

Better Schools by Promoting Musculoskeletal Health

A strategic approach for promoting exercise and preventing MSDs in schools

Report

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Executive Summary

Introduction

This report takes a comprehensive look at how schools can contribute to the early, long-term prevention of musculoskeletal disorders (MSDs). It considers the different perspectives of safety and health in work, education and public health and explores options for common courses of action across these three policy areas. By systematically tackling the issue of integrating safety and health in schools, the report helps promote the quality of education and develop a culture of prevention long term.

Occupational safety and health (OSH) can only be achieved if children and young people are already able to learn about healthy behaviour and acquire health competence in their preschool and school educations. If this is successful, they will be capable of skilfully navigating health risks and dangers in their lives and maintaining and improving their own health. Beyond this, early prevention is necessary for the additional reason that the majority of health issues occur, or have their foundations laid, in childhood or adolescent years, not in adulthood. As such, it is essential to fully integrate safety and health into education for the benefit of people in all stages of life.

This report clearly demonstrates that such integration is not only desirable, it is essential, and that schools can make a concrete, long-term contribution to the prevention of MSDs.

Background

Not least because of this, the integration of OSH in education – school education in particular – has been on the agenda of the European Agency for Safety and Health at Work (EU-OSHA) for years. The topic was first introduced by EU-OSHA twenty years ago in the form of a seminar. This was followed a short time later by the first report and the first campaign, which was likewise concerned with education and schooling. Since then, it has become a recurring topic on the EU-OSHA agenda, together with associated measures and plans of action. From 2002, the official framework for these activities was provided by the European Community Strategy on Health and Safety at Work. Today the framework is called the EU Strategic Framework on Health and Safety at Work.

With regard to the topic of MSDs and future generations, the 2020–2022 campaign “Healthy Workplaces Lighten the Load” also deals with the integration of safety and health into the education system. Similarly, prior this report, there have been several OSHWiki articles (Niemi 2020; Taylor 2020a, 2020b; Somhegyi 2021), one discussion paper (Leitner 2020) and one literature review (EU-OSHA 2021) that have been published on the topic.

MSDs: A problem for children and adolescents?

Scientific studies and everyday experience clearly show that the health and well-being of children and young people represent a global priority and are closely intertwined with their school education:

- Next to family, school constitutes the most important point of socialisation for young people. It has a decisive, long-term influence both on the acquisition of health competence and health behaviour, as well as on health opportunities in childhood, adolescence and all later stages of life. It is also a place that is perfectly suited to realising a sustainable strategy of prevention.
- There is a reciprocal relationship between school education and health. On the one hand, school and teaching–learning processes and school culture in particular influence well-being and health as well as the short- and long-term health behaviour of children and young people. On the other hand, the health and well-being of both the students and the teachers have an influence on learning and academic success.
- Health issues are a serious problem for children and young people and teachers alike. Teachers complain about mental and psychosomatic illnesses and impairments in particular, but also about MSDs. The causes of these are not exclusively related to the school environment, though this is often the case. This goes for acute impairments as well as adverse effects and deficits in later stages of life.

The reciprocal relationship between health and education

Health and education are closely linked to one another and are mutually dependent. In this respect, the education side must put more of a focus on health while, for their part, the public health and OSH sectors have to place more importance on prevention in educational institutions. Anyone seeking to improve safety and health at work must start promoting the topic as early as childhood. The childhood and adolescent years not only shape a person's personality and educational opportunities, they also shape that person's safety and health behaviour as well as their health opportunities.

The school system as a suitable setting for the prevention of MSDs

The school system is a suitable setting for the prevention of MSDs. Although concrete work on the topic of health in general and MSDs specifically still leaves a lot to be desired in most European countries, the formal framework for health promotion and prevention in schools is quite well developed almost everywhere. Furthermore, the necessary school-focused concepts are already in place in the form of the "good healthy school" approach and the health-promoting school approach from the Schools for Health in Europe (SHE) network. Both of these are comprehensive pedagogical approaches which are no longer limited to the mere prevention of accidents, injuries and illnesses, the reduction of social disorders and the promotion of safety and health in general. Instead, they tackle safety and health in a more comprehensive way and look at the environment and sustainability as well as ways to improve learning and teaching, leadership and management as well as school culture and school climate. Accordingly, the central fields of action for prevention are identical to those for school development in general.

The importance of physical activity in the prevention of MSDs

When it comes to a preventative health strategy focussed on promoting musculoskeletal health and preventing MSDs, more emphasis needs to be placed on physical activity and exercise regardless of the setting. Current findings indicate that illnesses and disorders of the musculoskeletal system can be prevented and minimised first and foremost through exercise. Exercise can prevent obesity, improve bone density, optimise strength and mobility as well as prevent or reduce anxiety and depression, among other things. These are all factors that have an influence on the development, progression and severity of MSDs. Accordingly, alongside the ergonomic design of a given environment, movement-oriented intervention plays a large role in the prevention of MSDs. In terms of school, exercise has the added benefit that it promotes learning and can improve the academic performance of children and adolescents.

To achieve the positive effects of exercise, activity levels must at least meet the recommendations of the World Health Organisation (WHO) as a minimum. It is also necessary for people to learn how to exercise properly.

Despite all known advantages of physical activity and despite international and national exercise recommendations, there is still a trend towards being less active per day. To counteract this lack of exercise that pervades all groups of the population, there are numerous international and national initiatives to reduce physical inactivity. Educational institutions are assigned a key role in this regard.

How to bring about change in the school system?

Bringing about change in the school system or in any individual school is a challenging endeavour, no matter the topic at hand. The reasons for this are the complexity of the school system and the individuality of every individual school. Additionally, change requires a willingness to change on the part of the schools, and this is not always present to the required extent from the start.

Previous experience has shown that the successful implementation of change measures is largely dependent on whether

- those in charge and other involved parties have an awareness of the project and the changes it is intended to bring about. A willingness to change must be present or established;
- the teachers are capable of implementing the envisaged measures. As teachers often have insufficient expertise in the topics of health and exercise as well as in the implementation of changes, it is usually necessary to provide them with further training and Continuing Professional Development (CPD) accordingly;

- the resources required for the change processes are available in sufficient amounts. The financial backing of prevention measures and, to a lesser extent, the time burden placed on teachers, play a key role;
- education and public health sectors cooperate effectively, ideally also working with communal institutions to this end.

Examples of successful integration in Europe

A look at European countries shows that, despite these challenges in managing change, a more intensive promotion of exercise, play and sport in the school context is very feasible. The selected examples from Finland, Austria, Hungary and Germany illustrate different possibilities in terms of implementation. However, they do not direct their attention specifically at the prevention of MSDs, but rather at strengthening the role of exercise in schools in a more general health-promoting way.

That being the case, this direction should correspond to the school conditions in European countries and reflect the realistic possibilities for prevention and health promotion. The prevention of MSDs and promotion of musculoskeletal health in schools may be an important matter from the OSH and public health perspective. However, a look at the current situation reveals that this is far from the case from the education perspective. What is now standard for the topics of diet, tobacco, illegal drugs, violence and mental health is not (yet) the case for the topic of MSDs. The issue is obviously not seen as serious enough to warrant this kind of attention and is therefore not in the sights of schools or the education sector. As such, it has so far only rarely been a part of preventative and exercise-related initiatives in schools. And the probability that schools will change their perspective on MSDs seems to be on the lower side.

