective* processes of experiential learning can be done with or without guidance from a teacher (Andresen et al., 1995). For experiential learning, the reflection part is a vital activity and is greatly helped when someone facilitates the reflection process before, during and after the experience. This facilitation can be challenging, and Jacobson & Ruddy (2015) developed a 5-stage questions model to suggest how to guide a reflective discussion helping the learner move from *knowing* to *knowing about:* 1) *Did you notice? (*Recall the experience), 2) *Why did that happen?* (Reflect on meaning), 3) *Does that happen in life?* (Reflect on own experience), 4) *Why does that happen?* (Reflect on rules and patterns) 5) *How can you use that?* (Consider if the insight can be used for something.)

Emotions and feelings can be essential parts of experiential learning. Andresen, Boud and Cohen (1995) say that students must be *engaged* for experience-based learning to work. There must be an atmosphere of trust, openness, and respect. The whole person must be involved with "intellect, feelings and senses. In learning through role-plays and games, playing or acting in these typically involves the intellect, some or other senses, and a variety of feelings. Learning takes place through all of these" (p.1). In *affective learning,* it is recognised that the quality of emotion and engagement influences learning. New knowledge is most effectively generated when learners can engage in a process where they build something external, which then can be examined and discussed. They *feel* differently about what they have learned through active participation and control, and it influences how they will use and think about this knowledge and make use of it later (Picard et al., 2004). Madsen and Aggerholm (2020a, 2020b) state that embodied cognition and enactivism (sensorimotor input with emotional and social dimensions) can be used to integrate academic content and movement. "This theory informs an enactive approach to the didactical work of teachers, where pupils' bodily actions and academic content merge, affecting pupils' perceptions of their positions in the world" (p. 163).

The artist Richard Serra (2000) is a proponent of working with the physical, with *real material,* because he feels it stimulates and triggers the mind. Rather than pursuing a "solution", the solution is the process itself. And in this, there is no right or wrong, just experience. He says the real world is where *real* experiences can be found. He talks about

creating sculptural form by moving according to movement verbs resulting in sculptures. He is not recreating a preconceived idea of what a form should look like but is directed by the verbs. He prefers to engage directly with models and materials, not conceptual ideas. The real world gives so much response and feedback that inspires new possibilities and paths never seen before and is best experienced with physical experimentation and not theorising (Serra, 2000).

Physical experimentation is also what Steiner school teacher and architect Alf Howlid (2017) does when he lets students explore structural forces in architecture with their bodies. The students use their bodies as structural elements when building simplified versions of classic structures with foam blocks, rods and ropes. They can feel the invisible forces of pressure and tensile forces. The concept is described in his book *Inn i arkitekturen* (2017) and is an excellent example of how an abstract concept can be translated into movement.

Gatto (2010) describes that most students perceive school as dull and utterly meaningless. Could it be caused by a detachment from the real and the relevant, from what has practical application in a student's life, something that makes life easier or more interesting? The research by Picard et al. (2004) indicated that traditional math education fails because it is too cognitive and is disassociated from practical applications and personal feelings. "Instead of trying to make children love the math they hate, make a math they'll love" (Papert, as cited in Picard et al., 2004, p. 263). When the distance from theory to practical use is too long, the theory is unrealised. The idea does not make it to the real world and finds no meaningful place in the learner's life. Concepts that the body can test and evaluate, on the other hand, become real experiences. Jerome S. Bruner has described three levels of knowledge. First is the enactive phase (learning through the body and real-world experiences), second, the iconic phase with narratives, images, and games used to represent the real world; and third, the symbolic level with theories and abstract concepts. According to Bruner, the starting point must be the enacting (Bruner, 2006, as cited in Madsen & Aggerholm, 2020b). Steiner (1984) explains how relevance for young children only can be achieved by gently growing out from the child's previous experiences and tying abstractions such as letters to those. If the abstraction comes first, the letter F, for example, it becomes like a foreign "demon" (p. 47) to the child. If the child could recognise the *form* of the letter F in the form of a fish, the child can feel and hear the letter. The teacher is encouraged to find ways to connect to the child's previous experiences. These are experiences that the child can relate to and build on. It

becomes a way to allow the child to integrate the new idea easier because it is only an extension or a variation of what they have already processed and accepted.

Making "mistakes" is an important and perhaps overlooked part of learning. Mistakes. Even the sound of the word makes you slightly ashamed. However, so-called mistakes are core components of experimentation and could instead be embraced. Making mistakes is the key to learning and can benefit any learning program. "It is in the interplay between expectation and experience that learning occurs" (Kolb, 1984, p. 29). When you only have your expectations confirmed, what new have you learned? "Any experience that does not violate expectation is not worthy of the name experience" (Hegel, as cited in Kolb, 1984, p. 29). Make "mistakes" faster to learn faster or simply say *there are no mistakes*.

The role of the classroom environment

As we have seen, there are benefits of using corporeal physical activity to stimulate and improve learning and cognitive processes. Another factor influencing academic performance and behaviour is the physical learning environment, coined *the second pedagogue* (Auer, 2017, p. 13). "The aesthetics of the physical environment is a significant consideration that, for the most part, has been overlooked in the literature on early childhood environments" (Read, 2010, p. 76). According to L. A. Hart, how teaching has been conducted in traditional classrooms has reduced students' cognitive capacity (Degen, 2011). "If you wanted to create an education environment that was directly opposed to what the brain was good at doing, you probably would design something like a classroom" (Medina, 2008, as cited in Degen, 2011, p.5).

In Brain-Based Learning, the classroom plays an important role. Since learning involves the entire body, emotions and sensory experience, the classroom shall provide an inspiring and stimulating environment in which an immersive experience can be had. This enriches and intensifies the learning process and improves comprehension and retention. Part of this process is the social aspect which includes mutual respect, discussion, and generally feeling safe and not exposed or threatened. One way to archived this is, in addition to the decor, more colours, sound, and tactile stimulus and to arrange seating and tables in a circular layout and make them comfortable with cushions. This supports interaction and leaves more room for movement (Jensen, 2008; Resilient Educator, n.d.). If the learning environments are more exciting and engaging, they improve learning (Hirsch-Pasek & Golinkoff, 2008).

Ngware et al. (2013) show learning gains of 5%-27% for primary school students sitting in the front row compared to those further back. This helps slower students by placing them in front and risks limiting the students put in the back. In other words, the learning conditions are different in the front and the rear and thereby not equal for all.

The form given to a teaching environment will influence the activities in that space. Boyce (2003) describes room and lighting installations as visual "messages" that we intuitively perceive when entering a space. Our understanding of the installation's "intention" encourages or discourages specific behaviour. Classroom lighting conditions can also impact creativity or engagement. LED lighting has been shown to create more student engagement than fluorescent lighting (Pulay & Williamson, 2017). It has also been found that a dimmer room illumination can create a feeling free from rules and constraints. This can promote more risk-taking than a fully illuminated room (Steidle & Werth, 2013). The learning environment influences our creativity, mood, and learning ability through spatial character, air quality, light, acoustics, smell, materials, and colours. The materiality of space can affect attention, awareness, and engagement through our inherent embodied knowledge and receptiveness. This awareness needs to be stimulated, nurtured, and cared for to develop. James Gibson (1979) proposed that the material qualities embedded in objects and spaces *offer* a specific potential for interaction and perceivable value and meaning.

> Perhaps the composition and layout of surfaces constitute what they afford. If so, to perceive them is to perceive what they afford. This is a radical hypothesis, for it implies that the "values" and "meanings" of things in the environment can be directly perceived (Gibson, J. 1979, p. 127).

Since the space and objects surrounding us can inspire or limit us, so do learning environments. A well-designed classroom with appropriate furniture, wall colour, and other interior variables has contributed to student success and development. We learn from our experiences and interactions with the built environment (Evans, 2006, as cited in Pulay & Williamson, 2017). The literature also shows that in makerspaces, the relationship between what is "offered by the space" and the student's actions is directly linked. In the compelling case of makerspaces that Hughes and Morrison (2020) studied, some elements need to be provided for such spaces to release creativity and co-creativity. The facilities and tools available need to be visible and examples of what can be made should be on display to trigger imagination and engagement. The materials and tools available and how they are displayed will influence what the students build and the techniques they use.

In a makerspace, the tools used in the room and the learning that occurs within that space require a new ethos that bears little, if any, resemblance to the old way of doing education (Hughes & Morrison, 2020, p. 1). The space must be adapted to the curriculum to avoid a mismatch between the two. Other interior design adaptations can be movable furniture, comfortable seating, and colours. "A well-designed physical environment could positively influence hands-on activities and internal cognitive processes connected to learning, such as theoretical concept attainment" and problem-solving (p. 3). Good lighting and air condition further contribute to lowering stress and well-being, as do patterns and images of biomorphic character from the natural world, such as fractals. The perception of the space and its affordances, such as tools, materials, furniture, and mood, are essential in setting the scene for a positive and creative experience. "The physical environment encourages emotions and responses associated with being psychologically present, inspired and open" (p. 5), whereas other architectural expressions communicate and trigger different responses. The more human-oriented and less industrial utilitarian, the stronger the feeling of inclusiveness. Embodied learning, material and creativity can help students gain a conceptual understanding of a subject matter. "I had students show me they understood the entire water cycle without using any scientific vocabulary, which would have been very difficult for them" (p.10).

The environment needs to be inclusive and reflect the culture of its students. It needs to be flexible and open, allowing for experimentation, cross-fertilisation, learning and being inspired by fellow students. It encourages risk-taking rather than taking the safe route and lays the foundation for creativity, exploration, and confidence. Hughes and Morrison (2020) conclude:

> The making process is inquiry-based, failure is part of the process, learning happens through making, and there are many experts in the room (not just the teacher). Making can happen anywhere, at any time and with any tools— plugged or unplugged, expensive or not. What is most important is the pedagogical approach. Finally, the tools and materials included in a makerspace need to reflect its community of users. (p.15)

Architecture and the design of space and the materials, lighting conditions, and colours profoundly impact psychology and learning (Boyce, 2003, Hughes & Morrison, 2020).

2.3 Challenges with movement integration

There is evidence that movement and exercise can improve academic achievements and cognitive performance and increase joy and engagement (Fedewa & Ahn, 2013; Martin & Murtagh, 2017; Singh et al., 2019; Watson et al., 2017). Still, some teachers and institutions do not integrate movement into their practice. This section will look at research that attempts to find the reasons for this. There seems to be limited research on the subject, but there are some reoccurring themes in the literature. Understanding MI challenges is important for understanding MI in general.

Teachers are often knowledgeable about the benefits of MI, but they are less knowledgeable about how to integrate it and are motivated to learn more. It has also been found that the younger and with less experience, the more knowledge and interest they have (Benes et al. 2016). Teachers perceive that the students enjoy movement as part of the classroom activities because it helps them engage and focus. There are three significant challenges: 1) Getting students involved, 2) planning and 3) limited knowledge of implementing movement in the classroom (Benes et al., 2016). Webster and Starrett (2020) found that more knowledge about integrating MI into the curriculum was a priority. This required more training material such as guidebooks and training manuals and more time for training. Routen et al. (2018) suggest more time to plan and implement MI and more training. There needs to be more support from school administrations for these things to happen, and they need to help teachers become more knowledgeable and confident (Benes et al., 2016; Michael et al., 2019). Although motivated to use MI / Classroom-Based Physical Activity (CBPA), many teachers find it challenging to integrate movement with the curricular content (Madsen & Aggerholm, 2020a) or integration difficulty (Knudsen, 2019, p. 72).

> A few teachers mentioned that integrating or translating activity into a subject can, at times, be a highly frustrating task and that this integration issue often hampers their use of CBPA because they do not know how to do it (p.72).

Teachers' motivation and willingness to use MI are generally high, but they need more support in conducting it. They complain that integrating or translating activity into a subject can, at times, be a highly frustrating task and that this integration issue often hampers their use of CBPA (MI). This is because they do not know how to do it, and there is insufficient time set aside for preparation. Too little collaboration results in each teacher preparing their classes independently, which can be demanding. The consensus was that MI needs more

support, courses, time, and increased collaboration while retaining teacher autonomy. Knudsen (2019) suggests that "it may be fruitful to find ways to better present and describe how to integrate MI meaningfully. This may have crucial implications for teachers' understanding and didactic reflections of the match between traditional subject-specific content and CBPA" (p. 106).

The result can be that generalist teachers expected to teach physical education (PE) often feel inadequate. The lack of training, interest, and time can lower self-confidence when teaching physical subjects, resulting in a poor-quality lesson. This can manifest itself in that the teacher will simply avoid teaching PE or putting minimal effort into developing the classes, thereby doing an insufficient activity that does not generate the necessary engagement and interest from the students. Students might become affected by the teacher's attitude and the low quality of the activities, thereby becoming less interested in physical activity. Therefore, teachers must become confident and competent, which requires more time and training (Morgan, 2005; Morgan & Bourke, 2004).

Conservatism and lack of ability or will to change can also become obstacles. It can be difficult for some teachers to adapt to new MI routines because they are fixed on the routines and ways they have developed over many years and have become "too stuck in their 'didactic ways'" (Quarmby et al., 2018, as cited in Knudsen, 2019, p. 83).

There is also the concern that MI can result in a lack of classroom control (Michael et al., 2019), like getting the students gathered after movement activities. One suggestion was to have transitional phases allowing students time to calm down (Routen et al., 2017). There are indications that more sharing of MI experiences will make it clearer that MI can improve student attention and support classroom discipline (Michael et al., 2019). The formation of routine and habit is essential to retain order and discipline, as are more practical solutions to rearranging furniture. Further, it is required that teachers and school leaders get on board and support MI activities (Routen et al., 2017).

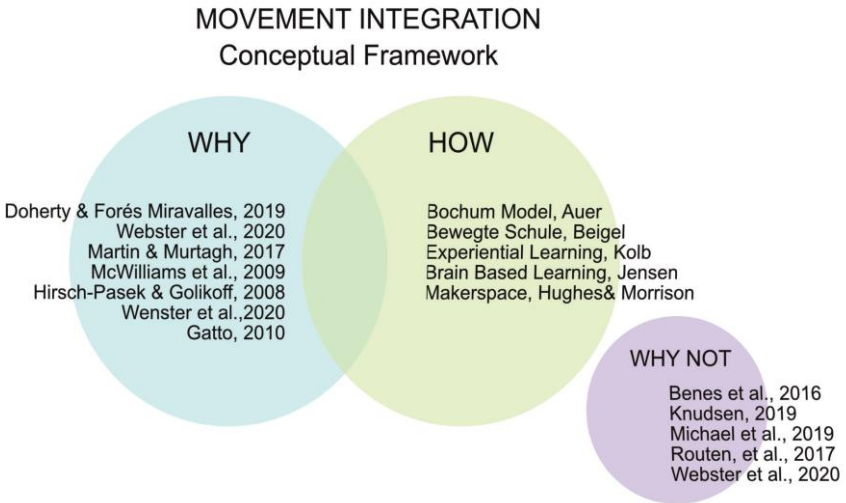
2.4 Summary of the literature review

The interest in movement integration (MI) research and embodied cognition is growing. Much research is available on the effects of movement on cognition, creativity, learning, memory, social adaptation, and physical and psychological health and well-being. The

benefits of MI on child health, learning and development make it clear that movement should be integral to child pedagogy education. This has become an urgent issue because children suffer from under-stimulation physically and mentally. Children suffer from too little physical exercise and play, both in school and at home. Recess and play are out, and academic performance and sedentary behaviour are in. Too low activity levels have negative effects on health and learning.

Body, movement, play, and education are inseparably linked. Movement and physical experiences are essential if integrated in an inspired manner; they can motivate, make learning and teaching easier and improve health and socialisation. The literature shows diverse ways to incorporate physical activities into the curriculum. They range from simple body movements that increase oxygen levels and alertness to physical activities conceived to deliver academic concepts. The latter type, MI, is what has particular interest for this thesis.

This review has also explored why MI is not being used everywhere. There is a unison demand from teachers for more support in the form of educational material and didactical methods for how MI can be used to convey meaning. Teachers like to be independent, so they prefer methods rather than premade examples. This is also where the literature has been less generous. It is not apparent exactly *how* MI is made relevant to curriculum content. The review has investigated how *engagement* and *relevance* can be created through material experiences, play, storytelling, reflection, and social interaction concepts from which MI-didactics can grow. The role of the classroom has been reviewed. The classroom influences how we think, use the space and feel and learn in that space. Therefore, it is important that the design of the classroom interior is considered accordingly.



3 Methodology

This study aimed to understand essential aspects of movement integration (MI) and contribute to the more widespread use of MI in child education. These aspects are contained in the following three research questions:

RQ1: How do the teachers perceive the role of movement integration in primary school learning?

RQ2: How do the teachers create and integrate movement activities they perceive as engaging and relevant?

RQ3: What do the teachers perceive to be why some teachers do not use movement integration in their practice?

In this chapter, I will justify my choice of methods for collecting and analysing empirical data and why this approach was appropriate to answer the research questions and achieve the purpose of the study. I start by presenting the qualitative research method I chose, the in-depth interviews that generated empirical data based on the participants' personal experiences and reflections. I designed the research to obtain rich data that would answer the research questions and contribute new insight and knowledge to the field of MI.

3.1 Design and data collection

For this research study, I used a pragmatic qualitative approach since the aim was to gain new insights that could be of practical use for teachers using or considering using MI. A qualitative study makes it possible to collect empirical material based on the perspectives and experiences of the research participants (Savin-Baden & Howell Major, 2013). A pragmatic research approach contributes to constructive and useful knowledge (Goldkuhl, 2012) for answering the research questions I had developed. I did not want to embark on a philosophical discussion about a sedentary school setup versus a movement integration setup. Instead, I conducted the study to describe teachers' experiences and ways of working that could have *practical* application, shed light on benefits and challenges related to movement integration, and fill gaps in the extant literature.

"Interviews are the most common method of gathering data for qualitative research" (Savin-Baden & Howell Major, 2013, p. 357) and offered an effective and feasible way to gain in-

depth and detailed information about the participants' experiences. Qualitative data was collected using interviews designed to explore the participants' reflections on their use of MI and their views of its benefits and potential challenges. I interviewed six informants, each for 60-90 minutes. Four of the interviews were conducted as Zoom computer conferences, one was over the telephone, and one interview was face-to-face. The internet-based interviews made it possible to conduct the interviews despite travel restrictions and also interview informants living far away. The disadvantage of screen-based interviews was perhaps a reduced sense of a physical presence which might lead to reduced engagement and missing out on the richness that body language adds to communication. Corona and travel restrictions forced me to have to exclude observations.

The interview questions were designed to collect rich data relevant to the research questions. The in-depth interviews were *semi-structured*, meaning they followed a pre-defined yet flexible interview protocol (Savin-Baden & Howell Major, 2013). This allowed for the same set of questions in all interviews but to weave them into the dialogue to form a natural progression of the topics. The interview protocol was organised thematically to ensure the interview retained research relevance (Kvale, 1996) and was simplified further to increase overview and control. The questions were non-leading yet open-ended enough to motivate detailed replies. I did my best to create an atmosphere where there were no right or wrong answers so that the informants could freely share opinions and experiences without being judged. I tried not to let my reactions influence the informant by reacting neither positively nor negatively and not exposing any preconceptions I might have had. It remained a challenge to be responsive and interested yet not react too strongly or make judgements, influencing their responses, as Josselson (2013) recommends. Each participant received an information letter a consent form beforehand (see Appendix B & C).

3.2 Sampling

The purpose of the study was to contribute practical knowledge about the use of MI in primary schools, why MI is used, how it is used, and its potential challenges. This led to *purposeful* sampling, suitable for understanding a topic in detail. Purposeful sampling criteria typically involve four goals: Representativeness, heterogeneity, examining elements critical to the study, and understanding differences between people (Savin-Baden & Howell Major, 2013).

The primary sampling criteria were: 1) Teachers should have experience with the use of MI, either as teachers or with the development of MI methodology. 2) They should be proponents of MI. The reasoning was that this would likely make them more positive and solutions-oriented towards MI than someone with a negative attitude towards MI who would be more problem-oriented. They would probably have overcome potential challenges with MI themselves and have experience with teachers who do not want to use MI. 3) The participants should have diverse experience levels, from the very experienced to newcomers, making the empirical data diverse (Bloomberg & Volpe, 2016).

The first three participants were identified in the literature and then contacted by email. Two participants I knew from before, and one was recommended to me as experienced and reflected. All agreed to partake based on initial email contact and information letter. Three were women, three men, four were German Steiner/Waldorf school teachers, one was a Norwegian Steiner school teacher, and one teacher had taught in many German public schools. There appears to be some differences in how MI is used in Steiner schools and public schools but describing this difference was not the focus of this study.

There are mostly Steiner school teachers in the sample. This is because I find the Steiner school way of using MI in the dynamic classroom compelling and thought it would contribute valuable data that would help answer the research questions. Below is an overview of the participants. Names are fictional but reflect gender.

	Years teaching (approx.)	MI teaching experience /MI development	School	Nationality	Age (approx.)
Agnes	*25*	Teaching /MI development	Public	German	*70*
Bernhard	*30*	MI development	Steiner	German	*70*
Cornelia	*10*	Teaching	Steiner	German	*60*
Doris	*4*	Teaching	Steiner	German	*40*
Edvard	*30*	Teaching /MI development	Steiner	Norwegian	*70*
Ferdinand	*25*	Teaching /MI development	Steiner	German	*50*

Table 3.2: Participants

3.3 Data recording and transcription

The Zoom meetings allowed easy audio-video recording, capturing facial expressions and gestures, and made transcription and translation easier than audio recordings only.
The raw data was stored locally and backed up in the cloud, encrypted and password protected during the study. The interviews were transcribed verbatim, and body language or non-verbal expressions were added as notes to the relevant text.

Five interviews were conducted in German, one in Norwegian. Initial transcription was done with MS Word voice recognition software, followed by manual correction and clarifications. The transcriptions were sent to the respective participants for *member check* to ensure validity (Savin-Baden & Howell Major, 2013). Some returned the texts with minor clarifying additions or grammar using the "track changes" feature. This allowed me to ensure the original content, tone and wording were not altered. Most verbal tics (uh, oh) and pauses were documented to covey the dialogue's tone and pace and make it easier to recall the informant's mood during coding. Repeated words, stuttering and other irregularities were left out in the final translation if deemed accidental or irrelevant. Transcribing the videos did not include details about expressions nor many notes about the non-verbal aspects of the video, as suggested by Hammersley and Atkinson (2007), as it did not offer much to the understanding of the spoken words.

The transcripts were translated into English using Google Translate and manually corrected. Each question and answer were listed and numbered in English and German with frequent time stamps for quick access to the raw material. The process was very time-consuming but ensured the intended meaning in each reply was clear, preserved and easily accessible before starting the coding process. I did the translation to English before coding to avoid going back and forth between German, Norwegian and English during data analysis and to have one common language from that point on.

3.4 Data Analysis

The data set for each interview was organised into a table with the questions and answers arranged and separated vertically. The original texts (five German, one Norwegian) were displayed next to the translations, making it easy to cross-reference the original (Fig. 3.4). There were two additional columns for codes and In Vivo excerpts, one for themes/high-level codes. Coding a qualitative data set is mostly an interpretative process (Saldaña, 2012, as cited in Savin-Baden & Howell Major, 2013). Applying a *constant comparison* method enabled me to use initial open coding combined with axial coding to establish common and primary categories. This was combined with an initial and relatively intuitive *thematic analysis* with short summaries of the transcripts by listing differences (Savin-Baden & Howell Major, 2013). The two methods helped generalise, compare, and theorise on commonalities and differences. The thematical analysis helped define more prominent themes (Bloomberg & Volpe, 2016) and create a structure (Fig. 3.4) that made locating the data visually easier (Hammersley & Atkinson, 2007). For the first-cycle coding, I used descriptive and analytical codes as I began to process the data more holistically and recognise underlying patterns. These, in turn, were categorised in the second cycle and then attempted to be organised into overarching themes that informed the themes of the final discussion. The codes I generated were primarily *inductive codes* (based on the texts) rather than *a priori codes* (refer to other literature or theory) to allow the terminology used by the informants to be kept intact. Sometimes I mixed the two using *co-occurring codes* when referencing outside theory (Qureshi, 2020). The constant comparison method allows adjusting further data collection based on the preliminary analysis, allowed me to tune the interview questions and inform further exploration of the literature. Quotes were selected if they would summarise and preserve a participant's motives personality, and actions in an informative way (Bhattacherjee, 2012).

Figure 3.4 (next page) shows the layout of the transcripts (one interview).

Figure 3.4: Transcript/analysis

Layout of the transcripts (shown one interview consisting of 16 A4 pages):
Questions were on grey background and answers on white background. Each A4 page was divided into four columns.
Columns: 1) original language, 2) English translation, 3) In Vivo excerpts and codes, 4) overall themes (text/symbols).
Text sections were colour coded; quotes were framed.

3.5 Ethical Considerations

Confidentiality and anonymity were maintained throughout the study. The participants were presented with fictional names and no personal data to prevent negatively exposing anyone. The participants approved the data shown in Table 3.2. The study has been approved by Norske Senter for Forskningsdata (Consent form included in Appendix C).

3.6 Quality Assurance

This study has been conducted in a manner to make the findings credible. I have been transparent about my background and intentions and the bias I am bringing to the discussion (Maxwell, 2013). The criteria and reasoning behind the selection of participants have been explained. I also described how the interviews were planned, conducted, and analysed. The interview guide was written to not lead the informants in any direction by expressing strong values, opinions, or expectations during the interviews. The participants did a member check of the transcripts and corrected errors or misunderstandings, strengthening credibility by ensuring that my bias had not influenced the transcripts (Bloomberg & Volpe, 2016). Every phase has been conducted with rigour and attention to detail, and limitations have been described.

3.7 Delimitations

The field of MI is large, so I limited the scope of the study by defining its boundaries (Bloomberg & Volpe, 2016). The study looks mainly at how MI is used in Steiner schools since it integrates movement and academic content well but also includes many other aspects important for child development. This was reflected in the selection of participants. The dynamic classroom (Bewegtes Klassenzimmer) is mainly used in 1.-3. grade, so the focus was on MI in these classes, although the findings could be relevant for older children and adolescents. The research objective and the research questions made it sensible to involve participants with a positive rather than negative attitude toward MI to discover ways that contribute to making MI successful. More emphasis on potentially challenging aspects might have given valuable data. MI challenges have been covered to some extent in the literature. It was, however, important to understand the participants' impressions of potential MI challenges.

3.8 Summary of the methodology

To answer the research questions and meet the purpose of the study, I chose to use a pragmatic qualitative approach which was problem-solving in character rather than philosophical. Detailed data were collected by conducting in-depth interviews with six teachers. All teachers were experienced with MI and willing to reflect on various aspects of MI, including why other teachers might be less positive about MI. Five were Steiner school teachers, and one from public schools. The interviews mainly were conducted via video conference, then transcribed, member checked, translated, analysed thematically and with inductive codes, the presented in the empirical findings chapter and finally considered in relation to the literature in the discussions chapter. Ethical consideration, quality assurance measures and delimitations have also been covered.

4 Empirical findings

Empirical data presented in the following chapter was collected by interviewing six teachers. Five were Steiner school teachers and one public school teacher (see table 3.2).

Movement integration (MI) refers to its use in Steiner schools (*Bochumer Modell*) and German public schools (*Bewegte Schule*). Movement is used differently in Steiner and German public schools, but I have not researched the differences more than what was described in the literature review.
Dynamic classroom refers to classrooms in certain Steiner schools for 1st - 3rd-grade. These are furnished with small, mobile benches and separate cushions. The benches are typically placed in a circle but are easily and frequently rearranged.

Sections 4.1. present the findings primarily relating to the first research question, which is

RQ1: How do the teachers perceive the role of movement integration in primary school learning?

Section 4.2 presents the findings primarily relating to the first research question, which is

RQ2: How do the teachers create and integrate movement activities they perceive as engaging and relevant

Section 4.3 presents the findings primarily relating to the second research question, which is

RQ3: What do the teachers perceive to be why some teachers do not use movement integration in their practice?

4.1 The role of movement in learning

The empirical data in the following section expand on why the participants consider movement integration vital for child development and learning.

Movement is essential for learning, according to the teachers interviewed for this study, and especially for young children. Many of the participating teachers have spent decades finding new ways to weave movement into their teaching praxis. That movement has importance for children is not new; it has been part of Steiner pedagogy since the beginning. However, the way it takes centre stage in the dynamic classroom used in many Steiner schools is unique. Ferdinand explains why: "We believe that a person cannot learn without movement. Period." However, to move appropriately, he continues, children must develop all their senses, especially the *lower senses*, which according to Steiner, are touch, well-being, movement, and balance. Ferdinand says:

> If it is true that you cannot learn without movement, then you have to be able to move correctly first. Movement exercises can help children learn with *all their senses* and possibly also learns things that they would not learn cognitively. They can learn mathematics and numbers without language or traditional conservative mathematical approaches. The children develop a 3-dimensional space which they can later mentally access. This kind of pedagogy is entirely different and not easy to explain causally.

To learn well, a child must be able to move properly first, says Ferdinand. The basic senses must be stimulated and developed for this to happen. Only then can the child learn with all its senses. In some Steiner schools, new employees are even *required* to use movement in their teaching, says Ferdinand.

The movement deficit seen in very many children today results from our lifestyle. Children are physically understimulated and lack opportunities to develop their sensory-motor skills. "The living conditions of children today are very different from when we were young", reminisces Cornelia. Outside play is now rare; kids are brought to school in cars, public

transport and even taxis. They simply have too little exercise. When there is a shortage of stimuli on the home front, schools become responsible for ensuring that students get the necessary movement.

According to Agnes, some kids cannot even walk properly. Therefore, she uses every opportunity to make mundane tasks more physically challenging. "Sometimes we walk out of the classroom backwards, sometimes sideways. It is also good for the teachers to walk sideways, backwards, to jump." She says that many children have "skipped some developmental steps" and that few children can walk adequately sideways nowadays. This is why she works with the entire spectrum of motor development that humans go through. It has to be carefully adapted to the children's development level, starting with those with the weakest abilities. Agnes says that teenagers also suffer from underdeveloped sensory-motor skills and need more stimulus. There is a lack of the challenges required to develop good motor skills for babies, children and adolescents. Agnes says:

> Children grow up differently today. We put babies down very early; we do not even let them get up on their own, which continues into adulthood. Therefore, it is worth working with movement at *any* age and in any type of school! The advantage with the older students is that I can explain precisely what we do.

Since we receive less sensorimotor stimulus throughout our entire modern lives, the need for more movement is constant. More movement benefits everyone in all stages of life, no exception. Staying fit is a lifelong task, Agnes says. "We must support movement activities with hearing and seeing and also tactility, proprioception and the vestibular system. We should do it with pleasure so that our amygdala also has a shot of joy and motivation. Yes, then it's just fun!"

Children differ in infinite ways, and so do their senses, causing different sensory biases. This is something to be aware of when making sensory experiences part of the curriculum, recommends Ferdinand:

> There are many facets to children's sensitivities. In every class, we have the auditory types, the tactile types, and the visual types. Each has its primary emphasis. However, the tactile types are often forgotten! They are rarely offered something.

It becomes possible to meet their sensory needs in the right way by better understanding how sensory input affects individuals differently. "Meeting their needs can help children suddenly open up and comprehend something or deal with emotional blockages, for example", says

Ferdinand. People are different and sense differently; therefore, the stimulus needs to be adapted and provided accordingly.

Every child has strengths, weaknesses, and preferences. We need to be alert to those but make sure never to embarrass a child in front of the class for their movements, says Agnes. "Never expose or embarrass a child! Then you may have ruined the child's joy of movement forever. Every child is lovely just the way they are." When Agnes feels the need to correct a child's movement, she does not say, "The way you are doing it, that is not right", but rather "You know, I too want to do it that way, but I only do this. Watch out for me that I do it like this." *(Points hands up and not to the side.)* And then, the children look at her and comment on her mistake. "You have to do it like this", they say. The teacher then replies, "Thank you for telling me that there are some things I simply cannot do properly." She feels that helping each other like this creates a friendly atmosphere. She has reversed the roles by making the kids focus on helping the teacher do *her* movement correctly. The result is that they become much more conscious about doing their movements right.

Just like our sensorimotor needs differ, so do our mental needs. Agnes has successfully used movement when educating youth suffering from very high aggression levels. She used it with math and other cognitive tasks but also to help them relax. "The students could not even lie down on their backs; that is how tense they were!"
After half a year of movement exercises, things improved. After class, she asked if they wanted next week's plans or to hear a fairy tale. *"Ein Märchen (a fairy tale)!"* they replied with childish voices. The teacher could hardly hold her tears back as she thought, "What have we done? What have we done to make these children so hurt and raw inside?"

The toughest guys in the school of whom everyone was scared could again allow themselves to be children. A kind teacher and some movement exercises had helped them manage to relax on their backs and enjoy a little *Märchen*.