What might be effective would be the strengthening of a more general effort to promote exercise, sport and play in schools. There are three reasons in favour of this:

- Exercise is established in the educational policies, teaching plans and school routines of all countries.
- Exercise can contribute to the improvement of teaching–learning processes and thereby to the improvement of academic results.
- There are numerous international and national initiatives that aim at quantitatively and qualitatively improving the way in which exercise is promoted in schools.

To bring more exercise into schools and thereby promote the quality of schools to ultimately prevent MSDs, the “Moving Schools” concept and its components can be used as a point of orientation and a source of inspiration.

Recommendations for the design and implementation of measures

In a prevention initiative aiming to promote exercise in schools and thereby prevent or at least reduce MSDs in the short, mid and long term, the target group is the school students themselves. However, the required changes to staff and structure would not be possible in schools without the teachers and school head, because they are the ones that are usually needed to implement the required measures. They therefore constitute further important target groups and should be given special consideration in the implementation of measures.

If initiatives are undertaken by the OSH sector to promote exercise, sport and play at school, then the following recommendations should always be taken into account when drawing up and implementing the measures to be taken:

- Speak the language of the school.
- Formulate objectives together with the education sector and the affected parties.
- Work together with educational institutions and other interested organisations, bodies and individuals.
- Include all relevant school levels.
- Place importance on all affected parties being involved from the start.
- Provide sufficient resources and support.
- Teach skills relating to exercise and health.
- Adopt a holistic, integrative perspective on prevention.
- Work with the school development approach.

1 Introduction

Anyone seeking to improve safety and health at work must start promoting the topic as early as childhood. The childhood and adolescent years not only shape a person's personality and educational opportunities, they also shape that person's safety and health behaviour as well as their health opportunities. Firstly, this life stage is when people can be given the fundamental tools that they need to be able to skilfully navigate health risks and dangers in their lives and to maintain and strengthen their health.

Secondly, early prevention is necessary because almost all health issues occur, or have their foundations laid, in childhood or adolescent years, not in adulthood. For instance, MSDs that become a problem in adulthood often stem from childhood or adolescent years, or have their causes rooted in this earlier life stage, such as a lack of exercise (see Chapter 2 of this report).

Educational institutions, in particular schools, are highly suitable as settings for the implementation of early prevention and health promotion. In many countries, there are places where all young people can be reached over an extended period of time. Additionally, childhood and adolescence is a time of systematic learning, including the acquisition of a large part of the competences (knowledge, skills, crafts and behaviours) that are required for safe, health-conscious behaviour in present and future stages of life.

Accordingly, prevention in schools is seen as an effective strategy to prevent health disorders such as MSDs in adulthood as well as build safety and health competences that young people can carry through their entire lives. As already found in EU-OSHA reports such as "OSH in the curriculum: requirements and activities in the EU Member States" (2009), "Training teachers to deliver risk education" (2011) and "Occupational safety and health and education: a whole school approach" (2013), education and training in the area of safety and health in the scope of preschool, school and university education is an important part of preparing young people for work and an important part of the agenda for lifelong learning. With regard to MSDs, schools have the opportunity to get kids active and help them gain valuable health competence through qualified physical education (PE) lessons and additional attractive sports offerings as well as through the targeted design of the learning environment. This is particularly beneficial to their musculoskeletal health.

As important as early prevention in educational institutions during childhood and adolescence is, this alone is not enough to achieve safety and health over the course of a lifetime. It facilitates and supports prevention and health promotion in later stages of life but does not replace them. In accordance with the "life course approach", adequate prevention measures are also required in later stages of life to improve musculoskeletal health and prevent MSDs.

In this light, the present report "Better Schools by Promoting Musculoskeletal Health" is concerned only with a small but very important intervention phase – the school period – in the life course approach. It aims to highlight what possibilities the OSH sector has for reducing the number of MSD cases that arise before and, above all, during working life through school-based prevention and health promotion. The central strategy here is promoting exercise, play and sport in conjunction with teaching health and exercise skills. Exercise and physical activity can effectively prevent MSDs. Additionally, there are also other reasons why a great many national and international institutions and organisations are pushing for more exercise in schools (see Chapter 4 of this report). This large push for exercise has the added effect that the OSH sector would have highly influential allies and could use their existing initiatives and efforts for its own work.

Integrating safety and health and thereby using schools to promote OSH can, however, only succeed when the prevention strategies and measures not only serve the interests and goals of the OSH sector itself, but also, and more importantly, those of schools: schools are tasked with education and learning, not healthcare. Their central role is to achieve academic results for their students, not reduce health problems. For the sustainable success of prevention measures, particularly those that are imposed on schools from outside, it is therefore extremely important that the measures introduced are compatible with the pedagogical framework of schools and support individual schools in fulfilling their duty of education and learning. In other words: intervention must be pedagogically oriented, consider the needs and expectations of schools and actively involve schools and their members as partners. For this reason, it is also important to embed the MSD-prevention measures in an overarching, holistic approach of prevention and health promotion in schools (see Chapter 3 of this report).

1.1 Background

It is exactly twenty years ago that EU-OSHA became a pioneer in the integration of safety and health in education: it all got started with the seminar “Learning about occupational safety and health”, which was held in March 2002 under the Spanish EU Council presidency and with the support of the European Commission.

The first EU-OSHA report that systematically addressed the topic of integrating OSH into education and illustrated it using practical examples from Europe was published in 2004. One highlight was the EU-OSHA “Safe Start” campaign, which took place in 2006 and was aimed explicitly at schools and the education sector alongside workplaces. In the years that followed, further publications on important sub-topics were released at regular intervals: The integration of safety and health into the school curriculum (2009) as well as in universities as the “forgers” of future managers (2010), the training of teachers in safety and health (2012) as well as in a holistic school approach as a guiding principle for the integration of safety and health into all levels of the education system (2013).

In parallel, for many years, EU-OSHA has been concerning itself in particular with the topic of young workers, their specific working conditions and risks as well as the question of what is required for successful prevention measures for this target group.

You can find a compilation of selected EU-OSHA resources on the topic of OSH and education here:

Table 1: EU-OSHA resources on OSH and education

OSH and education

https://oshwiki.eu/wiki/Category:OSH_Education

Learning about Occupational Safety and Health, Forum publication summarising the 2002 seminar proceedings, 2002 <http://osha.europa.eu/publications/forum/8>; a longer report of the seminar proceedings (working paper): <http://osha.europa.eu/publications/reports/310>

Mainstreaming occupational safety and health into education. Good practice in school and vocational education, 2004 <http://osha.europa.eu/en/publications/reports/313/view>;

Factsheet 52 – Mainstreaming occupational safety and health into education (summary of a report) <https://osha.europa.eu/en/publications/factsheets/52/view>

OSH in the school curriculum: requirements and activities in the Member States, 2009 <http://osha.europa.eu/en/publications/reports/TE3008521ENC/view>;

Factsheet 82 – Summary of the report “OSH in the school curriculum” <http://osha.europa.eu/en/publications/factsheets/82>

Challenges and opportunities for mainstreaming OSH into university education, 2010 http://osha.europa.eu/en/publications/reports/mainstream_osh_university_education;

Factsheet 91 – Challenges and opportunities for mainstreaming OSH into university education – Summary of a Report (in 21 languages) <http://osha.europa.eu/en/publications/factsheets/91/view>

Training teachers to deliver risk education – Examples of mainstreaming OSH into teacher training programmes, 2012 https://osha.europa.eu/en/tools-and-publications/publications/reports/teachers-training-risk-education_TE3111358ENN/view;

Summary Factsheet 103 <https://osha.europa.eu/en/tools-and-publications/publications/factsheets/103/view>