Movement can play other roles than simply stimulating the sensorimotor system. In a teaching context, it can bring joy, motivation and support to learning. If we cannot move, we cannot adequately explore the world. Ferdinand does not doubt that movement belongs in education: "For a child, one of the most natural things is movement. A child usually only feels comfortable and "at home" when moving." Being in motion is a state that is natural for children; it is much more than that, at least it has the potential to be. According to Ferdinand,

movements should be unforced, happy, and beautiful, not like "now we will say the poem about the sun for the 27th time, and we will do this and that movement". This is boring for everyone, showing how misunderstood movement integration can be. On the contrary, he thinks, "movements can and should be pleasing, exhilarating, and beautiful. Something you enjoy and where you express yourself. Here these young people feel they are seen and can express themselves positively through movements, music, rhythms, poetry," says Ferdinand.

Movement is essential, but it can become boring if it is burdened by repetition. One way to create a healthy rhythm and variation and avoid repetitiveness is with what Bernhard calls *breathing,* common in Steiner pedagogy. Breathing focuses on creating a pulsation between different activities and states of mind. Bernhard explains:

> Even with adults, you must be careful not to present or lecture for too long because everyone gets tired. You then should ask a question, encourage, stimulate, and start moving. That applies to every subject. The result is a particular culture of movement and rest.

Variation helps children and adults focus by including periods of relaxation. Movement needs to be kept alive and beautiful; only then does it have to power to bring young people to express themselves through movement and feel joy and be inspired.

4.2 Teaching with movement integration

The following section explores the preparation and integration of movement activities when teaching specific subjects. First, we will look at how engagement can be built into MI activities. As we have already seen in the literature review, free will and a positive attitude make learning more emotionally positive and effective. How do the participating teachers engage the students and make them want to actively take part in movement activities?

Building engagement

Play and games can help drive a learning process and make the activities feel effortless and natural. Agnes finds that a game-like situation can develop during grammar or mathematics lessons. Some children had difficulty comprehending how letters verbally connect, so she let each child say a letter, placed them next to each other and let the sound move from child to child. "That is how they understood the attaching of the letters, through physical effort and voice. Our bodies supported everything that we did. This is how these learning games came about", Agnes says. Playing in class can become so loud and cheerful that people outside

wonder what is going on. "The children could laugh so much in class that people who walked past start to worry." Could they be learning anything, or are they just playing, they would wonder. "Playing is learning!" exclaims Agnes. Clear rules are required for this kind of active and liberal teaching to work. "I can only offer freedom if I have very clear limits, rules and rituals. It is simply necessary. No rules can endanger the children."

Agnes is under the impression that small children need the most movement. If they do not receive adequate amounts, she says it can lead to fatigue. The element of joy and fun is essential, and movement must be done playfully and actively. Even finger play is valuable as movement, according to her. Agnes has experienced that movement activities have more effect when done in smaller amounts *every day* than a more extensive session once or twice a week.

In some Steiner schools, there are periods between classes that can be used for free play. These are periods of about 20 minutes when the children can do what they like and with few restrictions or rules. They can paint, read, rest, or build things. Cornelia has witnessed some extraordinary creativity unfold during these periods. As unstructured periods open for free expression, she considers them very valuable.

Storytelling is a powerful and indispensable source of inspiration for both children and teachers. Edvard is not in doubt; he says that "the story is a carrier of motivation when it comes to processing in some pedagogical form. If it springs from the story, then it springs from something that is fundamentally fruitful and which in a way becomes a source of motivation." But children need time to form pictures in their heads. Unlike a photograph that is instant, stories need time to plasticise in the child's mind, like every three to four sentences, says Edvard.

> As a drawing created by expanding surfaces rather than outlines, it remains malleable, like clay. As soon as an outline is made, like with a photo, there is no return; it is fixed.

By allowing inner pictures to develop slowly, the teacher has more time to explore with the children. This co-creation allows for things to form more interestingly and surprisingly. "It means that a story can become something other than you planned. But it is over the moment you make an outline," Edvard says. Young children require time to form inner images, but they also need concrete, figurative details. Edvard vividly remembers an article he read by

Conrad Englert, an early anthroposophist pioneer in Norway. Edvard recalls the content to be this:

> One must be concrete when telling stories because you must describe what it is possible for the children to see for themselves. If you say, *"I met an old woman, and she was so ugly that I had never seen such an ugly old woman,"* there is no picture. There is no story about anything. It is just a report about *my reaction* to something that the pupils yet do know not what it is because they have not been told. It just describes my feeling.
> According to Steiner, this is to burden the children with one's astral body. It is as if you were tearing the hair out of the children's heads if you carry on like that. Instead, the ugly woman should be described as *"There came an old woman. She had a crooked back and had such a long nose that it reached the ground and made a trail in the gravel as she walked."* And then you can let this older woman say something as well.

One must refrain from reporting one's *feelings and interpretations* and instead be very figurative and concrete when describing scenes for children. One must slowly expand the story from the *inside* and describe what happens as it unfolds. The benefit for the teacher is that by making detailed descriptions of the scenery, it makes it easier to remember the story. This makes any upcoming activities such as painting, discussions, continuations or acting much easier to integrate since everyone has detailed images in their heads. Details help the story come alive and can enliven subsequent activities.

Each child processes the story according to their capacity and needs. It also synchronises all the listeners' imaginations because everyone is in the same place in the story as it is being told. On the other hand, reading from textbooks risks that all students end up in different locations based on reading speed and comprehension. Storytelling is different; it is unique, says Edvard:

> It is only in the story that everyone is in the same place! The absolute requirement for the story and the storytelling situation is that everyone is in the same place in the exact second of what is happening! It is, in a way, the uniqueness of storytelling.

This social aspect is an essential trait of storytelling. It creates a special sense of togetherness by sharing the same experience, the same event, and the same imaginary space. The fairy tale offers a field where the teacher and the students form a shared space, says Edvard. "They get to know each other because the teacher must go into it, process, communicate, live with it. And the students must take it up in their own way, and then they must process it further.

Although everyone sees it differently, they have shared the experience. This makes it easy for subsequent activities such as movement, art or acting to be based on the story. "Letting the storytelling become the starting point is crucial. I do not think everyone understands that", he says. Everything rests on the story, according to Edvard. It must be rich and engaging, and the students must have learned to sit still and listen to form inner images, contemplate, and take it all in. If this is the case, the movement/making part becomes less critical. He says:

> If the *story* is something that has gripped the children, then they can withstand a naive and somewhat simple making process. You are not so dependent on what you do *after* the story is so incredibly good, super to the point and with so many elements.

The activity represents just *one aspect* of the story. It is valuable because it carries a much larger world, the one existing in the story. "Everyone feels it is meaningful immediately; perhaps unconsciously, it is significant because you have the story! But without the story, it would have fallen entirely to the ground because the activity was too helpless. In that sense, the story is *the key* in many situations."

Therefore, if the story is engaging, the subsequent activities can be supported by it. The movements become rich and purposeful because they connect the children to the rich qualities of the story. Activities that are not supported by a story are missing this underlying element of motivation and reason. Spoken stories make a tremendous impression on children. It is something adults tend to forget, says Edvard:

> If you say that the story is the foundation here, then I think it is infinitely much richer and more captivating for the children than we are aware of. It is so grand for them! And when you pick it up again in one way or another, either in conversation or in some other activity, then what you do can be simple and still stand there as something that the children experience as meaningful.

He reminds us of another quality children have and how intensely they experience stories, namely personification. They have the incredible capacity to become something other than themselves: "What children can, and as adults not so well, is to *personify the elements; they* can *be* things. There are dramatic moments here." Children can act out, become objects, take roles, use disguises, and the most minimal items can convince a child they are now something or someone else. This has tremendous power and can make a magical world possible in the classroom through very small measures.

The imagination is a powerful driver to creating engagement and interest. One way to activate this power is to ask the students to predict what will happen in the next moment, like imagining if a tetrahedron volume will increase or decrease *before* its form/proportions are manipulated. Edvard explains how he lifts the corner of three rods, forming a tetrahedron standing on the floor:

> I grab a corner of the flattened tetrahedron and lift it up half a meter.
> Then I say, *"Now look at this volume. If I lift another half a meter, will its volume become bigger or smaller or the same size?"* And then I allow that thought process to take some time. Or I say, *"Say stop when it is biggest."* To stimulate the imagination *before* something happens is quite fruitful stuff.

Asking the students to evaluate the outcome of events that have not yet happened makes them create and evaluate multiple solutions in their minds. They apply their current logic level but eagerly await its verification or rejection. It grows the effect of what would otherwise have been just a small practical experiment.

Creating relevant MI activities

There are countless ways to implement movements in lessons. We have heard about two approaches: the dynamic classroom (Bewegtes Klassenzimmer) in Steiner schools and Bewegte Schule found in public schools. So far, I have not encountered concrete methods for developing subject-specific movement through an analytical and structured process. It is unclear if such material exists. The following section will investigate how teachers prepare and apply movements for various subjects. Since five of six are Steiner school teachers, most data come from them.

How do the teachers ensure that the movements support the intended subjects? Can we say that all subjects benefit from movement, or are some less suitable? Agnes is not in doubt: "All subjects benefit. Yes. YES! Most definitely. If someone says, *"That does not work for this subject!"* I will come and show them." Her process is this: She looks at the subject and asks herself, *"What exactly do I need, what is the basis, what do I want to define, how do I convert that into movement?"* That is one way she creates movement exercises, or perhaps she asks

groups of students to organise them and put them into motion. She says the main thing is to deepen, prepare, and vary the content with movement, not replace it with movement. The idea is to consolidate and internalise the subject knowledge. She continues: "I do not say *"this curricular topic must have this movement"*, or *"this movement belongs to this subject"*. We say, *"subjects offer* opportunities *for movement."* It is excellent if a movement closely resembles the subject matter. She says:

> It is nice when someone does something brilliant; that's nice! However, it is brilliant when I bring movement into the subjects at all. I must not lose any time; I must not neglect learning content. And it must be appropriate for my group.

Bernhard thinks a strong correlation between the core principles of the subjects would be ideal, but he does not see it as realistic. Topics are so different in their character, and "you should not expect the movement to be equally strong and relevant to the same extent in every subject," he says. It is not about *adding* movement, but the movement arises from the content when the subject is prepared in a didactically meaningful way. Bernhard explains:

> You do not start by asking, *"How can I get them moving?"* That has nothing to do with the subject, but you begin by asking yourself: *"How can the children get practical experience with this subject?"* Then the movements appear by themselves.

He explains that this is nothing new but an essential part of Steiner's pedagogy: "Do not teach the children something theoretically, but let them do something practically, let them experience it!" It is all about preparing the conditions for the children to explore. Bernhard says: "I do not explain; *I create a situation* where the children can become active themselves. And then maybe help to get the concept at the end." It is all about asking, "how can I give the children *hands-on and practical* experiences with the subject?" he says.

Cornelia thinks it would be helpful to have concrete *methods* and guidelines for creating movements that more closely relates to the subjects. "This question might give rise to a whole new impetus for this concept. Teachers can come together, share experiences, and discuss how they can develop new methods", says Cornelia. She thinks it sounds interesting to develop a methodology to make movement more subject-specific but will not attempt to answer if necessary because she has never felt the need for it. However, she does believe it merits further reflection and could lead to discoveries in the field. Bernhard thinks there is a good starting point for a method in what he already mentioned. He says:

> You do not have to teach the teachers how to translate a subject into movement;

> you have to ask them to figure out how children can get *practical experience* in the respective area.

The participants generally say it would be ideal if movements and the subject were as analogue as possible, but such analogy is rare. They doubt methods are taught for how to create a resemblance between movement activities and core principles of the content. If movement is used successfully without a high degree of analogy, is it worth pursuing a high degree of analogy? Below the participants reflect on various projects.

I make the grouping according to what I perceive as different "degrees of analogy" between the MI activities and the academic subjects they are meant to support. The grouping is not very important but can help exemplify what I mean by "analogy".

Highly analogue MI

One project exemplifies how analogous movement integration might look. It is a project by Edvard that lets students experience structural principles in architecture with their bodies. The building elements such as large foam blocks, ropes, and long wooden rods were made generic and simple to be used for many different projects. They could withstand pressure and tension. They were made large to provide a good challenge, requiring multiple participants to build simplified structures. The students then took various "positions" in the constructions and had to replace compression and tensile elements with their bodies. They *became* the buildings and thus felt the forces directly. Edvard explains:

> A model remains a model until it becomes so large that it becomes architecture. If it is possible to put a load on it, then it also becomes a construction that is a reality. If you even incorporate the body into the structure, you can experience something that you cannot see. Tensile and compressive forces cannot be seen in the construction of a building. But you must understand them. Now you can experience them *in your own body.*

Feeling and understanding the invisible forces made it worthwhile for the students. Working together is also exciting. Edvard says, "I was very strengthened in my belief that having a big enough concept and having to be many to achieve can make you connect to the great leaps in architectural history." As with the increase of scale, the *number of participants* was also impactful and crucial. Only with teamwork were the constructions and experiences possible.

Language is an interesting example that can be argued to be analogue. Bernhard shares an example in which movement was cleverly integrated into French classes. By creating practical situations, the teacher came to class all dressed up and with a big basket, from which

she sold vegetables and whatnot, and the children were allowed to "go shopping in France". Everyone was moving and got a taste of the French language in practical life, which is very analogue to real life.

Semi-analogue MI

Steiner school teachers often use the sequence of *story, verse, and action.* When teaching letters, do not start with the letter itself; start with a *story*, then a poem and then *movements* depicting something; for the letter H, you could begin with the tale of the horse *Grimsborken*. The horse, in turn, morphs into the letter H. Edvard likes the example and explains:

> You start with what it is possible to connect with in one way or another. Then you give it life. Then you drag it to the abstraction you have to reach in this context. This letter, which is an abstraction, can carry a concrete experience of something, like the horse's tail, for as long as it is needed.

First, spark the imagination with the story about the horse; then, connect movements reflecting the horse to the children's imagination. You seamlessly guide the transition from a personal, mental image into a collective arrival at the concrete letter H, from image and movement to the concrete instead of the other way around. This also works well even if some pupils already know how to read because it is supported by exciting activities like verses, movement, and drawing. These activities can involve everyone, independently of their familiarity with the subject matter.

Another way to integrate movement is in *painting.* Painting is used to connect more deeply to the content. After Edvard has told the children about the dandelion, they all paint their own. He emphasises that the pupils must master the activity of painting and all it entails, which they now do after five years in the Steiner school. The paintings are then hung on the wall, and the teacher can reflect with the children:

> We can say: "Yes, which dandelion is standing in a meadow, and it is morning? In which painting is it earlier in the day?" Or another question: "Which dandelion is the strongest, which has fought to get up? Which dandelion stands in dry soil?"

We see that *additional information* about the dandelion is woven into the questions associated with the paintings. Thereby the paintings become a functional enrichment of the material, *purely educational*. Not just something you do at the end of the lesson for fun!

Rather than being a fun reward "after the education", the paintings motivate a continued involvement with the subject. It ties the activity of painting, personal expression, and subject

matter together and encourages group discussions in a social context. Many activities can be made simple and joyful and still be very rewarding. "Children tend to be extremely thankful and do not ask for much," says Edvard.

Language can also be explored with movement. This is typically seen in eurythmy, the expressive, artistic movements and gestures practised by all Steiner schools' pupils when the essence of the different letters and language is expressed through movement. Doris likes mixing verses and movements because they can be intuitive and reinforce meaning and sound. Mathematics also offers many opportunities for movement. All the teachers mention this. It can be on a large-scale involving floors and walls, furniture down to the size of finger movements and counting finger joints. Doris includes many exercises to increase finger dexterity because it is connected to arithmetic. She says that "if I am skilled with my fingers and body, I will eventually become skilled with arithmetic."

Another example is form drawing. In Doris' form drawing class, she makes figures outdoors since she finds being outdoors very rewarding. "We simply hammered nails into the hard earth outside and stretched them with wool thread," each child carefully figured out where their nail would go to extend the imaginary form correctly. Doris reflected on the form at home, which she enjoyed, and maybe thought of or found a little poem. She supports the activities with verses and songs as it makes the children very attentive.

Non-analogue MI

According to Agnes, a high level of analogy between movement and content can be a nice thing, but it is not required. She says she has used it in public school:

> Analogy in form can be excellent, also with older students, but it is not required. I want the learning content to sit deep inside so that they can benefit from it for the rest of their lives. And for that, I adapt it to human sensorimotor development needs.
> I know what my curriculum is and what the children need to learn.
> I know that I support this with movement patterns for human development.

She knows the curricular plan and selects appropriate movements that are right for the subject but suitable for the student's developmental needs, both body and brain. Using non-subject specific exercises, Agnes explains that the grades in German and math and physical education improved significantly, as did concentration and attention. This method uses five different difficulty levels and focuses on the inner ear, i.e., the sacculus and utriculus and the three

semi-circular canals (balance organ). She says they also work on the Moro reflex, the asymmetric tonic neck reflex. It takes three minutes and is done at the beginning of the lesson, regardless of age.