Occupational safety and health and education: a whole-school approach, 2013 <https://osha.europa.eu/en/tools-and-publications/publications/reports/occupational-safety-and-health-and-education-a-whole-school-approach/view>

OSH and education

Web area dedicated to mainstreaming OSH into education

<https://osha.europa.eu/en/themes/mainstreaming-osh-education>

Napo for teachers <https://www.napofilm.net/en/using-napo/napo-for-teachers>

The official framework for the activities of EU-OSHA as well as for the European Network Education and Training in Occupational Safety and Health (ENETOSH), with which EU-OSHA has worked with on the topic of mainstreaming OSH into education, since the beginning, is provided by the European Union's Community strategy on health and safety at work. In the very first Community strategy "Adapting to change in work and society: a new Community strategy on health and safety at work 2002–2006", education and raising awareness played a key role in strengthening a culture of prevention. In the following strategy "Improving quality and productivity at work" (2007–2012), the topic of mainstreaming OSH into education was concretely stated and its importance highlighted for all levels of the education system to create a preventative culture in the area of safety and health at work. With the change from a strategy to a strategic framework for occupational safety and health, the topic of mainstreaming OSH into education loses its status as a topic in its own right and only comes into view as one policy area among others at the end of the EU's strategic framework on health and safety at work 2014–2020. In the current strategic framework on health and safety at work 2021–2027, education takes on a new importance in supporting the implementation of the Vision Zero concept. All strategies can be accessed via this page:

<https://ec.europa.eu/social/main.jsp?langId=en&catId=151&moreDocuments=yes>.

With its 2020–2022 "Healthy Workplaces Lighten the Load" campaign, EU-OSHA is making a valuable contribution to supplementing the current strategic framework and is committed to promoting a culture of prevention throughout Europe and, beyond this, to being a cornerstone of EU OSH policy. With a focus on MSDs and future generations, it is not only giving education its own space within the campaign, it is also paving the way for a systematic discussion bringing together the policy areas of OSH, education and public health.

1.2 Aims of the report

The report pursues three main goals: Firstly, it systematically deals with the integration of health and safety in education and, in doing so, lays important groundwork for a well-founded discussion on the topic. This ties into the first EU-OSHA report on the topic from 2004. Secondly, it uses a concrete issue, specifically the prevention of MSDs, and the different perspectives of the OSH, education and public health sectors to shed light on a shared problem, present the similarities and differences of their concepts and thus make a contribution to a joint policy action. Finally, the report makes a contribution to the current EU-OSHA campaign and, in that way, helps prevent MSDs as early as possible and in later adulthood.

1.3 Structure of the report

In school, the course is set for health development over an entire lifetime. However, anyone looking to introduce effective prevention measures in schools must first understand the school system. On the basis of relevant publications in the European and international education sector, the report first introduces in its first three chapters the topic of promoting health and safety in the school setting. In this way, Chapter 2 is dedicated to the relationship between school and health and Chapter 3 presents two central concepts, the "good healthy school" and "health-promoting schools" approaches. Chapter 4 goes on to deliver the reasons behind and support for promoting exercise, play and sport in the scope of prevention in schools, while Chapter 5 looks at the conditions necessary for the successful implementation of exercise, play and sport as well as the development of health competence in children. In Chapter 6, four examples of good practice illustrate possible factors for success and potential obstacles. Finally, in Chapter 7 and 8, a strategic approach is presented for the systematic promotion of exercise and for the prevention of MSDs in schools.

2 Health and school

2.1 The complementary relationship between education and health

The health and well-being of children and young people is a global priority (OECD 2019, 77). This is all the more true since the outbreak of COVID-19, because educational institutions, and in particular the children and young people that attend them, were particularly affected by the pandemic in almost all countries. An increase in educational disparities and negative effects on mental health, physical fitness and confidence in exercise were often the result.

But even before the pandemic, schools played a big role in the health and safety of young people, including for their later lives. Next to family, school is the most important point of socialisation for children and young people throughout Europe. As a central societal institution, its role is to ensure the systematic education and upbringing of students. Alongside the learning of subject matter and social skills, this also includes the development of personal and emotional competences such as a stable sense of self-worth when dealing with challenges as well as empathy.

Additionally, school education and health are closely intertwined with one another (Bada et al. 2019, 5; OECD 2019, 50). The health of students as well as that of teachers is closely linked to the quality of schoolwork in the following ways:

- Inclusive, equal education as well as factors related to school structure and processes of school life are key determinants of health and well-being (WHO Europe 2016a, 13; Paulus & Hundeloh 2020, 199). Affinity to one's school is an important safety factor for children and young people (National Academies of Sciences 2021, 9).
- The academic success of students and the work performance of teachers are dependent on health. Children and young people that feel happy and healthy work and learn better, have a higher degree of satisfaction and more faith in their own creative power and abilities – meaning they learn better and have fewer accidents.
- The greater the well-being and health of teachers, the more positive their pedagogical interactions, teaching impulses and activities (Hundeloh 2012, 36 f.).

Due to the interaction between the health of the students in schools and lessons and academic success (OECD 2019), helping students and teachers stay healthy must be a fundamental component in a school's mission (CDC 2011, 11). Studies show that higher academic levels are achieved when consideration is given to the health requirements of children and young people (ASCD & CDC 2014, 3). Without health, success in school is obviously not possible.¹

In this light, it is no surprise that the Organisation for Economic Co-operation and Development (OECD) counts physical and mental health and well-being amongst the core foundations of learning listed in its Learning Compass 2030. The OECD defines core foundations as the fundamental conditions and core skills, knowledge, attitudes and values that are prerequisites for further learning across the entire curriculum. Health as a core foundation means knowing and actively pursuing what it means to live a good and healthy life (OECD 2019, 48).

¹ The term health is used in a broad, comprehensive sense (see glossary).

Figure 1: The relationship between health and education



Source: Paulus & Hundeloh 2020, 204

However, school is not just important for the health of young people, but also for individual health and individual well-being in adulthood, because childhood and adolescence, and thereby school, are seen as fundamental life stages for human development, health development included. Essential groundwork for lifelong safety and health is laid and consolidated during childhood and adolescence (EU-OSHA 2009, 12; EU-OSHA 2011, 11; Bröder et al. 2019, 2; OECD 2019, 54; DGUV 2020b, 25).

Therefore, raising awareness of and teaching occupational safety and health starts in early education, in schools and other educational institutions (EU-OSHA 2009; EU-OSHA 2011, 3; Bollmann, Gründler & Holder 2018, 18). Schools are particularly suited for this task because they can reach children and young people continuously and over an extended period of time, due to schooling being mandatory in most cases (ASCD & CDC 2014, 3; Okan 2019, 170; Paakkari et al. 2019, 186; Thomas, Bruland & Bollweg 2020, 503). Additionally, as institutions of teaching and learning, schools are well equipped to influence and change ways of behaving. Studies from Switzerland show that this is also possible with regard to health. Through lessons that are tailored towards prevention and other health-promoting initiatives, children and young people can improve their health opportunities and awareness of health over the course of their schooling careers (Vuille 2004). The case is similar for the activity and exercise behaviour of children and young people. Schools can contribute to children and young people getting sufficient exercise and finding a lifelong connection to exercise, play and sports through PE and additional attractive activities.