So, if movements are not analogue to the subject, does this mean that the subject is not part of the learning? Agnes uses movement extensively and consequently in German public schools, but differently than in the Steiner school. She says:

> The subject is essential. I do it to deepen, consolidate, and internalise the subject knowledge; I do not run through the math class and cheer, but I do certain things to reduce the subject or make it understandable first.

She uses movements that support the content though not by being analogue to it. Agnes often works with older children and has an example from the Latin class. Rather than being anything analogue to the subjects, it is just a reaction game mixed with a grammar assignment.

> Latin classes loved doing that. The students face each other. A small group has now worked out vocabulary beforehand, and then one is the verbs, and the other is the nouns. And it is just a matter of pulling your hands away or hitting them when a verb or noun is mentioned. That was so popular in higher classes, and they were wide awake afterwards! Yes. It is something very simple. I think exercise in higher grades is just as important.

It is nothing fancy, but it makes the students focus on Latin while focusing on another task that is not losing the game. It makes them very focused on the subject while having fun.

Intuitive teaching

Ferdinand has noticed that when the children have more freedom and closer proximity to the teacher, he is learning "*intuitive teaching methods*". When there is an unobstructed flow of movements in the classroom, an intuitive exchange of information can occur. The low benches and cushions of the dynamic classroom make it easier. During the process, which can take days, the teacher becomes aware of the children's learning needs and will do his utmost to meet these needs. "These needs cannot be specified in any curriculum. Not possible", says Ferdinand.

The close and fluid interaction makes the teacher so sensitive that he subconsciously registers underlying needs expressed by the class. He sees this type of teaching as being on a more spiritual level "when the children's souls and the teachers' souls start to vibrate. After all, this is a highly personal, spiritual process. And then the children teach the teacher. In method, not

in content. It does happen." Ferdinand is confident that the teacher and children can reach a heightened state of interaction when exchange and communication are instant and intuitive. Authority is no issue at this point; the teacher can only lift a finger at it is dead quiet. Ferdinand continues:

> At this stage, we are talking about something completely different. It can no longer be specified in the curriculum; it can only result from very intensive, good quality teacher training. With these abilities, the kids cannot help but learn. They do not even *notice* when they are learning.

This heightened state of co-learning between pupils and teachers is something extraordinary. Learning becomes so natural that it ceases to represent any kind of challenge.

Letting the flow in class direct the use of movements is a reoccurring explanation of how movements come about. One must be attuned to the children, sense what they need and respond to the situation. Detailed preparation is not necessary if you are mentally present, says Cornelia. "You can read a lot from the children as a teacher. The smaller they are, the easier it is because they show what they need." Ferdinand has a similar experience and says:

> If you go through the learning process with the class, you know when they must move and how the topic needs movement. And not the other way around.
> I do not *invent* a movement for something upfront but feel that *"this needs the following movement."*

In many situations, movements are not invented beforehand but come naturally *in response* to specific situations. It is about responding with movements that make sense at the moment. Being highly attuned to the class is essential for this to happen, but Ferdinand knows teachers can do this. He likes it because "you do something for the children directly on-site, not *in general*." The class expresses its unique need for *this group* of individuals. The following activities are just the response from a teacher who is present in the moment and is flexible and open. Doris also thinks that many movements can only be conceived as a response to something happening in class, "it can only be developed with the children and not thought our beforehand. And if you did, you might not have been able to use it anyway because it never became relevant".

The role of the classroom environment

The classroom is where learners and teachers spend the most significant part of the schooldays. It provides the stage for various activities and should possess many different qualities depending on the activity that will play out.

Furniture and room layout

The *dynamic classroom* primarily uses small benches placed in a circle with separate large cushions. The benches can function as low tables when the children kneel on the floor or sit on the cushions. This flexible and innovative design offers many new opportunities. It creates a cosier, more intimate atmosphere but primarily supports learning by making movement, variation, and social dynamics much easier than with heavy desks and chairs. Arranging children and teachers in a circle removes the rows used in frontal teaching; as Bernhard says, "In the old frontal teaching system, the children in the first row get everything right away. Those who sit further back do not get it. Everyone sits in the front row in this configuration, close to the action, like in an arena or a circus.

Unlike in traditional classrooms, where the teacher is in the front and in constant focus, the circular arrangement creates a sense of *community*. Doris says: "The old way had no sense of community. When I sit here in a circle, I have the feeling that I belong together. For me, it has something to do with community building."

Benches alone are not enough. Not much is gained if they are used the same way as traditional furniture. Bernhard explains: "Teachers can be afraid of the children being released into movement. So, they put the benches in rows like they used to have the tables and chairs and have practically no movement." The circular formation and movement must be part of the equation as an underlying principle. In the over 150 Steiner schools worldwide that use the dynamic classroom, the default setup is with the benches in a circle. So, no more rows, and everyone gets a seat in the front. But of course, they are rearranged constantly.

Atmosphere

The classroom in its entirety radiates a unique atmosphere; it can be good or bad, and anything in between, and is felt by anyone that enters it. It is a combination of light, size, acoustics, smell, materials, layout, and decoration. The classroom plays an integral part in a healthy and inspiring learning environment. Agnes says:

> What is very important to me is that the space is a *living* environment. That means we can achieve this with pictures, sometimes we use flowers, and we can support learning and life in school with sensible and good lighting. These are essential basics. And if the atmosphere in the class is good, it doesn't really matter what kind of furniture is there. We do not get better furniture anyway.

Spaces affect our well-being, as do classroom spaces. Although Agnes has stopped hoping for new furniture, she finds it necessary not to give up on creating a good environment. Doris thinks that the benches placed in a circle give the impression that there is more space available. The feeling is nicer and airier, open to all kinds of ideas and whims.

Flexibility

One of the main features of the small benches and the cushions is their flexibility and adaptability. They can be moved around, put on top of each other, made into parcour courses, "fairy tale landscapes," and surfaces for working and sitting. The multipurpose quality results in some compromise, admits Bernhard: "Sitting on the floor or the cushions and writing and drawing on the bench is a compromise. It's a pretty good compromise, but it's not ideal for writing and painting properly." He says that some standing tables would be better for working because standing while working is vital for developing good balance. However, his dream setup would be multiple rooms for different activities. Bernhard says: "In a dream world, having at least two rooms per class would be much better. It would allow for movement activities and benches in one room and writing, drawing, and painting on sitting and standing desks in another room."

When inventing the element used for the large architecture project, Edvard was conscious that the components should be multipurpose, making them generic and straightforward enough to be used for various constructions and purposes. Edvard extracted the essential qualities that could represent the subject. Without the flexibility, the tools would have become more functionally limited and demanding in terms of cost, organisation, complexity, and storage requirements. This process helped simplify and bring the subject down to its smallest common denominator, the essence.

The smaller size of the furniture in the dynamic classroom allows the children to get used to moving them around themselves. This activity itself is essential. Cornelia let the kids build fairy tale towers. They would arrange the benches and cushions and then sit on the towers when she told tales. It was exciting and a challenge for the children, and they would then sit perfectly still when the storytelling began. Cornelia emphasises that this type of furniture allows you to make more improvised activities. She explains that you do not have to move many heavy tables to the back, creating noise and fuzz to make a small play or something. There is no room to improvise anything with tables filling the classroom. It takes too much effort and is therefore left undone. The classroom is flexible with cushions and benches. It is

much more inspiring. Doris feels the classroom itself encourages action. For example, she let them clean up the cushions and said: "Now stack everything in 3 piles", and then she asked them, "how many piles do we get in each pile?" And that's just tidying up. The most mundane tasks can be integrated when the furniture is easy to move and rearrange.

Collaboration, interaction, sharing

The circular layout of the benches in the dynamic classrooms affords a very different teaching style from traditional frontal teaching. Bernhard describes the difference like this:

> The teacher is no longer up there by the blackboard with a lectern in front of him, like a wall or protection. Instead, he is on the same level as the children, and a new teaching style emerges, one of togetherness and not *"Now you do this or that!"* A circle allows for anything to happen. When the teacher sits together with the children in the circle, it creates an atmosphere that supports movement and brings everyone closer to the action, but it has just as much a social function. It brings the pupils closer to each other and the teacher.

Social competence develops through social interaction. Cornelia commented that many children nowadays do not have siblings, possibly resulting in less developed social skills. Sitting in a circle helps the class engage in a group conversation, which has become routine with the End-of-day meeting *(Tagesabschluss)*. This is an activity of great importance, say both Bernhard and Cornelia, and it is easier to conduct when all the children are sitting in the circle. The idea is that the group goes through the ups and downs of the day. Any good or bad things such as conflicts they resolve together in plenary. The circular layout supports such activities very well since all the children can see each other's faces and bodies and see things that might be shared in the centre of the circle.

4.3 Challenges with movement integration

So far, the data has shown that movement integration benefits child development, learning, social interaction, and motivation. With all the benefits movement has on learning and well-being, why is it not used *everywhere*? What are some of the challenges with MI that might cause this?

Almost all the participants thought some sort of *fear* is the main reason why many teachers do not use movement integration in their praxis. Several also described the fear as *irrational* because they think it is caused by too little knowledge about how MI works. Although fear is

the underlying emotion, it can have different causes. This section will look at some of the causes that MI can lead to this uncomfortable emotion.

Bernhard suggests that a lack of training is a significant problem limiting the more widespread use of movement integration: "I think that is probably where the problem or the fear resides. The teachers do not get enough training in this area. It is not practised at all." Movement integration is a field that lacks educational support. Some teachers recommend visiting school classes with teachers who are good at using MI for a week at least. Multiple participants suspect little is taught about movement integration in the colleges teaching Steiner pedagogy. One participant suspects the reason is that the *generation change* has not yet happened. Older teachers that teach pedagogy are likely not to have personal experience with MI and, therefore, are not strong proponents. Steiner school teachers have much freedom in preparing and presenting the curriculum. There are few methodological, didactical guidelines, says Cornelia. This left her with a feeling of being left alone when planning her first school year.

A type of support that would be highly valuable says Bernhard is to have an assistant teacher. This can be combined with interns from the pedagogy colleges and would not impact finances and spread the word. Doris regrets that her school does not have more teachers because all teachers are so busy and never have time to visit each other in class.

Teachers reluctant to MI need to be introduced slowly and gently. Small steps and more teacher training are the way to go, says Agnes:

> A few colleagues then sat all the way in the back row. I was just as careful with them as I was with the children; I started with the little things; I told them: *"If you implement it, do not implement everything we did this afternoon. Pick one where you thought* I enjoyed that". And then they try this with their children.

When those who have been afraid or reluctant start to warm to using movement, it is a great moment. Agnes continues:

> That makes me happy, and I experienced that when the fear was gone because they were afraid of doing something with movement. However, when the fear and the pressure were gone, the teachers tried it out and had fun. And that is why I would always say: *"Yes, more teacher training!"*

According to Agnes, more information, support, and sufficient training and incremental steps seem best. The teachers need follow-up training, seminars and exchange of experiences and

ideas. On the other hand, Bernhard is a proponent of going all-in from day one. "Otherwise, it will never happen." Cornelia also says, "You should either do it fully or forget it." That is for the Steiner school and not the public school that Agnes suggested. He says that when it comes to using the circle layout,

> you must start practising it *right away* on the first day. The big mistake some teachers make is they say, "I will start without movement. I want to get to know the class first". And then later you want to introduce rearranging...No, that's not possible, you started too late, you did not practice it right away.

When asked if introducing movement into the teaching praxis *increases the workload* for planning and teaching, the consensus is that it does not. On the contrary, movement can help the overall concentration in class and help you structure the lessons, says Agnes. The notion that movement results in more work and effort is unfounded, says Bernhard:

> I would say the reality is the opposite. Teaching is getting *easier* because, in the old frontal teaching lessons, it sounds awful, but in the old classes, the teacher has the pupils as *opponents*. In the dynamic classroom, we are *together*. You have the children as *support*!

Working with movement requires less effort because the lessons flow easier. You have more energy and higher spirits, which the children sense and respond to by being more engaged and focused. Doris agrees; she thinks frontal teaching forces you to *offer* something constantly as a teacher. It is so *teacher-centred*. The dynamic classroom has more of a community.

The argument that movement integration requires more work also receives no sympathy from Cornelia. "We have heard this argument for like 25 years now; it is an argument I do not accept; I have to say, I do not take it seriously." When using movement, you can rest and prepare work while the children are active in group work. "It is just a different time and place where you do your work."

Fear of failing, lack of confidence

Another aspect of fear is the fear of turning out not to be good enough. Many teachers steer away from using movement because they are afraid of failing. Edvard thinks movement can be intimidating because it implies being exposed, looked at, having to be a good example: "I think they are a little intimidated by it. I think they just do not dare." He recalls a similar feeling starting his first year as a young Steiner school teacher. It was expected that teachers told fairy tales *every day*, that *everything* should spring from this activity.

> When you are expected to tell stories, you get nervous and scared. The fear that you will..., that you will not be good enough, or that you will be stupid, and so on. I think this is the issue.

Edvard explains that the storytelling tradition is on the waning front in Norwegian Steiner schools. "People pick up a book and read instead. It is as bad as it can get!" The reason could be that storytelling, like movement integration, seems overwhelming at first. It is a great shame because it is the opposite; it is a support. He recalls thinking after his first year as 1st class teacher was over:

> When the year was over, I wondered how this year would have gone if I had *not* told so many stories. In other words, it was the very foundation for it to go well! Immediately I perceived it as such an experience."

How did he manage to prepare and tell all these stories in the end then? "Well, it was easy," he says, "I was just reading the fairy tale collections of Asbjørnsen & Moe, learned them and worked with them every day." What initially seemed overwhelmingly intimidating came to be the core of his teaching praxis. He consulted good sources of inspiration, and together with practice and endurance, he was rewarded with a sensation of joy, confidence and meaning.

Losing control over the children

The participants think teachers avoid using more movement and dynamic classrooms because they are afraid of losing control of the children, losing discipline. Bernhard reflects on why movement is not being more widely used in schools:

> I think there is a certain amount of fear involved. It is scary when you let the kids move. Then you get scared and think: *"I cannot get it under control anymore, and I don't have any discipline."*

Bernhard is convinced that this is another *irrational fear* because, in his experience, discipline becomes more effortless. After all, the class is working together, and students and teachers support each other. What is paramount is to establish and maintain good habits and routines. Cornelia says that rules and routines make discipline a lot easier, but newcomers must also seek advice from experienced teachers.

Also, in the German public school system, teachers worry that the class will get out of hand and descend into chaos, says Agnes. "They do not realise that it ultimately leads to a quieter classroom." For this reason, she helps teachers introduce movement in small steps so that the teachers realise that control is still possible. Still, she also says consistent rules and routines are crucial to retaining a calm classroom atmosphere. For example, routines can be combined

with a simple task with mathematical qualities, says Agnes. This makes mundane chores such as rearranging furniture a mix of mathematical and physical exercise. Doris also combines mathematical tasks and considerations with the rearrangement or tidying up of the classroom.

Keeping many free-roaming children under control requires a positive yet firm authority. In dynamic classrooms, children have much freedom but must accept the teacher's authority. This can be a challenge for novice teachers, says Ferdinand.

> Because many teachers are shoved into the busy classroom unprepared, they do not think it is possible to develop these skills because the teacher training is insufficient. This chaos principle is the reason why they may fail.

Combining free movement and discipline is a balancing act. Learning this skill requires proper guidance and education, which is often lacking. The mobility in dynamic classrooms requires a new teaching ability, says Ferdinand. The old thinking that everything breaks out in chaos unless the children are "grounded" on heavy furniture is passé. The social closeness in dynamic classrooms allows teachers to quickly bring the children together even when they move more freely. According to Ferdinand, the idea that quiet and discipline equals a good learning environment is massively misguided. Teachers who might be excellent at keeping their class quiet and in line cannot fathom why the children are not learning anything. The quiet conditions appear to be ideal, but as Ferdinand explains, they are the opposite of the ideal:

> The teacher steers towards a certain point in the lesson where he thinks: *"Now everyone has to learn."* The children are even very quiet. Yet the situation alone inhibits and blocks some of the children who cannot learn at all when being told, *"And now you have to learn!"* Children need a different atmosphere to absorb quickly and satisfactorily.

The teacher's pressure, expectations, and overall mood inhibit the children; they do not absorb information, and the atmosphere is wrong. The teacher has managed to quiet the class but has not inspired it or made them open to taking in new knowledge.

Fear of change

Change can feel like a threat if you are someone who struggles to adapt to new situations. Some of the research participants point to the differences between teacher generations. The old guard is sometimes confident they have done things the right way until now. Admitting change is in order would indicate otherwise. One participant knows this type of stagnation: "The Steiner education can imprint itself in the *ether body* so that it becomes

sclerotised during 1, 2, 3, 4 decades of teaching. They perceive what they did for all these years as the correct way. And when something new comes along, it cannot be right. After enough time has passed, some teachers are simply stuck in their old ways and cannot escape."

The most enthusiastic proponent of the movement is typically the younger teachers. They often come to the school, observe, and say: "I want to implement that in my school!" explains Bernhard excitedly. He mentions the stark contrast to some rather lone voices of the older generation arguing: "But that is no longer Steiner education" or "The children should not be sitting on the floor! They belong at a table!" or "Children on the ground, that is not human". Agnes often experiences the same in public school. Whenever movement, play and fun are involved, people get suspicious and question if any learning can be happening.

In the Steiner schools, the implementation of dynamic classrooms is something that each school decides. In some schools, it is a requirement in the lower classes; others do it partially, and some not at all. Healthy renewal and growth must originate from within the school. Therefore, some schools cannot change; the divide between the generations in the collegium is simply too broad. One teacher explains:

> It must grow from within, but sometimes a generation change is required. Many schools suffer from older teachers not managing to move on but holding on to old traditions. The new teachers want something new, but they are not being allowed. Some schools are suffering as a result.

A difference between generations can cause stagnation and prevent the younger generations from exploring and developing new teaching methods. Cornelia recommends that we allow the young and eager teachers to try out movement in their teaching praxis. "Let them visit and observe teachers who are good at using movement. That is my recommendation", she says.

Making movement possible in a school is a collective effort. It needs support and approval from many. According to most interviewees, it is critical to ensure *everyone* is on board when introducing such a seemingly radical teaching approach as MI. This applies to fellow teachers, janitors and especially *parents*. Everyone must somehow approve of the activity. Parents want the best for their kids and should be informed why things are done the way they are. Agnes thinks it is imperative to tell parents first. "Parents love their children, parents fear for their children, parents want the best for their children, and that is why I have to explain why movement is in my class at a parent's evening." Conveying to worried parents why

movement is used should not be difficult, at least not for a Steiner school teacher who can explain why *Norse Mythology* is taught in fourth grade!" says Cornelia.

Contextual and practical concerns

Introducing dynamic classrooms can be challenging due to a lack of space or funds. Most schools have tight budgets, and asking for money to finance new benches and cushions while throwing out the heavy old desks can be a hard sell. Agnes reveals the logic behind getting acceptance for new projects in schools: "If you do not want money, the projects go through. The moment you say you need money, then they do not."

Cornelia finds the argument about the cost of benches and cushions needed for dynamic classrooms weak: "That is such nonsense! I mean, other school furniture also costs money!" Still, one bench costs €350, and additional folding tables are even more. The money must come from somewhere, so if school management is not convinced that benches and cushions will improve class dynamics, the teacher must find another way. One of the interviewed teachers did precisely that. She borrowed the benches from another school and arranged for cushions to be made privately.

Space limitations can restrict some activities. Doris does not let that stop her, and she often brings the class outside to the schoolyard or the forest. It adds to the mood and the excitement and leaves nothing to be desired for inspiration and learning. She says she finds it "very good and fruitful" to be outside. Assignments like drawing and writing can be done in the classroom afterwards or as homework.

The personal relation to own body, movement, and intimacy

Agnes knows that many teachers do not like to move because they are scared to do something wrong or make a fool of themselves. She would never argue with them but rather make tiny steps to help them get into using their bodies more actively. It can be basic clapping exercises, even while sitting down, making sure they are not overwhelmed. "This is something significant to remember", she says. One teacher explains what can happen when the body suffers from old age:

> Many older teachers argue against more movement because they can no longer move as dexterously and are not as agile. They cannot bend down that fast; they cannot kneel, they cannot make quick movements; they are just old. Then they invent reasons why it is not okay to integrate movement in class and why it is not suitable *for the kids*.

The reason why someone disapproves of movement can be personal, yet it is presented as something else, such as cost, didactics, or lack of space. However, age does not have to be a limiting factor. One teacher says: "We have seen some *incredibly* flexible and lively older teachers who implement movement in their schools. They are completely enthusiastic and without reservation because they have experienced what movement does to the children." Since these older individuals managed to keep an open mind, they allowed the positives to outweigh the negatives.

Ferdinand suspects that too much intimacy can make it hard for some to engage in classroom dynamics where bodily closeness and interaction are central. One teacher thinks that "the encounters between child and teacher in such classrooms are more direct and intimate, but not every teacher wants to allow that. The older generation cannot do that at all." The concept of the dynamic classroom is based on the close physical interaction between the children and the teachers. It is supposed to feel natural and great, but it simply does not feel appropriate for some.

Actively using the body can instil sensations of joy and acute awareness and affect the mental state. "Something happens in my body when I move. I feel it mentally. Perhaps those that do not appreciate movement do not feel this sensation", Cornelia reflects. "I am thinking right now, speaking to you, that people who like to move might be easier to win over. They like it better than someone who does not like to move. If you like to move and exercise yourself, you have more affinity for it." Cornelia finds it logical that there is some correlation between if a teacher enjoys physical exercise herself and her affinity for movement as a teaching strategy.

4.4 Summary of the empirical findings

The data show that the teachers are reflected and articulate and express a firm belief in MI's purpose, importance, and educational potential. They are clear that MI is a lot more than stimulation of the physical body; it is about stimulating the entire child as a person and building a deep and sound curiosity, ability to absorb and reflect on academic subjects and become confident and respectful in social contexts.

The data shows that all participants consider physical activities a prerequisite for learning and that learning cannot happen without it. There is agreement that the cause of sensorimotor

dysfunction in children is caused by lack of play and too much sedentary behaviour in our contemporary lives. This should ideally be compensated for early in school, focusing on consistency and adapting activities to the needs of each class. There is no one size fits all. The most insignificant routine is an opportunity to integrate movements and even some curriculum subjects.

It is critical to respect and understand that all children are different and have different sensorimotor needs. If these needs are not met, it can lead to blockages or, if taken care of, the sudden comprehension of a concept. The learning environment must instil a sense of trust in which children and teachers all work together.

An essential function of MI that needs to be protected is its capacity to spread joy and laughter by injecting a more playful behaviour into education. Movement is the most natural state for children and should be protected as something they cherish and love, free from fear and embarrassment. It needs to be connected to a feeling of free will and meaningfulness, not monotony or force. Movement is not just a vessel for learning; it is something that the children can use to express themselves through music, poetry, and rhythm. Making sure there is enough variation between tasks helps keep children and adults awake, says one.

The data is particularly rich in how MI can be applied in the lessons. The data shows many suggestions for how MI can support the delivery of academic subjects in engaging and relevant ways. The findings show there is consensus that the movement themselves do not have to reflect the subject's essence to be meaningful. Yes, it can be nice, but it is unnecessary and unrealistic. The reason is that relevance can be created in other ways, like exploring practical applications of the subject, recreating it with physical elements, or relying on storytelling to give otherwise insignificant activities deeper meaning.

The data clearly shows that the classroom plays an important role, especially in the dynamic classrooms found in many Steiner schools. Thanks to small benches, these classrooms' functional flexibility makes it easier to rearrange the classroom. This encourages creative, physically active, social, and collaborative behaviours. It strengthens group feeling, trust, mutual respect and dialogue and reduces the divide between teacher and children.

The data helps us understand what makes many teachers resist using movement in their practice. The consensus is that it is based on the emotion of fear but that it is an *irrational* fear. Much of it is caused by a lack of information or education on MI methods and praxis.

There seem to be no precise methods available but many MI examples. There is concern that MI/dynamic classroom is not adequately taught and that there are too few opportunities for training and support.

The findings show that a generational divide can be the cause. Younger teachers tend to be more enthusiastic than older ones, but the older ones have more say in schools and pedagogical education. The divide might be caused by pedagogical stagnation and the inability to change didactical practice. Some data indicate that reluctance can be caused by discomfort with the high level of intimacy that follows more collective movement. It can also cause physical or mental discomfort connected to self-image, the body, and physical activity. According to most of the data, the classical idea that MI will make the class descend into chaos is unfounded, although it does require good routines and guidance to avoid.

The empirical data that was collected to form a complex view of the use of MI. The data clearly explains why movement should be integrated into education and indicates ways it can be done in meaningful ways. The findings also provide many practical and solution-oriented suggestions for MI practice. The data indicate what causes reluctance to MI and suggest how this reluctance can be overcome by visiting classes using MI, providing better teacher education, finding good sources of inspiration, and discussing with more experienced teachers. If it is scary, do it in small steps. Alternatively, go all-in at once, according to others. The participants believe MI offers a way of teaching that is very rewarding for both children and teachers.

5 Discussion

The following chapter discusses the empirical findings in relation to the literature review. The focus of this study has been on movement integration (MI) and its role in learning and why teachers use MI, how they use it and why MI is challenging for some teachers.

5.1 The role of movement in learning

This first part discusses the role of movement in child development and learning.
The fictional names of the six teachers interviewed for this study are *Agnes, Bernhard, Cornelia, Doris, Edvard, and Ferdinand.*

Learn to move, move to learn

Our contemporary lifestyle robs many children of the chance to spend enough time engaged in physically challenging, stimulating, and exciting movement activities and physical play. North American Childcare shows that many children spend 89% sitting, 8% in light exercise and only 3% of their time in moderate or higher physical activity (Williams et al., 2009). The reasons are limited outside play and increased sedentary activities. Children sit up to 70% of the time in school and get insufficient exercise. Walking or cycling to and from school is replaced by motorised transport is the observation that Claudia has made. That lifestyle change is the leading cause why children receive a massively insufficient amount of exercise and physical and social play; this is clear for all informants and in the literature (Panksepp, 2007; Routen et al., 2017). Children are raised in ways that rob them of the opportunity to develop normally - physically, mentally, and socially - so schools must do their best to compensate for this. This is unfortunately not what happens in many schools. According to Hirsch-Pasek and Golinkoff (2008), the trend abolishes recess and play, hoping that this will boost academic performance. According to the literature and the empirical data, this approach can only be described as catastrophically misguided. It is difficult to imagine that such strategies have the children's best interests in mind or that of society as a whole.

The good news: There is no conflict between play, movement, and learning. Both play and MI will support learning while having endless additional benefits if done right.

Sensorimotor stimulation offered by MI can help compensate for the insufficient stimulus that today's children receive. It can simultaneously support cognition, concentration, learning, creativity, social development and more (Fedewa & Ahn, 2013; Doherty & Forés Miravalles, 2019; Gao et al., 2013; Madsen & Aggerholm, 2020b; Martin & Murtagh, 2017; Singh et al., 2019; Watson et al., 2017; Webster et al., 2020). The literature and the empirical data are aligned on this point, leaving little doubt about the many benefits of MI. For children, movement is the best thing there is: "I want to do it all day!" and "It is the best part of the day!" children say (Mc Leroy et al., 1988 as cited by McMullen et al., 2019, p. 13). They think movement makes things more fun, and they also comprehend and appreciate the simultaneous benefits it has on health. They even want it for *other* kids because the opportunity to move has become precious and rare, something not all kids have access to in their lives (McMullen et al., 2019).

The importance movement has for children's well-being has made teaching with MI in *dynamic classrooms* a non-negotiable requirement in some Steiner schools. Ferdinand, who teaches in a dynamic classroom (Bewegtes Klassenzimmer), says that "a person cannot learn without movement." For someone to learn, they will have to be able to move well first. Moreover, to move well, *all* the basic senses must be engaged, by which he means the feelings of touch, life/well-being, movement, and balance. Nalder and Northcote (2015) emphasise that for learning to be rich and joyful, it must compellingly involve the full spectrum of senses. Most children receive insufficient physical activity (McWilliams et al., 2009; Routen et al., 2017). To Agnes, this is apparent in children of all ages. She says it can manifest itself in retardation of the most mundane abilities, like confidently walking backwards. The inability to move freely in all directions motivates her to integrate simple exercises into trivial tasks. In Agnes's opinion, every routine is an opportunity to incorporate challenging movements and stimuli of various kinds. Doherty and Forés Miravalles (2019) report that even minor physical interventions increase oxygen levels in the brain. For Agnes, it is as much about sensorimotor stimuli, variation of daily routines, fun and social interaction. Children get fatigued *without* movement, she says. Agnes works a lot with adolescents and observes that their sensorimotor skills often remain poor even as they grow older. Poor sensorimotor skills do not automatically disappear with time or work themselves out. The retardations become more challenging to get rid of as the person gets older, and it becomes harder to improve coordination. Clumsiness remains or increases if the elementary abilities and not adequately established. Therefore, sensorimotor stimulation is more effective when offered during primary school years (Morgan, 2005). Agnes's relentless pursuit of providing physical challenges for all ages illustrates this element of urgency. The best effect she sees is in the consistency and frequency of MI. She finds this significantly more important than more extensive and fancier MI done with longer intervals. The more regularly you move, the easier it gets.

Children in one class can be in very different developmental with different needs. Jean Piaget warns that the developmental phases cannot be sped up (Ginsburg, 1982). Ferdinand explains how important it is to ensure that stimulus is provided according to each child's needs. There is something that he calls *sensory biases*. He says that each child experiences things differently because their senses have different levels of sensitivity and receptiveness. It is crucial to pick up on these different needs to meet that child's needs. Otherwise, the result can

be that the child is not developing and learning according to its character if their needs are not adequately met. According to Ferdinand, this can typically happen if certain senses are insufficiently stimulated and can lead to emotional or learning blockages. These blockages can, in many cases, be released if stimulated appropriately, helping the child comprehend subjects that have until then been problematic for it until then. Ferdinand says that there are auditory, tactile, and visual types. He mentions that *the tactile children* tend to receive less stimulus than the auditory and visual ones.

According to the participants, being receptive, attuned, and responding to the unique needs of the class is crucial. It seems to be the starting point for all the teachers. There are many reasons for this. When doing things meant to stimulate the senses and motor skills, it is essential to remember that not everyone has identical needs or the same abilities. One stimulus does not fit all. The result is that everyone moves differently. This uniqueness should be cherished and protected, says Agnes. Being aware of each child's preferences is essential. Each child should feel safe and never be made fun of or exposed negatively. Agnes says: "Never expose or embarrass a child! Then you may have ruined the child's joy of movement forever. Every child is lovely just the way they are." For a child to engage fully and passionately in MI, there must be trust and support in the classroom environment.

Trust is also one of the premises for brain-based learning (BBL) to work correctly, that the learning environment provides a sense of security (Jensen, 2008; Resilient Educator, n.d.). This idea of never exposing anyone is hopefully elementary to most teachers, but even then, the atmosphere in the classroom can still be unfriendly. Doing the utmost to create an environment where everyone is excepted for who they are is a prerequisite for both BBL and MI. For MI to have the best effect on learning, it needs to happen in a positive environment where the students do not feel threatened. And it should also be voluntary and joyful, not repetitive or obligatory, for the best effect (Diamond & Lingh, 2015, as cited by Doherty & Forés Miravalles, 2019). The movements must come from the inside, so to say. Not like a mechanical act in which the children just react to what is requested of them, but that they feel that it makes sense, they like it, and they want to do it without any fear of being ridiculed.

Agnes told a touching example where she talked about the toughest guys in school who were so tense that they could not even briefly lie on the floor to relax. After months of MI in a classroom environment in which they could feel safe, they dared not only to lie down and

relax but even request fairy tales to be told at the end of class. These were the guys that the whole school feared.

How MI affects learning depends on *why* we move and *how* it makes us *feel*. This is also Ferdinand's impression. Movement is the most natural thing for a child. He says this is the state in which they feel comfortable and at home. Therefore, MI should be moments filled with joy and happiness. MI has so much emotional potential that focusing only on cognition and motor skills is a mistake. Movement can be something significant and beautiful. According to Ferdinand, MI offers children a way to express themselves through their bodies, poetry, music, and rhythm. Movement should be something extraordinary, exhilarating and pleasing to the child. Repetitive, obligatory and boring activities are "misunderstood" approaches to MI, Ferdinand says, something research attests to (Diamond & Ling, 2015, as cited in Doherty & Forés Miravalles, 2019). To avoid repetitiveness, Bernhard prescribes what is called *breathing (Atmen)* in Steiner's pedagogy (Auer, 2017). It intends to have alternating activities and states of mind to prevent tiring monotony and too long sessions of focusing on one topic. Therefore, we can view breathing as MI on a higher, more rhythmic level between different activities. It alternates between play and silent contemplation, loud and quiet, alertness and relaxation, movement and rest.