The high importance placed on health and, by the same merit, on exercise in educational policies on the European and international level is not always reflected on the national level, especially not in school practice. Although it can be said, for example for Germany, that the topic of health is considered in school policies in all 16 federal states, the value placed on it varies greatly between individual states, and it is under-represented in all states in relation to its actual importance for schooling success and the healthy development of young people. If the central policy and legal guidelines for schools neglect the topics of safety and health and do not present them as central pillars of a school's duty, then it is no

surprise that schools do not see health promotion and prevention as key developmental duties and class them as less important than other duties. Special initiatives, programmes, projects and explanations and guidelines can only rarely stimulate any kind of long-term change here. Expert assessments indicate that this not only applies to Germany, but also to other countries. According to the experts, the integration of health in the daily lives of schools, teachers and students has often failed to date (ASCD & CDC 2014, 3; Högger 2017, 2; Okan, Paakkari & Dadaczynski 2020, 8; Thomas, Bruland & Bollweg 2020, 503).

A key reason for the subordinate role of health, safety and exercise in the everyday school routine, as well as in the school administration and in the education sciences, is that it is still a fringe topic on the sidelines of the larger discussion of quality development in schools. The idea that health promotion, prevention and exercise promotion are required for good school quality and a good education is not at all widespread in the school system, school administration, the education sciences or amongst school heads, teachers or parents.

The low level of importance placed on the topic is, however, not only due to a lack of awareness amongst those in charge, but also due to a lack of suitable resources. For example, school buildings – which in many European countries predominantly date back to the 1970s – are often unsuitable for the realisation of a healthy and pedagogically effective school – especially with a pandemic underway (Grellmann & Schweppe 2018, 1; Gratnells 2020, 2). The majority of existing school buildings are based on traditional teaching and learning forms that are hard to adapt to new school requirements. Furthermore, the school environment in the old buildings only rarely meets the ergonomic requirements of students and teachers, which is conducive to MSDs.²

2.2 The health situation in schools

The number of studies on the health and safety of students, teachers and school heads on a national and international level have increased in recent years, usually painting a worrying picture. However, studies covering or comparing multiple countries are rarer. One exception is the study “Health Behaviour in School-aged Children” (HBSC study) from the WHO which is conducted every four years. In the 2017/2018 study, a survey was carried out on 227,441 young people aged 11, 13 and 15 from 45 countries in Europe and Canada (WHO Europe 2020b).

2.2.1 *MSDs: A problem for children and adolescents?*

Looking at the subjective opinion of European children and adolescents as well as their parents, the majority consider the state of their health to be unproblematic (WHO Europe 2020b, VII). For instance, the results from a representative German study entitled “The health of children and adolescents in Germany (KiGGS)” from 2017 clearly showed that, according to their parents, 95.7 percent of 3- to 17-year-olds have a good to very good general state of health (Rathmann, Kotarski & Schricker 2020, 11). Even when measured against the number of current diseases it can be assumed that the young generation is overall in good health. Compared to early eras, acute physical illnesses leading to death have become rarer. In this regard, the health risk for children and adolescents in Germany and Western Europe today has been reduced to a minimum (Richter, Ottava & Hurrelmann 2007).

However, based on the available results, it can also be seen that, especially in highly developed countries, there has been, and continues to be, a shift from acute to chronic illness and from somatic to mental disorders. The studies show that a not-insignificant percentage of children and adolescents – in Germany between 25 and 30 percent – suffer from temporary or longer-term health problems. In the German-speaking countries in Europe, five neuralgic points of health development can be identified in this regard (Hundeloh 2012):

1. Immune system disorders, especially allergies
2. Eating disorders leading to overweight and underweight
3. Motor and sensory coordination disorders, caused by lack of physical activity

² The aspect of ergonomic design and the equipment of schools plays a big role in the prevention of MSDs and the development of healthy musculoskeletal systems in children and young people, though this is only covered briefly as a secondary topic in this report. The focus is on the “exercise” aspect.

4. Mental health disorders leading to mental anomalies, disorders or aggressive or violent behaviour. Bullying, for instance, has become an everyday occurrence at schools. Globally, over 30 percent of 13- to 15-year-olds have already experienced bullying at school (UNICEF, 2018, 7)
5. Accidents and accident-related injuries, for example, due to unadjusted risk behaviour and lack of confidence in exercise.

These findings were at least in part verified by the results of the last HBSC study conducted by the WHO.

As a result of the COVID-19 pandemic, the health situation of young people in many countries has probably further declined. This is particularly the case for mental health. According to the scientific studies available to date and practical findings from the fields of paediatrics and adolescent medicine, there has been an enormous increase in mental stress and mental illness in young people, especially children and adolescents from marginalised groups and those whose mental health was already an issue before the pandemic (Andresen et al. 2021; Kinderärzte in großer Sorge 2021; National Academies of Sciences 2021; Pieh et al. 2021; WHO Europe 2021b).

With regard to the incidence and severity of accidents, we can only draw on national figures from Germany. According to the German Social Accident Insurance (DGUV), there were a total of 977,073 accidents in or on the way to or from schools in 2019, with 10,911,332 students in general and vocational schools (DGUV 2020a).

MSDs are only rarely the subject of school-focused health studies. As such, there are only limited figures available on this as well. Headaches and back pain in children and young people are also often subsumed under psychosomatic disorders. However, studies of children and adolescents relating to MSDs do present the picture that MSDs are not an insignificant problem for the young generation. Here are some examples:

- As early as primary school age, a considerable percentage of German students complain about back pain and around 33 percent of this age range are medically certified as having posture issues (BAuA 2011, 26).
- In a British study, 22 percent of the 11- to 14-year-old school students surveyed state that they suffer from neck pain. Eighteen percent of them complain about pain in the upper back and 22 percent complain about pain in the lower back (Taylor 2020a).
- In 2019, a large Polish cohort study with 11,000 participants reported that 75% of the 10- to 19-year-olds had suffered from back pain in the last 12 months. Pain in the lumbar spine (lower back) was most common (56%). As in most of the studies, girls complained about back pain more frequently than boys (83% versus 64%), and frequency increased with age (Taylor 2020a).
- A national Danish study, also from 2019, reported a prevalence of self-reported “severe back pain” in 11- to 14-year-olds of 14% in girls and 10% in boys (Taylor 2020a).
- A more recent German study concluded that musculoskeletal problems such as back pain are extremely common. Every sixth child is given such a diagnosis at least once a year. This makes MSDs the eighth most common type of disease in childhood and adolescence (Greiner, Bartram & Witte 2019, 24).
- A current EU-OSHA literature review on MSDs in children and young people (7 to 26 years old) has concluded that the prevalence of MSDs in young people that still attend school or higher education and that are not yet in the work force is extremely high at around 30 percent (EU-OSHA 2021).

Although the results of the different studies are not identical, they fundamentally paint the same picture. MSDs are also a serious problem for young people that will often have consequences on the future health and opportunities of children in their later stages of life (Taylor 2020a).

“Anyone who suffers from musculoskeletal pain in their childhood or youth is at an increased risk of having these issues as an adult as well.”

Lorenzo Munar

Anyone who suffers from musculoskeletal pain in their childhood or youth is at an increased risk of having these issues as an adult as well. If MSDs could be prevented in children, a cycle of recurrent episodes could be prevented and the prevalence of MSDs in adulthood reduced (EU-OSHA 2021). For the prevention of MSDs, it is therefore of fundamental importance to start early, to raise awareness for the topic amongst young people in their early school education and to give them the tools to actively counteract these disorders.

The impaired physical and mental health of many children and young people is caused by numerous factors. On a personal level, these factors include a lack of exercise, excess bodyweight, increasing media consumption, inadequate risk awareness, mental health problems and inadequate health competences (Hundeloh 2012; Taylor 2020a, EU-OSHA 2021).

In summary, it can be established that the diverse health problems and complaints of young people are of concern in consideration of the fact that a good state of health is an important resource for overcoming developmental challenges in childhood and adolescence and that health disorders arising early in life can contribute to the occurrence of longer-term health issues. Additionally, the increase in behaviour that is detrimental to health from childhood to adolescence emphasises the urgent necessity of early health promotion and prevention measures to enable young people to grow up as healthy as possible (Rathmann & Schricker 2021, 23). Finally, the health and well-being of young people has a considerable effect on academic success, as is the case the other way around as well (OECD 2019).

2.2.2 *MSDs: A problem for teachers?*

The picture painted of teacher health by past studies in many countries shows that a majority of teachers suffer from physical and, above all, emotional stress and are greatly impaired in terms of health. Contrary to a widespread preconceived notion, the strain put on teachers by their teaching role is apparently very great (BAuA 2005; Scheuch, Haufe & Seibt 2015; Pennsylvania State University 2017; Paulus & Hundeloh 2020).

Two health problems in particular are very prevalent amongst teachers. On the one hand, these are the mental and psychosomatic issues and disorders. On the other hand, many teachers suffer from disorders of the musculoskeletal system. There can be mutual correlation between these two health issues (EU-OSHA 2019, 20). While the mental and psychosomatic issues are given a great deal of attention in teacher health research, MSDs in employees of education institutions are under-represented and not given due consideration (Taylor 2020b).

“While the mental and psychosomatic issues are given a great deal of attention in teacher health research, MSDs in employees of education institutions are under-represented and not given due consideration.”

Lorna Taylor

In various national studies in Germany, the percentage of teachers that suffer from mental health issues is reported to be up to 50 percent. Population-based medical studies and incapacity for work and sick leave statistics reveal a greater prevalence of mental health disorders in teachers than the population average (Scheuch, Haufe & Seibt 2015; Pennsylvania State University 2017). Additionally, alongside the public health sector, the education sector is the sector that reports the most hidden or suppressed feelings, which can lead to mental health issues (Mellor 2013, 1).

Some surveys and scientific studies report an even higher percentage of teachers suffering from MSDs. Taylor cites a percentage of up to 95 percent; 85 percent of younger teachers experience skeletal and muscular pain once per week, but only 8 percent report this to their employers (Taylor 2020b). In particular, the following are cited as causes for MSDs in teachers:

- Unfavourable working posture, such as sitting for too long
- Psychosocial problems and burdens
- Lack of exercise
- Higher body mass index
- A working environment that is detrimental to health, especially due to insufficient ergonomic equipment, unfavourable lighting conditions, poor air quality and noise (Taylor 2020b).

In summary, it can be taken from this that the health problems in schools are in part very serious and that the working ability and performance of teachers suffer as a result. As a consequence, the health impairments of students and teachers negatively influence the quality of the entire school system and each individual school both directly and indirectly. Schools with poor quality of health run the risk of not fulfilling their duty of education and learning. As such, it is necessary from an education policy and education science perspective that schools take greater consideration of the health of all members of the school.

“Schools with poor quality of health run the risk of not fulfilling their duty of education and learning.”

Vinka Longin Peš

But also, from the perspective of OSH, there is a need for greater promotion of health and safety in schools. Early education and school education lay the foundations for safety- and health-aware behaviour in all stages of life, including in a child's later working life. Anyone looking to foster safety and health awareness in the workforce must invest in early safety and health education as well as in building health competence, where “early” means primarily in preschools and schools. Experience and scientific studies show that this has the greatest chance of success when health promotion and prevention are systematically integrated and based on scientifically founded concepts that are tailored to the educational setting.

3 Concepts for promoting health and safety in schools

3.1 The formal framework for prevention in schools

Despite the overall low level of importance placed on the topics of health and safety in the educational system to this day, there is a favourable formal framework for the realisation of prevention in schools:

- In line with a humanistic understanding of education, “education” means developing people into autonomous individuals. This does not only include cognitive competences, but also a broad spectrum of personality traits and dispositions. In this way, lifetime health and well-being are also important factors for professional success and social integration.
- In many European countries, there are initiatives, programmes and projects that engage with the topic of health in schools. Furthermore, health in schools is often an aspect covered by national policy-making, though not always by education and school policy.
- The pedagogical ethos of schools fundamentally shapes the integrity of students.
- Health and health-related topics are part of the curriculum in all countries. They often just have to be identified.
- Health topics are increasingly becoming the subject of school performance studies. This is also testimony to the great importance of health for education.

Another positive factor for the sustainable promotion of health and safety, and thereby also the prevention of MSDs, could be that schools, similar to hospitals, can be seen as person-related service organisations whose role lies in the provision of immaterial services in the direct communication between people – in this case, between teacher and students.

“Person-related service organisations are dependent on the active cooperation of their clients – in this case, students – for the satisfactory fulfilment of their duties, with the word ‘cooperation’ being used in the sense of attention, motivation and active participation. For schools and other educational institutions, this results in a twofold objective: on the one hand, fulfilling their educational role, for example, imparting knowledge, values and skills and, on the other hand, enabling co-production in the form of identification with one’s own school and the development of motivation to succeed and social competence. This twofold objective makes the work of schools extremely complex and highlights the potentials, but also the limitations, of the pedagogical mission. In this very special working situation right at the person–person interface, there is a key difference to companies that manufacture goods” (Badura 2007, 103 f., translated from German by the translator).

As such, the health-related work in schools displays definite structural similarities with the public health and OSH sectors as well as health promotion in companies and administrative bodies:

- From this (in this case, sociological) perspective, both cases involve an intervention in a social system. This means that the preventative interventions in diagnosis/goal setting, planning, management/intervention and evaluation draw on the instruments of social, work and health sciences (Badura 2008, 104).
- In schools, companies and administrative bodies alike, prevention that is effective long term follows an approach that focusses on systematic processes of organisational development and active involvement of the organisation members (Bollmann, Gründler & Holder 2018, 16). Due to the multi-factor causal framework, such an approach is also effective in the prevention of MSDs (EU-OSHA 2019, 22, 26).
- In light of this multi-factor causal relationship between MSDs and most other health issues, their prevention should be integrated into a concept of organisational health promotion (company or school health promotion) or be complemented by such a concept (EU-OSHA 2019).
- The measures must take into account the relevant dynamics of the respective systems. “Every individual organisation – administrative body, company or school – is a case in and

of itself which must be analysed independently in order to develop appropriate, effective strategies for action” (Badura 2008, 104, translated from German by the translator).