The need for MI partly results from children not being physically active enough, causing them to struggle in many ways. When they are not active and use all their senses adequately, their ability to learn and develop is reduced. In the past, and in cultures less sedentary than ours, childhood used to offer movement and play by default. Even schools used to provide more of it, like proper recess breaks. Those days are gone (Hirsch-Pasek & Golinkoff, 2008), but let us bring them back! More physical activity and more play in school, get up from those chairs and fight screen time at home while we are at it! Sensorimotor skills need to develop early; they do not improve by themselves but get more challenging to improve as one gets older. Every little routine is an opportunity for movement interventions but should happen in environments where everyone is respectful and supportive of one another. Everyone needs to have a good time and should *want* to move. It needs to be *nice* because MI loses much of its positive effect on learning if it is not (Doherty & Forés Miravalles, 2019; Picard et al., 2004).

5.2 Teaching with movement integration

The following section discusses how the participants integrate movement into their teaching practice. This can help us understand how MI can be made engaging and relevant to academic subjects. As we have discovered, to make MI be of much use, it needs to happen out of free will and with a positive attitude (Doherty & Forés Miravalles, 2019). Therefore, it is not enough to simply make children move; first, they need to *want* to move. For this to happen, they need to become motivated and engaged.

Building engagement

It is important to remember that *mood* and *motivation* alter the effect of MI on learning. Movement integration, something that from its name appears to be a rather physiological or almost mechanical activity, must be viewed from a mental and emotional perspective as well. Children benefit from MI the most when they *want* to do it and find it *rewarding* and *fun.* Creating engagement is, therefore, an essential task for the teacher.

There are many ways to create motivation; one is to introduce elements of *play*. This increases engagement in MI, but it has other benefits that are caused by how play affects children mentally and socially. Agnes says that when she mixes play into MI, it often results in so much joy and laughter that passers-by question if any learning can happen in that classroom. "Yes, because playing is learning!" she says. The benefit of play and games is that they make the activities effortless, says Agnes. And play also gives activities a purpose. Research shows that tasks with a goal, such as a cognitive challenge, might improve executive functioning. (Diamond and Ling, 2015; Dekker et al., 2012, as cited by Doherty & Forés Miravalles, 2019). Madsen and Aggerholm (2020b) say play is an excellent way to give movement meaning. The Swiss psychologist Jean Piaget says that play is the ultimate way to motivate a child. Play can make tedious tasks intriguing to a child by making them into a game (Ginsburg, 2007). The problem is that physical play is becoming a red-listed part of childhood and school time due to a narrow-minded focus on academic performance and the failure to realise that play is beneficial for learning (Hirsch-Pasek & Golinkoff, 2008; Ginsburg, 2007). The fully *child-driven* type of play is an even more threatened variety though essential for the child's ability to develop psychological resilience (Ginsburg, 2007). Therefore, it is uplifting to hear Cornelia talk about the occasional breaks between classes at her Steiner school, in which free play is encouraged in the classroom. The children are allowed to do all kinds of creative things without adult intervention which often results in

surprisingly high levels of creativity. It would be interesting to see the effect when children were allowed to direct more classroom activities and teachers retreated to the sideline as observers or advisors.

Play is unique because it permits the child to form their own version of reality, an alternative reality to explore. This process gives the child a chance to have an inner dialogue between the two realities, the real and the imaginary, and explore and compare them. Play boosts attention, interest, and joy, which are vital for academic learning, say Hirsch-Pasek and Golinkoff (2008). This is different from regular frontal teaching classes that offer minimal variation in terms of MI and modes of social interaction. With frontal teaching, everyone is always in the same place - the teacher, the other children, the furniture, the view, its degree of variation is minimal. Frontal teaching also limits social interaction and group work activities which students otherwise find motivating and meaningful (Randoll, Graudenz & Peters, 2014). Physical play offers unexpected events and interactions that students sitting behind a desk will never have. Play offers what Piaget called *active education* (Ginsburg, 2007) in that it allows them to engage in a much more complex reality through exploration, challenges, and social interaction. Play brings something significant to education through how uniquely it engages students. It is highly complex and provides a context to explore social rules. It is a great way to bring joy into learning – by being physically, intellectually, emotionally, and socially stimulating at the same time. "Play and learning are inextricably intertwined" (Hirsch-Pasek & Golinkoff, 2008, p. 3). But it needs to happen in an atmosphere of safety and trust (Jensen, 2008). If the environment supports play, it can allow more experimentation, encourage curiosity, welcome "mistakes", and allow identity and self-confidence to grow. The idea behind MI and play offers the children much freedom, says Agnes, but there needs to be clear limits, rules and rituals for it to work. It needs *structure*, but structure and rules benefit everyone, she says. With freedom comes responsibility. It seems logical that schools would do their utmost to make time spent there as meaningful and stimulating as possible and that more play would be part of this. When play becomes part of teaching, MI becomes more natural and less like an add-on (Madsen & Aggerholm, 2020b). It is all about inspiring the will to act, explore, and learn. Play is so cherished because it is complex, rich, meaningful and with a deep sensation of freedom, which can become the foundation for engagement.

Storytelling

Our curiosity is one of the many reasons we love to listen to stories. Curiosity also has an

element of freedom in that it is *you* who desire to know more about something. It is like an invisible line between you and something external that you want to make your own, get to know, understand, and fit into your worldview. Does it add new knowledge or confirm what you already know? Neff (2011) says curiosity is what drives growth. Storytelling is one way to bring the power of curiosity and engagement to MI. When it comes to introducing more movement into education, sitting and listening to stories seems the opposite of using more movement.

Edvard argues that storytelling is *the key* to making activities meaningful, rich, and inspiring. When done well, storytelling forms the necessary motivational foundation for any subsequent activities. It can motivate any pedagogical process, he says. Edvard feels so strongly about the role of storytelling in building engagement, particularly for the younger children. Storytelling is powerful and indispensable, he says. The unfolding story fills children with excitement and anticipation; they all want to know what will happen, says Creswell (2007). Stories can offer intense experiences for younger children because they can perceive the imaginary world as authentic, making the impact of the fairy tale as strong as reality itself and creating memories and meaning that can last for a lifetime (Bettelheim, 2010).

There is another valuable aspect of storytelling: the social aspect. Storytelling, when done correctly, can become a co-creation event. Stories should not just be read out as many do; they must be told from memory. Then storytelling can reach its potential as a social event where teachers and children are equal, according to Bettelheim (2010). Both Bettelheim (2010) and Edvard consider the element of *flexibility* essential. Creswell (2007) describes flexibility as a necessary feature of the Storyline concept. Edvard likens it to a drawing: If the drawing develops from growing surfaces, it can keep developing; as soon as you make an outline, it is over, and it is fixed. The same way a photograph is fixed, there is no room for change to happen, he says. *Free narration* allows for the story to adapt. When the story is told from memory and not read, it is much easier to respond to the reactions and interests of the audience. Children feel this, too, which gives the sense that listeners and the narrator are in the story world together and unfold it together. This co-creation allows for things to take exciting and surprising forms. "It means that a story can become something other than you planned. But it is over the moment you make an outline," Edvard says.

Storytelling is unique in that everyone shares the exact moment, independent of their age or how advanced they are in a school subject. A story creates images in the mind of the listener. These images tend to become so intense for children that they almost form an alternative reality. Schiller said: "Deeper meaning resides in the fairy tales told to me in my childhood than in the truth that is taught by life" (Friedrich Schiller, as cited in Bettelheim, 2010, p. 5). Edvard says that it is essential that children are given time to allow for inner images to form. The story must be paced so that the children have enough time to process the content and picture it. A few sentences, then pause. And it needs to be visual content and not based on the narrator's interpretations or feelings; like what Bettelheim (2010) says, the story must be told without didactic ambition or explanations of hidden meaning. According to Edvard, detailed imagery makes it easier for children and teachers to remember the story. Bopp (2008) explained that humans tend to organise memory in analogue stories and that this can help them recall details better. This rich memory can then be accessed for inspiration and references during subsequent activities.

The power of storytelling can be used to motivate children. Tasks, such as MI activities, can be given meaning by connecting them to a story that the children already have found meaningful. MI can help the children give the story physical form. MI activities can become meaningful by connecting them to something the children *already* had established and accepted as significant when they listened to the story. If the story is rich, exciting, and told with empathy and interest, subsequent activities can piggyback on it. "It all rests on the story!" Edvard says. Stories make a tremendous impression on children, and if the story has "gripped" the children, the meaning of the subsequent activities is not so critical. The making process following does not have to be so genius or fantastic because *the story carries it*! On the other hand, if there is no story, or if the story is weak, then a too naive and simple making-task will be unacceptable and ultimately fail. Edvard explains:

> If you say that the story is the foundation here, then I think it is infinitely much richer and more captivating than we are aware of. It is so grand for them. And when you pick it up again in one way or another, either in conversation or in some other activity, then what you do can be simple and still stand there as something that the children experience as meaningful.

Edvard mentions another variant of activating curiosity and imagination: To ask children to imagine and explain what they think will happen as a result of some action or experiment thy can observe is what Edvard calls "quite fruitful stuff."

I have found little literature on the methodology for using storytelling as a tool to give MI meaning. In the dynamic classroom in Steiner schools, however (Auer, 2017; Kaliski, 2014; Schönherr-Dhom, 2014), the story plays a significant role which can be used when the children build and move in imaginary landscapes made of benches and the cushions, for example. The imagination of the children makes the classroom come alive. Still, storytelling as a vehicle to carry meaning into the world of MI holds as much potential as children's imagination.

Creating relevant MI activities

In the following part, we will look at ways MI can support comprehension of academic concepts or subjects and how it can be made relevant to the curriculum. The literature shows a demand from MI teachers for more information on how movements for MI can be designed and integrated (Benes et al., 2016; Madsen & Aggerholm, 2020a; Michael et al., 2019) which can cause "integration-difficulty" (Knudsen, 2019, p. 72). Although many books show examples of how MI can be used in various subjects, few explain the methodology for analysing a curriculum topic and making meaningful MI. The lack of didactical guidelines is apparent also in the empirical data, and the participants suggest more attention should be given to this.

Movement can be used in many forms in an educational context. Nalder and Northcote (2015) list three main types of movement intervention methods: 1) discrete physical activities, like mini sports, 2) integrated movement-based activities (IMBA), which can reflect the subject being taught; and finally, 3) brain breaks (movement intervention not directly related to the content). The movement integration focused on in this thesis is the second type, IMBA, or MI. Only in this group are movements used to convey an idea or a principle to support the delivery of academic content. The other groups focus more on stimulating the sensorimotor system, boosting awareness and concentration through increased oxygen uptake, for example. MI has the potential to increase comprehension through a *physical experience* of concepts. The more complex and more affluent, the better the brain and the sensory system are stimulated (Madsen & Aggerholm, 2020a; Jensen, 2008; Meade et al., 2019; Michael et al., 2019).

Some teachers find MI only meaningful for themselves and the students when MI and subject matter are related; otherwise, MI becomes a burden (Knudsen, 2019). This is, however, not the attitude reflected in the empirical data. All the participants are aware of the holy grail of

perfect analogy between subject and MI activities, but they see it not only as unrealistic but also unnecessary. Bernhard says that the MI cannot be made equally relevant to all subjects since subjects have different characters. It does not mean that there are no appropriate MI available for every subject, but one cannot expect them to achieve the same similarity to the subject matter. Agnes experiences that other teachers can sometimes struggle to develop MI and complain that there is no way MI would work for various subjects. This is never correct, says Agnes; there are always possibilities to use movement. The closest this she has to a method is to ask herself the following questions about the subject at hand: *"What exactly do I need, what is the basis, what do I want to define?"* and focus on that. She says that "subjects offer *opportunities* for movement", not the other way around. And importantly, it does not have to be *brilliant*. Brilliant is nice, she says, but *any* movement is better than *no* movement, in her opinion. But it needs to support awareness of the content, and it must fit the developmental stage of the class. The approach *Bewegte Schule* (Beigel, 2012) explains the approach used in many public schools. It is perhaps less focused on achieving a conceptual, analogue representation of the subject, but any movement is always a victory and deserves celebration, says Agnes.

Bernhard is a Steiner school teacher and does not start by focusing on making movements. He recommends focusing on finding *practical applications* for subjects. If you do that, he says, then movements will automatically appear as a result. The teacher should ask: "How can the children get *practical experience* with this subject?" This aligns with the Steiner tradition of focusing on practical experience, not on theory. It is all about preparing the conditions for the children to explore, says Bernhard: "I do not explain; I create a situation where the children can become active. And then maybe help to get the concept at the end." It is all about giving the children *hands-on* experiences with the subject and only assisting with some reflection at the end. There are examples in the literature that promote the same strategy. Wilson (2010) states that the hand is an incredible learning machine that, unfortunately, is forgotten in today's mainstream education. Hands-on learning is critical when children are young. "You cannot really separate what is in the mind from what is in the body. Knowledge really is the whole behaviour of the whole organism" (Wilson, 2010, 3:40), and you cannot educate the mind by itself. Richard Serra (2000) experiences that working hands-on with *real material* triggers new ideas that he would never arrive at just by theorising. In *affective learning*, one theory is that the quality of engagement influences learning. This is best achieved when the

learners can build something and then discuss what they just created. It makes them *feel* differently about their newly acquired knowledge partly because they have ownership of it. This again changes how they view and apply that knowledge in the future (Picard et al., 2004).

Gatto (2010) and Picard et al. (2004) are concerned that current education is too focused on theory and the cognitive with little attention to feelings and concrete application. When practical use is not present, the learner would have no purpose in acquiring the knowledge other than passing a test. "Traditional education fails because it is too cognitive and is disassociated from practical applications and personal feelings" (Papert, as cited in Picard et al., 2004, p. 263). Concepts only become real experiences when tested and evaluated by the body. According to Bruner, the first phase of learning must be *enacted*, where the child learns through the body and real-world experiences (Bruner, 2006 as cited by Madsen & Aggerholm, 2020b).

Bernhard provides a setting in which the children can find their own ways. This inspiring approach leaves more room to play for them. It is like child-driven play, but where the teacher directs the play by how the learning space is prepared like in the *makerspace* (Hughes & Morrison, 2020) or with *affordance* (Gibson, 1979). The space and the tools direct action and creativity by what they offer. The exciting thing here is that suddenly, the teacher will start learning from the children too, which can motivate and engage teachers and children simultaneously, rather than the teachers having to serve everything on a silver platter, which is tedious and exhausting for everyone.

Analogy

Physically experiencing something with the body can make comprehending and appreciating a subject more natural and easier for the learner (Madsen & Aggerholm, 2020a; Michael et al., 2019). MI can be used to express different concepts. Some MI activities resemble concepts inherent in the subject; others do not. When MI closely resembles a subject's core principles, I would say they are more analogous to it. Below are some examples showing MI with different levels of analogy to the academic subject.

Very analogue MI

Edvard is excited by how *scaling up* offers realism, like when conveying structural principles in architecture. By adapting the size of the construction elements to the human body, the

students could *feel* the structural forces with rods, ropes and big foam blocks that they support with their bodies. Edvard explains the principles behind this architecture project:

> A model remains a model until it becomes so large that it becomes architecture. If it is possible to put a load on it, then it also becomes a construction that is a reality. If you even incorporate the body into the structure, you can experience something that you cannot see. Tensile and compressive forces cannot be seen in the construction of a building. But you must understand them. Now you can experience them *in your own body.*

Various factors contribute to making this experience feel real. The large size made it easier to sense the forces working on the body. Multiple participants and teamwork were required to make the experiments possible. The abstract and the invisible were made tangible, analysed, and discussed. The project is similar to brain-based learning ideals (Jensen, 2008) strives for, like complex stimulus, teamwork, discussion, experimentation, and immersion are essential. The richer the sensory stimulus, the more profound the experience becomes. It also resembles Kolb's (1984) model for *Experiential Learning* and its four phases of learning: 1. Concrete experience, 2. Reflective observation, 3. Abstract conceptualisation, 4. Active experimentation (which starts the cycle over). Edvard's project is in a class of its own in that it makes something otherwise invisible tangible through the body. Just brilliant.

Bernhard reports another example of analogy: The French teacher appears all dressed up in class with a basket full of French groceries. She then starts to sell groceries to the children in the class, all in French, of course. Realism emerges through its practical application. The degree of analogy is close to 100%. The experience has elements of play, socialisation, gestures, "French behaviour", fun, excitement, embarrassment, and movement - just like speaking French in a real-world context.

Semi-analogue MI

When learning about the dandelion, the children paint it afterwards, explains Edvard. They focus on the content and recreate it by painting it. This is not new, but it is a great way to link content to movement and memory, just like drawing (Meade et al., 2019). No grand movements, but it can be applied to activities with more movement. The exciting part is when the paintings are later discussed as a group. The character of each flower is given attention, what are their differences, all in a safe environment where everyone's feelings and thoughts are respected. It is not so much about the body's movement as it is about the discussion that follows the activities. It is a collective exploration of each child's painting, all the possible

ways of seeing, reflecting on and questioning the world, as Freire (1997), Jensen (2008) and Andresen et al. (1995) advocate. It is the opposite of the teacher distributing "the truth" (or a dandelion picture to copy); it teaches the children to appreciate how many different truths can coexist, each child's own truth being one of them. The children have created something through controlled and expressive movements that become the basis for investigating the subject, the dandelion, and the many faces a dandelion can have. Edvard said: "The children tend to be extremely thankful and do not ask for much. Activities can be kept very simple yet be very rewarding."