3.2 The health-promoting school approach

An effective concept of health promotion and prevention in schools follows the approach of the health-promoting school. In recent years, numerous attempts were made in Europe to define the dimensions and fields of action of this approach. Despite the differences, which are sometimes considerable, five common features can be identified:

1. The health-promoting school approach no longer aims exclusively at health results, it aims to promote the cognitive, emotional, physical and social development of young people in a comprehensive sense. It seeks to do so predominantly through improved cooperation between the public health and education sectors as well as through the integration of health and safety into existing topics and school activities. (ASCD & CDC 2014, 6; Okan, Paakkari & Dadaczynski 2020, 10). This endeavour is clearest in the “good healthy school” concept that was developed primarily in Germany and Switzerland, where it is also implemented (Brägger & Posse 2007; KMK 2012; DGUV 2013; Högger 2017).
2. The health-promoting school approach is based on the model of salutogenesis, which was developed by the Israeli-American medical sociologist Aaron Antonovsky. The model is centred around the question: What keeps people healthy despite risks and stress factors? The model is based on an understanding of health and illness as a continuum, and the importance of physical exercise is explained on this continuum. A key concept of salutogenesis is the sense of coherence that is developed over the course of a lifetime on the basis of resources and that reveals whether one’s own life is experienced as comprehensible, manageable and meaningful. A high sense of coherency leads to positive health, a low sense of coherency leads to poor health (Antonovsky 1997).
3. The health-promoting school approach is holistic in nature (whole school approach). Existing studies and experience lead to the conclusion that such an approach is optimally suited to integrating safety and health into schools (EU-OSHA 2013, 80). The holistic perspective covers two types of completeness: the whole person (a) in his or her whole environment (b). A holistic school approach requires a comprehensive understanding of health. Such an approach recognises that all aspects of school can have an influence on health and the well-being of school members and that learning and health are interconnected (Bada et al. 2019, 5). It is no longer only about individual behavioural changes, but rather about changing the circumstances or the situation. As such, it is about establishing a comprehensive culture of prevention.
4. The health-promoting school approach is a participatory approach. This means that, if possible, all school members should be involved in the planning and implementation of health-promoting and preventative measures (see also Bollmann, Gründler & Holder 2018, 26 ff.).
5. In the development of health-promoting schools, the setting approach plays a big role. It draws attention to the fact that health and safety are not only achieved through individual habits and lifestyles, but also through the material and immaterial environment (Bada et al. 2019, 8).

Alongside those already listed, there are further aspects that can positively and effectively influence the quality and thereby also the long-term success of an approach for promoting health in schools:

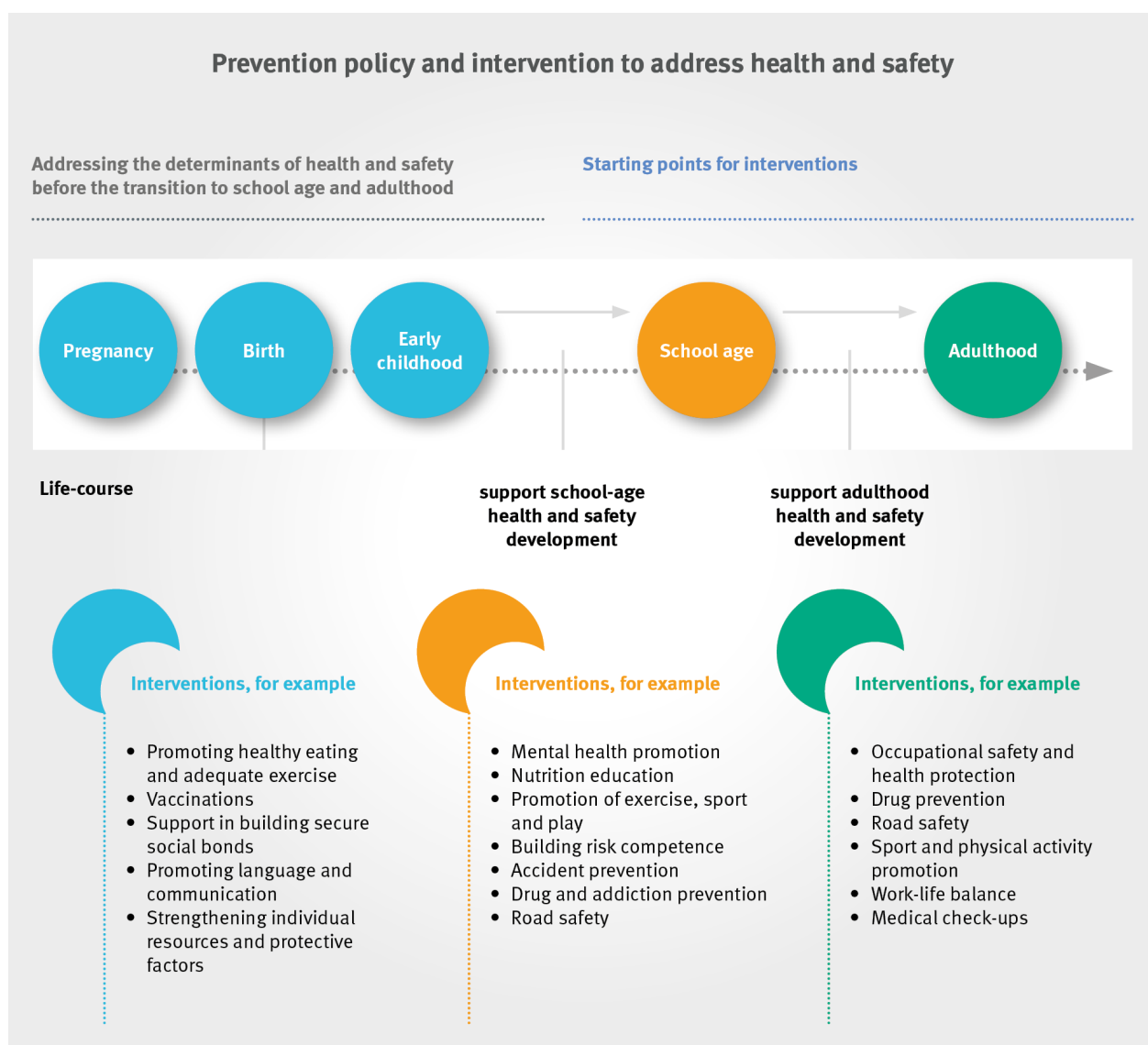
1. A health-promoting school is more than a school that implements measures on promoting health and safety. It is a school that orientates its school approach (policies, school programme, guidelines, etc.) and its processes and structures on health (Paulus & Hundeloh 2020, 208).
2. A health-promoting school aims to ensure that the students leave the school with a positive attitude towards health as well as an understanding of the relationship between individual health and one’s social and physical environment (Vilaca et al. 2020, 12).

“It is necessary to embed the health promotion and prevention in schools into a wider life course approach.”

Sarah Copsey

3. A health-promoting school should act on a united front. That means involving not only the members of the school but also the families of students and school community as a whole (WHO Europe 2016b, 19; Bada et al. 2019, 6).
4. As health in later stages of life is influenced by the competences, attitudes and experiences acquired and made in previous life stages, it is necessary to embed the health promotion and prevention in schools into a wider life course approach.
5. School is a complex and dynamic system, and every school is unique. As such, the necessary health-related interventions must themselves be individually tailored to the school in question. Not least because of this, health promotion and prevention in schools are continuous, long-term processes; sustainable results are only possible in the mid and long term (Bartelink & Bessems 2019, 2; Vilaca et al. 2019, 15).

Figure 2: The health and safety policy and intervention framework



Source: following Okan 2019, 174

3.3 Prevention as school development: Implementing the health-promoting school approach

Health promotion and prevention must take into account the unique characteristics of individual schools, have a long-term approach and prevent, promote and improve in a comprehensive, holistic way. Isolated projects that are often limited in time are not adequate for sustainable change of this nature.

The topics of health and safety can be sustainably anchored in schools if they penetrate the school organisation and change it at its heart – if it is no longer a matter concerning only a few individuals, but becomes a matter for the school community as a whole (Högger 2017, 9). This can succeed if:

- all decisions are made with health aspects in mind, and a good prevention culture is established in schools;
- health promotion and prevention take on the form of school development.

The term school development is used here to mean organisational development (OD) in schools and is probably the most effective strategy for successfully shaping innovation and reform projects in schools.