Non-analogue MI

An excellent example of non-analogue MI is reacting to certain words occurring in a spoken text or responding to Latin grammar rules, says Agnes:

> And it is just a matter of pulling your hands away or hitting them when a verb or noun is mentioned. That was so popular in higher classes, and they were wide awake afterwards! Yes. It is something very simple. I think exercise in higher grades is just as important.

Interestingly, it demands full attention to grammar, like grammar becomes a matter of life and death, you become hyperalert to grammar. It is, in one way, analogue because the critical movement is not the hands but the brain reacting to Latin and the MI is just a manifestation of this.

Intuitive teaching

What would happen if the children were directing the lessons? It would take the burden off the shoulders of the many teachers intimidated by all those expectations. This idea is close to the *intuitive teaching* that Ferdinand describes when the teacher is highly attuned to the children and the lessons just flow. He talks about a highly intimate and spiritual process in which the teaching and the learning happen in both directions. It is getting away from the notion that if the teacher does not deliver the goods, the children are helpless and unable to learn. It is about the teacher being *present*. Cornelia says that the children will express their needs, perhaps not verbally or explicitly, but the sensitive teacher will pick up their signals. It requires that the teacher responds to the group, not following some pre-defined, generic formula or method. This is similar to recreating the qualities of free play explained by Hirsch-Pasek and Golinkoff (2008). They point out the difference between teacher-driven activities and child-driven ones, where the child-driven ones result in better learning. What Cornelia and Ferdinand explain is based on the teacher *responding* to the children. The children are, in

a sense directing the lesson. It might not be a typical form of play, but just the fact that the children get to steer the progression of the lesson is a form of play because it is an unconventional switching of roles. The play lies in exploring and finding things out, only being assisted by the teacher and not being told what to do.

Using play in MI is an exciting direction to explore how the lesson can bring in elements of play without becoming just fun and games. It is a new way to view relevance. What is "*relevance to the subject"*? By being responsive to explicit or subtle suggestions from the children, relevance is much about responding to *their* signals, allowing them to influence what is considered relevant. The teacher might learn something in the process, be taken on a journey, and discover another perspective on the subject, perhaps an angle unique to this group. It becomes a collaborative, explorative process where reality can be explored together. It would help socialising the brain, something Panksepp (2007) believes can help reduce ADHD.

Perhaps there are agreements and compromises to be made when arriving at "truths", but the process is more important than a definition of a finite truth. Freire (1997) would be happy to know that these children are actively *discovering and discussing* knowledge, not being told they are too insignificant to decide what is relevant in this world. Setting the stage for more exploration and children to direct the process is a fascinating direction to teaching. The *process* itself is the goal, including the making, the movements, the discussions, not reaching a pre-defined conclusion. It is a state of mind where there are no right or wrong, no "mistakes" to be made. Anything that creates a surprise, or new insight is a valuable experience. As Hegel said, "Any experience that does not violate expectation is not worthy of the name experience" (Kolb, 1984, p. 29).

The role of the classroom environment

The classroom environment plays a significant role as an enabler for MI. It is the stage on which activities can play out, and it can influence those activities positively or negatively. In addition to the size and shape of the room, there are also mobile or stationary elements such as furniture, storage, light, decoration, wall colour, materials, smell and acoustics that together make out the classroom space.

The significance of the classroom and its interior should not be underestimated, yet too often, it is ignored. "The aesthetics of the physical environment is a significant consideration that,

for the most part, has been overlooked in the literature on early childhood environments" (Read, 2010, p. 76). It impacts behaviour and mood and has the power to provide or restrict activities. This becomes clear when we compare the traditional frontal teaching with desks and chairs in a row with the teacher up by the blackboard against the dynamic classroom version with small, mobile benches often arranged in a circle with separate cushions. The dynamic classroom has many benefits: the circular arrangement offers all children a "first-row seat" and creates a strong sense of community compared to frontal teaching arrangements. The traditional frontal teaching layout reduces cognitive capacity and works against the brain's natural capabilities (Degen, 2011). Although the small benches afford easier rearrangement, the circular layout makes the main difference, not the furniture itself. The circle creates a strong sense of togetherness and collective attention. This layout has also been promoted as part of the brain-based learning strategy (Jensen, 2008) as a constellation of seating that encourages dialogue, interaction and movement.

On a group level, the circle is ideal for dialogue. It offers an unbroken line of sight between everyone. In the middle is a space used to share things everyone has direct access to. Doris talked about *belonging* and Bernhard about *everyone being in the first row*, on the same level. Research shows a 5%-27% learning gain for primary school students in the front row versus the rear (Ngware et al., 2013), so it can be said that a circular arrangement is fairer and more democratic.

The mood of the classroom environment is of great importance. This atmosphere expresses the room’s intention and visual message (Boyce, 2003), as does the lighting, where a dimmer mood encourages more creativity and risk-taking, for example (Steidle & Werth, 2013), or that fluorescent lamps limit engagement compared to LEDs (Pulay & Williamson, 2017). Agnes says she does not ask for much (because she does not get much); all she requires are some flowers, pictures and sensible lighting. The shape and movable size, and weight of the furniture in the dynamic classroom express a willingness and potential for change; it encourages improvisation and action by both teacher and children. Doris thinks it feels a lot more spacious and open for improvisation. Hughes & Morrison (2020) explain that makerspaces' characteristics are that space and the tools and materials displayed suggest and encourage creativity, exploration, and confidence. The affordances provided by furniture and tools in terms of mobility, ergonomics, and intended use instil varying levels of expectations, possibilities, and creativity in the users. Decorative patterns, ceiling height and light can

stimulate or depress creativity. It can encourage or discourage new thoughts, interests, and the pursuit of new ideas. The space and elements that define the physical learning environment play a crucial role and should be respected and considered accordingly.

5.3 Challenges with movement integration

In this last part, we try to understand why some teachers find MI challenging to integrate and if there are differences between the literature and the empirical data in this area.

In my view, it is curious that MI is not used in all primary school education. How can this be when it is apparent that children need to move and be hands-on and when the literature details the many benefits of MI?

The empirical data and the literature align in many areas but show some noteworthy differences. The main difference is not so much the types of reasons causing challenges or reluctance to MI, but rather the importance they are given. It must be noted that five of the six teachers interviewed were Steiner teachers, of which most have taught in *dynamic classrooms*; one teacher was from the public school system. A dynamic classroom is a different approach to what mostly is referred to as MI in the literature. The literature on MI typically focuses on public schools with various MI activities and often with older students. Another difference is that much of the literature explains challenges experienced by teachers that are *already* using MI or other physical activities in their practice (Knudsen, 2019). The interviews conducted for this thesis focused more on why some teachers are reluctant *before* trying MI. Still, the result contributes to a better understanding of what might restrict a broader implementation of MI in education.

The empirical data emphasises *fear* as the primary emotion that holds teachers back from using MI. This emotion is attributed to several challenges related to MI, some already encountered in the literature.

Lack of knowledge and education about MI

The empirical data explain that variants of fear cause teachers not to try MI. One is caused by too little knowledge about MI. This involves pedagogical requirements and how MI affects classroom control. The participants think a lack of knowledge and experience often makes teachers judge MI more negatively than if they were adequately educated on MI, had visited classes using it, or had some experience practising it themselves. Therefore, they consider the

fear irrational and best treated with proper doses of information, education, and real-life experience.

There is insufficient information, education, teaching material, and time and opportunity to visit classes using MI. Some suspect that the dynamic classroom/MI is not adequately taught in Steiner pedagogy colleges, if at all, which is surprising if it should be the case. One suggestion for why it is so is that the teaching staff is old and conservative and that only younger teachers can get MI into the curriculum. This lack of education and training material is also documented in the literature, including challenges to integrating movement with the curricular content (Benes et al., 2016; Knudsen, 2019; Michael et al., 2019; Webster & Starrett, 2020). Cornelia also misses methodologies or didactical guidelines in Steiner pedagogy. It would seem logical that teachers would systematically exchange ideas, methods, and experiences with one another to counter this problem. Doris complains about little exchange of experiences between teachers, often due to time restrictions. The literature has also reported a lack of collaboration and knowledge exchange (Knudsen, 2019; Michael et al., 2019).

The literature documents that MI requires preparation and training that adds to the current workload and that school administrations rarely compensate for this (Benes et al., 2016; Knudsen, 2019). The empirical findings differed; Bernhard thought the opposite, experiencing that the dynamic classroom is more of a collaborative effort where everyone works together, resulting in less pressure on the teacher. Teaching becomes more manageable; it flows and creates more energy. You can both rest and prepare content during class, says Cornelia. She finds the worry about a higher workload unfounded.

The participants also have a preference to respond directly to what happens in class and rely less on detailed preparation of MI before class which is different from what is presented in the literature, where teachers seem to suffer from too little time for preparation (Benes et al., 2016; Knudsen, 2019; Michael et al., 2019; Routen et al., 2017). MI can be approached in different ways. Some respond to the present situation, while others prefer to prepare more in advance. The way MI in dynamic classrooms is practised in Steiner schools seems to be more about responding to the atmosphere and the situations during lessons rather than preparing things in advance. Doris says that if she prepares too much material, it is restricting and probably will end up not being used. She prefers to have just a few things, thoughts and

verses prepared and let the rest play out in class. Teachers new to MI must be allowed time, at least an entire week, to visit school classes with good and experienced MI teachers. According to Bernhard and Doris, there is not enough training made available, precisely as the literature concludes.

Fear of failing, lack of confidence

Teaching with MI represents a new teaching paradigm that can be intimidating for some, Edvard suggests. Like he was intimidated when he was asked to tell fairy tales *every* day during his first year as a Steiner school teacher. He says that depending so much on stories proved to be the best thing he could have done. He could not imagine how that year could have been possible *without* doing it. For him, the solution was to have good sources of inspiration and just practise it. People are afraid of failing, he thinks. It stems from the impression that teaching with MI is more complicated than frontal teaching. And to a certain extent, this is true if it is not taught adequately, says Ferdinand. It does need good practice and guidance. The literature shows this, too; if insufficient support and training are provided, it can lead to lower self-confidence and reduced interest and effort in preparing the lessons, resulting in unsuccessful lessons followed by reduced engagement and interest from students (Morgan, 2005; Morgan & Bourke, 2004). Confidence is essential, but it can only be built with competence, resulting from proper and solid education, practice, and unwavering support. This will encourage novice MI teachers and increase MI's chance of success. Based on the empirical data, it would be fair to suggest that MI is likely to make teaching more inspiring and satisfying rather than a source of frustration and failure. Not to mention the effect it will have on the children.

Fear of losing control over the children

According to the participants, many teachers unfamiliar with MI seem convinced that MI will cause a loss of discipline or even chaos. This concern has also been addressed by Routen et al. (2017) and focused on challenges with getting the students back after MI activities. One proposed solution is to develop routines for transitional wind-down periods. According to Ferdinand, reeling free-roaming kids is not a problem, but it is a skill that has to be learned and is a skill that is rarely taught. Many of the teachers interviewed in this study find that MI *increases* discipline and concentration, contrary to uninformed belief. Agnes is sure that MI leads to a quieter and calmer classroom which is also the conclusion presented by Michael et al. (2019), something that needs to be better explained to newcomers according to the

research. In the dynamic classroom, there is an atmosphere of community and working *together* where discipline in its classical sense can become almost obsolete, effortless, says Bernhard. What makes it easier to retain classroom control is well-defined and practised habits and routines, according to Ferdinand and Agnes. But habits and routines can also provide opportunities for MI activities. Ferdinand emphasises that discipline does not equal good learning conditions. Good learning conditions are not about quiet and still-sitting because such behaviour is likely to inhibit receptiveness. Discipline can reduce inspiration and student involvement, he says. It is essential to assist teachers new to dynamic classroom teaching because it can be challenging; it needs a different mindset. It does need proper guidance in the beginning for it to work. The reward is that less effort is required to keep order in the classroom.

Fear of change

The empirical data show that conservative attitudes amongst older teachers, school administration and pedagogy education can restrict the use of MI. The reasons can be personal or pedagogically founded, but according to Ferdinand and Bernhard, the underlying reason is most likely personal. They say that rigid stances against MI are often caused by emotional and pedagogical stagnation. It is due to an inability to change own teaching praxis rather than well-founded pedagogical arguments. This aligns with research showing that many teachers cannot free themselves from the didactics they have become used to (Quarmby et al., 2018, as cited by Knudsen, 2019, p. 83).

Benes et al. (2016) found that younger, less experienced teachers generally were more interested and knowledgeable about MI, which is also what the empirical data shows. The older the teachers are, the less likely they have personal experience teaching with MI, causing less interest in pursuing and promoting MI. This is not necessarily due to physiological limitations caused by ageing but due to mental barriers. This logic can also affect learning institutions. Ferdinand suspects that is already the case and why MI is not established in teacher education. He suspects it is because many of the teachers teaching there are of the older generation and do not have sufficient experience to be convinced. There needs to be a generation change for MI to become fully integrated. Implementing MI represents a change of practice that everyone needs to support, from school administrations to parents. Parents must be adequately informed of why their kids move and have so much fun, reminds Agnes. The overall impression is that young teachers need to be listened to, and the older generation

needs to allow room for new ideas. Teachers enthusiastic about MI need support in the form of time and the opportunity to visit MI classes and receive proper education and guidance.

Contextual and practical concerns

When new furniture is required to introduce MI, like it is for the dynamic classrooms in Steiner schools, cost issues can arise. Cornelia says that benches and cushions are no more expensive than other furniture and discards such cost arguments. However, it seems unreasonable that it is the teachers' personal responsibility to acquire furniture, as was the case for Cornelia. It indicates that MI and dynamic classrooms are something some Steiner schools do not prioritise. The teacher may be allowed to do it, but it is not financially fully supported. The literature on MI is mainly focused on public schools and specialised furniture I have only encountered in makerspaces, so there is little literature on this topic. Where there is a will, there is a way. Manifesting a few benches and cushions out of thin air should be possible.

The personal relation to own body, movement, and intimacy

Doing movements and exercises with your body can feel very personal, especially in a semi-public context like a classroom. Some might feel exposed, self-conscious, and uncomfortable. Many participants emphasise that movements must originate from the children's free will and not external pressure. This could be said for teachers too. If movement is difficult, it can be introduced in tiny steps to build confidence and acceptance.

One subject that has not appeared in the literature I have reviewed is the teacher's relationship to their own body. People who suffer from a strained relationship with their own body, either because of physiological or mental challenges, are likely to seek ways to minimise the use of movement in their practice. This can be the underlying cause why some resist MI, Cornelia suggests. Being open about one's own physical or mental difficulties related to movement can be difficult, also because MI is meant to be so great for the children.

Bodies interacting with movements can also be perceived as very intimate, perhaps too intimate. Ferdinand explains that the dynamic classroom has an aspect of being more direct and intimate. He says this type of interaction can be challenging for some and impossible for people of the older generations. Another teacher explains what can happen when the body suffers from old age:

> Many older teachers argue against more movement because they can no longer

> move as dexterously and are not as agile. They cannot bend down that fast; they cannot kneel; they cannot make quick movements; they are just old. Then they invent reasons why it is not okay to integrate movement in class and why it is not suitable *for the kids*.

The teacher quickly points out that age does not have to be a restricting factor; many old and enthusiastic people are teaching in dynamic classrooms. Cornelia assumes a connection between a teacher's relationship to one's body and that if someone enjoys movement and exercise in general, that person is likely positive to MI. "People that like to move might be easier to win over", she speculates. This topic is not often discussed in the literature, but Knudsen (2019) reports that teachers who have prior experience with sport and exercise tend to feel more competent and find it easier to integrate physical activity. The teacher who shall teach with MI will benefit from enjoying movement and exercise, which in turn will inspire the children. This suggests that learning about MI is not just about learning how to use it for teaching or for other benefits the children might have but should also be about how the teachers can learn to move and enjoy movement themselves.

6 Conclusion

6.1 Summary of findings in relation to research questions

This study aimed to understand why and how movement integration (MI) is used in primary education and the challenges MI may represent for some teachers. I formulated three research questions to provide more knowledge about these aspects of MI. Hearing teachers' views empirically on the role MI plays in learning would be valuable.

The first research question is:

RQ1: How do the teachers perceive the role of movement integration in primary school learning?