"OD concepts are characterised by the fact that they relate to the school as a whole and not only to individual aspects. At the same time, however, it is emphasised that only gradual development is possible, tying onto subunits of the school as well as onto the cooperation climate, onto school management, onto the school programme, onto a department or onto a subject committee" (Rolff, cited by Hundeloh 2012, 53, translated from German by the translator).

Accordingly, starting points for these processes can be found in both the design of the school (situational prevention) and in influencing the lifestyles and skills of school members (behavioural prevention), very much in the spirit of a holistic school approach.

By integrating safety and health into school development, they become an integral component of the organisational culture of a school, making them sustainable by nature (Bollmann, Gründler & Holder 2018, 47).

The central fields of action of school development in the general sense and health-promoting school development in the more specific sense are:

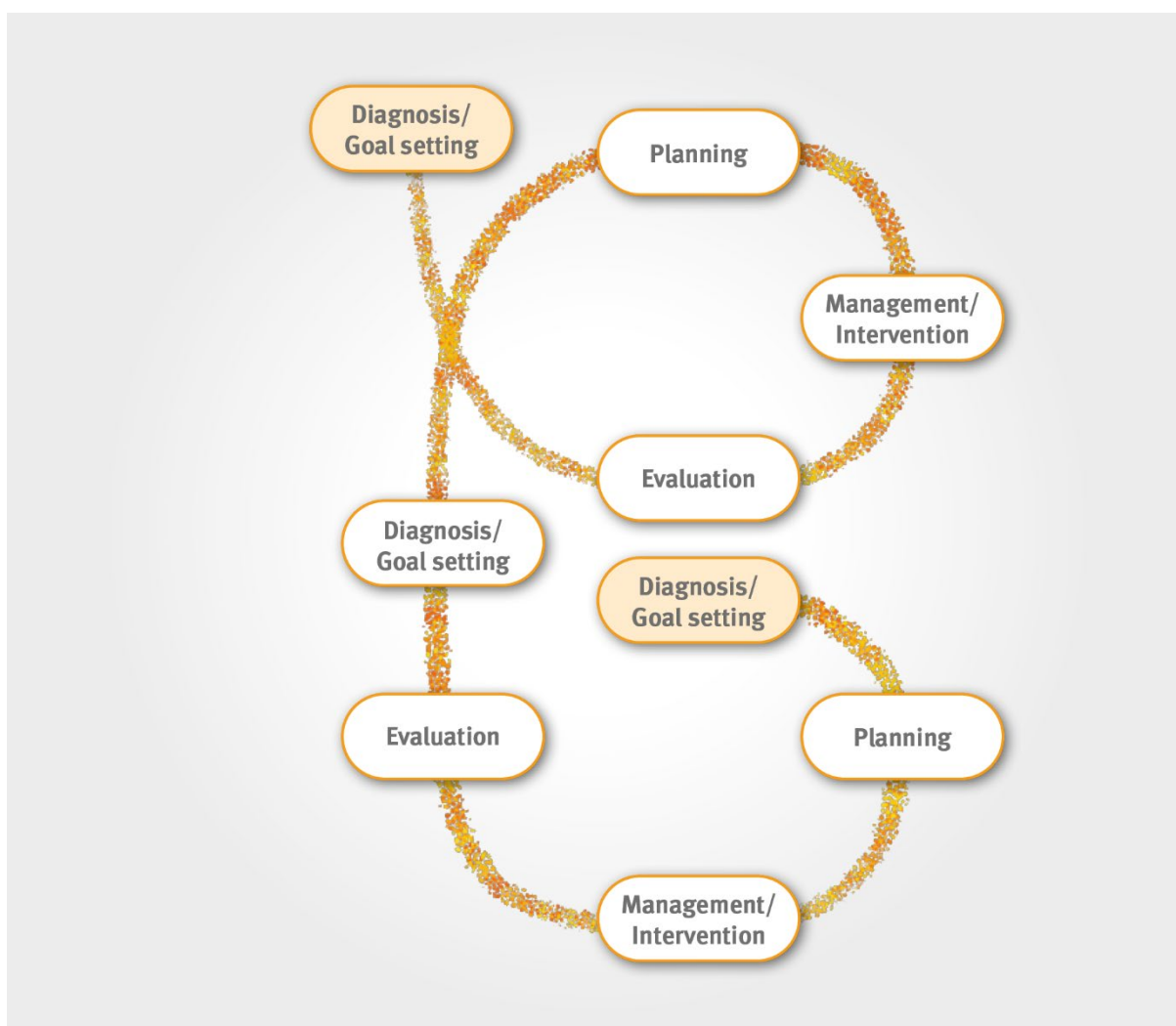
- staff development,
- teaching development,
- organisational development.

The processes in these fields of action are designed to last long term. However, this does not mean that health topics require permanent work. It means that the school head and teachers should continuously engage in the creation of person- and system-related "health potentials" and in the prevention of corresponding risks, not plan and implement a multitude of isolated, independent measures.

Preventative and health-promoting school development is essentially the further development of the individual school and must primarily be driven by the members of that school themselves. External experts and partners can still support and promote the processes, though. In this way, institutions and individuals from the field of occupational safety and health can initiate such projects and support schools that have decided to improve their health and safety through consultation, support and qualification.

The method used to realise the processes is central for the success of health-related school development processes. A cycle known as the quality or school development cycle comprises the phases diagnosis/goal setting, planning, management/intervention and evaluation already mentioned in Section 3.1 and includes the corresponding steps and phases of risk assessment which is central to OSH. Ideally, the cycle of diagnosis, planning, intervention and evaluation is continuously repeated, so that a constant learning and development process emerges (key word: learning school).

Figure 3: Ideal school development cycle



Source: Hundeloh

Although school development is an important, and probably the most effective, strategy for developing a health-promoting school, it is not the only way. Since prevention as a concept also involves the prevention and minimisation of acute dangers, measures must also be taken by school management at school level or by individual teachers at classroom level in order to protect the health of school members without being able to initiate long-term development processes or directly involve the affected parties, for example, removing damaged electronic sports equipment or banning dangerous equipment arrangements in sports class.

3.4 Fields of action for developing health-promoting schools

Starting points for health promotion and prevention in schools can be found in both the shaping of the school setting (situational change) and the change of the lifestyles and behaviour of, primarily, the teachers and students (behavioural change). As such, health promotion and prevention should involve staff development measures (see 3.4.1), teaching development, which is especially important in schools (see 3.4.2) and organisational development (3.4.3). It is important here to always consider all three fields of action and to approach the manner in a holistic way. The problem here, however, is that the development processes progress at different speeds. Pedagogical concepts and fundamental attitudes are slower to change than organisational structures, which in turn are slower than resources. If one of the processes is cut loose, development processes often ebb away half-way through the process (Posse & Bonsen 2021). It makes little sense, for instance, for PE teachers to encourage activity in classroom breaks if the classroom is not equipped for any kind of movement or play.

The processes of health-promoting school development in these fields of action should be designed, coordinated and managed by a management group with input from representatives of all groups involved in school life.

3.4.1 *Field of action 1: Staff development*

The focus of the “staff development” field of action is on the employees of the school, in particular the teachers and other teaching staff. Talented, motivated and healthy teachers are the most important resource of any school. Schools can only achieve their goals when both the school’s management and teachers are at their peak performance, for which physical and mental health are an important prerequisite. In this light, it can be seen how important staff development is. In a health-promoting school, staff development means looking at people as a whole and not just seeing them as employees or human capital. In the scope of staff development, quality- and health-aware school heads actively and regularly take an interest in the health, well-being, satisfaction and performance of their staff.