There is a clear consensus in the literature and among the participants that children suffer from insufficient physical activity, in school and in their free time. Physical activities such as those used in MI offer sensorimotor stimulation that compensates for this deficiency while at the same time improving cognitive development and learning. According to the teachers I interviewed, movement benefits children of all ages, and if children also receive appropriate sensory stimuli, it can also help them overcome cognitive learning barriers. MI activities must therefore be adapted to the whole class's developmental stage and sensory biases, especially the least capable children.

According to teachers interviewed, the body and mind do not develop independently but together. Learning will be more profound if curriculum subjects are experienced with the whole body and all its senses. The role of the hands and tactile experiences are often forgotten but should receive more attention, according to some of the teachers.

The findings show that MI works best when it is something children enjoy doing and find meaningful. They indicate that it is important that MI is varied and unforced and allows children to explore movement without the risk of being made fun of or embarrassed. Individuality needs to be cherished and protected, teachers say. This will encourage children to express themselves through movement and allow it to become a source of enjoyment, pleasure, and personal expression.

The second research question resulted from the limited literature on methods for creating MI content adapted to specific subjects. More insight and practical advice would support teachers

who already use MI and be useful information for teachers inexperienced with MI. The second research question is:

RQ2: How do the teachers create and integrate movement activities they perceive as engaging and relevant?

Purpose and relevance

The findings indicate that movement integration can bring curriculum subjects to life by making them experienced through the body and its senses. But for children to fully engage in MI activities out of curiosity, interest and free will, the activities with meaning and purpose are more motivating. Teachers interviewed, therefore, find it important that activities have purposes that capture the children's interests and imagination. Below are examples of how they do this.

Practical experience

One method focuses on creating situations where children can have a practical experience of a subject or a concept. Practical, hands-on activities will automatically result in movements that make sense because the activity would not be possible without these movements. Appropriate movements will be the natural result of offering hands-on, practical encounters with subjects.

The story as meaning-carrier

Telling stories involves the powerful imagination children possess. Rich and visually detailed stories, told slowly from memory, allow the children time to form clear and vivid inner images. When the story is strong enough, it becomes the meaning-carrier for subsequent movement activities, which can be pretty simple, the teacher says. Such activities can be anything from painting to modelling and gestures and create opportunities to reflect and expand on the subject based on what was done.

Child-driven activities

The findings show that movements become meaningful through child-driven activities and play. This is cherished by children and offers an alternative to teacher-directed activities. One teacher recommends creating situations that encourage the children to form such activities. This is motivating for children and outside of the ordinary routine. It also relieves the teacher of the role as a learning provider and is about reacting and responding rather than controlling the process. It builds independence and confidence and rewards collective effort, and the teacher is also likely to learn something from such processes.

Responsiveness and improvisation

Many participants often pointed out that they consider it essential to react to the class's changing needs and interests. Activities can develop and take new forms if the teacher is flexible and responsive rather than following a detailed lesson plan. Lessons can then become surprising and rewarding for both children and teachers. The classroom furniture must allow for improvised activities.

Finding the essence

Some teachers look for the essence of a subject and the core concept that needs to be understood. The purpose is to make abstract subjects tangible through embodied experiences that are quite analogue to the subject. Many other practices have emerged from the empirical data that show alternative ways MI can be made meaningful, relevant, and engaging.

The classroom as inspiration and enabler

The findings show that the classroom environment and furniture can limit or encourage MI activities and improvisation. The participants who use the dynamic classroom (Bewegtes Klassenzimmer) value its open and flexible quality. It represents the opposite of the traditional frontal teaching classroom, with its immobile desks restricting variation and movement. It puts less pressure on the teacher to conceive and direct every classroom activity and allows the children to learn through interaction, dialogue, movement, creativity, and improvisation. The dynamic classroom is an example of what a child-oriented learning environment can look like, and it demonstrates the learning environment's influence on teaching and learning.

The third and final research question asked why not all teachers pursue movement integration as a teaching strategy. With all the evidence of MI's benefits, how come it is not implemented everywhere?

RQ3: What do the teachers perceive to be why some teachers do not use movement integration in their practice?

The findings show that various forms of *fear* cause teachers to be reluctant to use MI. Teachers interviewed for this study consider this fear irrational, driven mainly by limited knowledge and experience with MI.

The empirical data and the literature indicate that teachers are concerned they will lose control when children are allowed to move freely. The participants experience the opposite: lessons

become calmer and more controlled with MI. They say discipline can become effortless with clear rules and routines, but it needs guidance from experienced MI teachers to be mastered.

The data shows that education and guidance are essential for MI to succeed, yet not enough is provided. Teacher education is important to make teachers confident since MI is an approach to teaching that many have never experienced. Observing a good MI teacher work for at least a week should be obligatory. Some participants suspect MI is not adequately taught in teacher education programs.

According to some participants, MI teacher education and support are missing partly because leading teachers and teacher educations are stuck in their old didactic ways. The findings show that they might have grounds to oppose or neglect MI as a teaching strategy, but they are rarely pedagogically founded. This indicates that negativity towards MI is seldom based on personal MI experience but rather the lack thereof and might hinder teachers enthusiastic about MI from starting to use it.

Some participants believe MI reluctance can be connected to a teacher's personal relationship to movement and physical exercise, suggesting that the more you enjoy moving and being physically active, the more confident you are likely to feel with MI. Just like the children are learning to move, so must many teachers, something that requires starting with small steps, according to one teacher.

The literature indicates that some teachers feel that MI requires more effort and preparation and can be difficult. This is not something the participants agree with. On the contrary, not everything has to be prepared in detail, making MI a co-creation process with the children. One participant says that instead of all eyes being on the teacher, it can become a collaboration between teacher and children.

6.2 Study evaluation: quality and limitations

I conducted a qualitative study using interviews to explore and thematically analyse the personal experiences of six teachers experienced with MI. The resulting empirical data was detailed and relevant and made it possible to answer the three research questions. I made sure all the transcripts were member checked, and I was transparent about the methodology used, my background, and my motivations.

Limitations

That there are mostly Steiner school teachers interviewed for this study might limit the findings' generalisability and their relevance for non-Steiner schools. MI might be applied differently in Steiner school's dynamic classrooms and public schools, but understanding these differences was not this study's focus. Another generalisability limitation is caused by the small sample from only two countries. Although the approaches described in this study are used in many countries, one can only imagine how many other approaches there are in other countries and cultures. The third limitation is that the study provides little information on how student age influences how MI is used. The participants repeatedly emphasised the adaptation of MI to the children's developmental stage as necessary, but the topic has not received enough attention to contribute more detailed knowledge.

6.3 Implications, contributions, and future research

The study has shown that more knowledge and education on MI is vital for its wider acceptance and support. The findings can ease some of the concerns that teachers reluctant to MI might have. They can also inform teachers and policymakers to realise the influence movement can have on learning, child development and well-being. Perhaps this would convince school administrations and policymakers to dedicate more resources to promoting MI in the form of research, teacher education, development of didactical methods, classroom design and more teacher support. Considering the value MI has for children, it should have its place in future education policies.

The study has provided valuable and detailed knowledge about many methods used to create MI content. The empirical data collected through interviews contribute detailed knowledge to didactic guidelines and methods for how to create MI content and conduct lessons. The study has shown that a better understanding of the thoughts and methods behind successful MI is needed to further its development. The study has also described some challenges MI represents for teachers and views these in a different light. It has confirmed how important movement is for children and their learning and the many ways MI can make children's time in school rich and rewarding.

The study has opened new directions for future research. Exploring how MI is used in other countries and cultures would be highly interesting and expand the understanding of MI and its application. Analysing and describing the many variants found worldwide would require a

massive research effort but be of equally immense importance. A worldwide network for MI research would be a great start. Another research direction is understanding the differences between MI in Steiner schools and public schools. This study has only briefly touched upon the differences, but further studies are needed to learn more about how MI is used differently the two pedagogical directions and the effects of these differences. Finally, four of the teachers in this mainly referred to the dynamic classroom used for 1.-3. grade children. Two have used it with older students as well. All have talked about adapting MI to the children's developmental stage and age. More research needs to be conducted to understand why and how MI should be used differently for various age groups.

Researcher's final thoughts

Our world is not in its best state, but if we shall have a chance of turning the tide, something must change. If the coming generations learn, think, and behave like previous generations, the chances of improvement are rather slim. Where then to start? The increased focus on using movement as a central teaching strategy represents a positive shift in understanding child learning. It has led me to believe that primary school can become one of the most cherished, valuable, and inspiring experiences in a person's life. This might be possible if we change how learning is understood and teaching is practised. Movement integration is an important contribution to this change.

As I embarked on this study, I was under the impression that MI activities had to be carefully considered and planned in detail to convey curriculum subjects or concepts accurately. The study showed that there are many other approaches to MI and that movements do not have to be analogue to the subjects. It can be as important to create inspiring and meaningful reasons to move. The movements themselves are just one aspect of a larger, more complex encounter with the subject matter that involves creativity, improvisation, social interaction, and personal expression, to name a few. As an industrial designer, I have become motivated to create school environments where children can learn and unfold, play, explore and discover meaning. This study has confirmed the learning environment's important role and how it directly influences what kind of learning experiences can occur. The many ways to use movement in teaching have inspired me to radically rethink how school architecture, classrooms and furniture can be understood and designed. Let's get moving!

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Appendices

Appendix A: Interview Guide

Personal introduction

-**Name**, age, nationality, education, profession?

-What have you **done** professionally?

-Are you still practising as a **teacher**?

-What are/were your **main subjects** and teaching responsibilities? Subjects/age groups

Why use movement

-Why do you use movement in your teaching practice?

-How it is different from traditional teaching?

-Is it equally important for all age groups? Which age groups benefit the most?

-Is it appropriate in all phases of teaching – both *new* content and *repetition*?

-Have you experienced MI that has made it *easier for the students* to grasp a concept?

Prepare and adapt curricular subjects for movement

-How do you use movement as part of your teaching?

-How would you describe the teaching process?

-How do you prepare a subject for class (with movement)?

-Describe your thought process when translating/interpreting abstract subject matter into movement?

-To what extent does the syllabus have to be reinvented and reformulated to appropriate it to MI?

-Does this require a deep understanding of the topic, the "essence", or a high level of expertise?

-How do you find engaging physical manifestations of the core principles that are taught?

DO YOU PREPARE SUBJECTS DIFFERENTLY?

-How do you use movement differently depending on the subjects you teach?

-Is movement integration applied differently for math, mother/foreign language, form drawing/?

-Why and how is this done? Intuition, system, method?

-How important is it that movement is analogue to the content?

-What is most important to consider when creating MI lessons/interventions?

-What makes it successful and what makes it a failure?

DO ALL SUBJECTS BENEFIT FROM MI?

-Can all topics benefit from movement?

-Are some topics very suited or less suited? Why?

-Is it irrelevant how movement is used across topics?

-Can it be difficult to use MI, compared to frontal teaching, if so when and why?

Practical Aspects

-How important is the classroom environment, tools, furniture, light, acoustics?

-Benches and cushions in the dynamic classroom. Are they optimal?

-What is required to make it work?

-Have you felt limited by the physical context, furniture (lack of variation, materiality, adaptability?

Why are some teachers not using movement?

-Why do you think some teachers do not use movement?

-How does this affect the workload for teachers to prepare and conduct such classes?

-Is it difficult for teachers to transition to MI from frontal teaching?

-How can movement affect the teachers?

-Does it have to be created differently for different classes, and individuals?

-Why not mainstream by now – its benefits seem to be many?

-Can you recommend any literature or research that focuses on how to translate curricular content into movement activities?

Appendix B: Information letter

Invitation to take part in Bendik Torvin's research project titled:

Learn to move, move to learn

Using movement integration methods
to create engaging, relevant
and profound learning experiences for children.

Background
I am in the 3rd and final year of a master's degree in Waldorf Pedagogy at the Rudolf Steiner University College in Oslo, Norway. My background is in Art and Design where I have worked as an Industrial Designer for 23 years and as department head and teacher at Granum Art School in Oslo for 7 of those years. Over the last 3 years of studying pedagogy I have been particularly interested in how movement can make school-based learning more engaging and rewarding for young students. Using movement as a teaching strategy has many names and varieties such as *Bewegte Schule, Bochumer Modell, Movement Integration (MI)*.

Purpose of the project
Traditionally, schools use a sedentary chair-and-desk setup and frontal teaching. MI is and alternative teaching method that uses movement as part of the classroom activities which can make learning easier and more profound. It is way to allow school children to move during lessons and experience the curriculum subject in a direct, physical way. This can result benefits such as better learning, concentration, cognition, sensorimotor and social skills.

The aim of the study is to better understand the potential benefits and ways of using MI.
It will explore why teachers use MI, how they use it and how they create engaging movements that are relevant to the subject and also why some teachers find MI challenging.

Who is responsible for the research project?
The Rudolf Steiner University College in Oslo, Norway is the institution responsible for the project. The project is being reported to and approved by the Norwegian Centre for Research Data (NSD).

Why are you being asked to participate?
This is a qualitative research project based on empirical findings collected thorough interviews. I hope to talk to you since you have experience and a particular interest in the subject. Therefore, I hope you will have the chance to share some of your reflections on this topic.

What does participation involve for you?
The interview will be conducted by myself and last for about 60-120 minutes. It will use Internet based meeting tools such as Zoom and will be recorded electronically (audio/video).
You are asked to talk openly about your experiences and reflections around the use of movement as a teaching strategy.

Participation is voluntary
Participation in the project is voluntary. After you have chosen to participate, you can still withdraw your consent at before March 15, 2022. There will be no negative consequences for you if you chose not to participate or to withdraw.

Your personal privacy – how we will store and use your personal data
We will only use your personal data for the purpose(s) specified in this information letter. I will process your personal data confidentially and in accordance with data protection legislation (the General Data Protection Regulation and Personal Data Act).

Only the researcher (Bendik Torvin) will have access to any personal data. The informant (you) will be kept anonymous upon request. In this case all interview data will be anonymised, informant names and contact data will be password protected, coded, and stored separated from the interview content.

What will happen to your personal data at the end of the research project?
The project is scheduled to end June 15, 2022, and the data will be kept until end of 2022.
After this date personal data will be deleted on the request of the informant. If this is not requested and I am allowed to store the personal data, it will make potential follow-up studies easier.

Your rights
If you can be identified in the collected data, you have the right to:

- access the personal data that is being processed about you
- request that your personal data is deleted
- request that incorrect personal data about you is corrected/rectified
- receive a copy of your personal data (data portability), and
- send a complaint to the Data Protection Officer or The Norwegian Data Protection Authority regarding the processing of your personal data

What gives us the right to process your personal data?
We will process your personal data based on your consent. Based on an agreement with Rudolf Steiner University College, NSD – The Norwegian Centre for Research Data AS has assessed that the processing of personal data in this project is in accordance with data protection legislation.

Where can I find out more?
If you have questions about the project, or want to exercise your rights, contact:

- The Rudolf Steiner University College via Marius Wahl Gran (see below).
- NSD – The Norwegian Centre for Research Data AS, by email: personverntjenester@nsd.no or by telephone: +47 53 21 15 00.

Schaanwald, February 2022

Yours sincerely,

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Rudolf Steiner University College
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Appendix C: Consent form

Einverständniserklärung
Consent form

GENERELL
GENERAL

Ich habe Informationen zum Bendik Torvins Forschungsprojekt "Learn to move, move to learn" erhalten, verstanden und Gelegenheit bekommen, Fragen zu stellen.

I have received and understood the information about Bendik Torvin's research project, " Learn to move, move to learn", and have been allowed to ask questions.

☐ Ich stimme der Teilnahme an Interviews zu */ I agree to participate in interviews*

DATENSCHUTZ (wählen Sie eine aus):
PRIVACY (select one):

☐ Ich verlange, dass Informationen über mich anonym bleiben.
I request that information about me/myself be kept anonymous.

☐ Ich verlange NICHT, dass Informationen über mich anonym bleiben.
I DO NOT request that information about me/myself be kept anonymous.

DATENSPEICHERUNG (wählen Sie eine aus):
DATA STORAGE (select one):

☐ Ich willige ein, dass meine personenbezogenen Daten nach Projektende (Ende 2022) für eventuelle Folgestudien gespeichert werden.
I consent for my personal data to be stored after the end of the project (end of 2022) for potential follow-up studies.

☐ Ich möchte, dass meine personenbezogenen Daten nach Projektende (Ende 2022) gelöscht werden.
I want my personal data to be deleted after the end of the project (end of 2022).

Ich stimme der Verarbeitung meiner personenbezogenen Daten bis zum Ende des Jahres 2022 zu.
I consent for my personal data to be processed until the end date of 2022.

(Unterschrift, Ort, Datum, Name) *(Signature, place, date, typed name)*