Accordingly, staff development in schools must ensure that teachers and other staff are present in the required numbers and are talented, motivated and healthy enough to fulfil their role as educators as well as all other duties.

The further training and Continuing Professional Development (CPD) of teachers, for instance in topics such as learning through movement and preventing MSDs, is very important in the context of staff development because otherwise the required competence cannot be ensured, a competence which is without doubt an important component of making teachers fit for their roles. Furthermore, training and CPD is also important specifically for health promotion and prevention because it is clear that only a minority of teachers are capable of supporting students in the acquisition of health competence as well as effectively and proactively overcoming the stresses and burdens associated with the teaching profession. As such, they can often only be successful “health role models” for children and young people to an insufficient extent.

3.4.2 *Field of action 2: Teaching development*

Teaching – physically and online – forms the core of school life and is the central, largest activity for students and teachers. It is in the classroom that knowledge, skills and attitudes are taught in a regular, systematic way. This also makes it the central place of learning to build safety- and health-related competences. If health promotion and prevention in schools are to succeed long term, then they must also be taught to students in a way that involves systematic lessons. This is what gives teaching development its importance, including for the preventative efforts of institutions and individuals in the OSH sector.

Health-related teaching development can, in principle, take on any topic that has an influence on the health and work performance of the teachers and, in particular, on the health and learning outcomes of the children and young people. In the context of health-related teaching development, teachers can, for instance, ask the following questions:

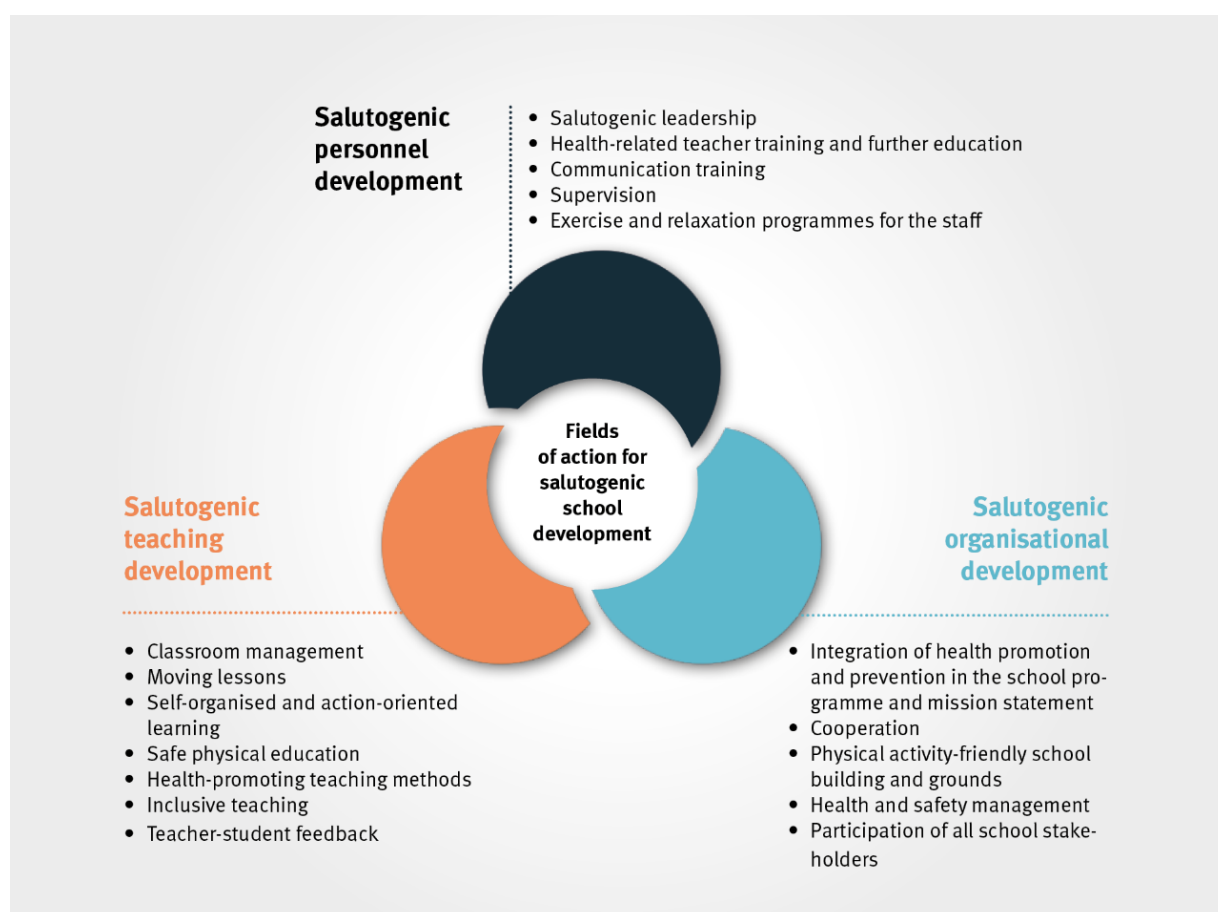
- Goal structure (What are my teaching goals? Do the students have the tools to achieve them? Will they be able to cope?)
- Content structure (Should I teach in more interdisciplinary fashion? What health topics should I touch on? What health-oriented competences should I promote?)
- Method (Should I use more cooperative and task-based work forms? Should I make my lesson more physically active?)
- Room structure and virtual classroom (Should I change the physical layout of the classroom, for instance by introducing workshop corners? Should I set up virtual work groups?)
- Goal structure (Should I change the time structure of my lessons? Should I introduce activity breaks?)
- Social structure (Should I change the “social architecture” of my class or learning group, for instance by establishing a helper system or fixed table groups or teams?) (following Meyer 2015)

3.4.3 Field of action 3: Organisational development

The results of staff and teaching development can ultimately only be successful long term if the organisation of the school is designed or adapted to the effect that the organisational framework not only tolerates this development but supports it. This is where health-related organisational development showcases its importance for the health and quality development of a health-promoting school.

In the scope of the organisational development of a school, it must be assessed whether the school's organisational structure is suitable for achieving good school quality in the sense of a health-promoting school, for example, whether the school's organisational structure supports the expectations formulated in the school's policy and school programme. For instance, a health-promoting school structure must provide assignments, roles and duties related to the preservation and promotion of health and safety. This must involve assigning health-related duties to certain departments and roles (such as the chairperson of the relevant subject committee tasked with risk assessments in school sports), developing and writing down rules for desirable and necessary behaviour in terms of health (such as activities on offer during breaks), arranging classrooms so that they comply with health guidelines and enable healthy behaviour, such as creating an ergonomic learning environment at school and at home. Additionally, it must be defined how statutory guidelines should be implemented specific to schools.

Figure 4: Fields of action of salutogenic school development



Source: Hundeloh

3.5 Health competence as the key to lifelong health

In its “Shanghai Declaration on Promoting Health in the 2030 Agenda for Sustainable Development” (2016), the WHO emphasises that health literacy is fundamental for the engagement of every individual in health promotion. This makes it an important foundation and driver for the sustainable promotion of safety and health (Gugglberger 2019). Accordingly, health literacy must be something that is cultivated and developed throughout all stages of life, particularly in schools and school lessons. From the point

of view of the WHO, health literacy is a core component of holistic approaches for promoting health in schools. The report from the OECD, “The Future of Education and Skills 2030” also describes health literacy as a core skill for the 21st century and defines strengthening health literacy as an important educational goal.

Health literacy is primarily understood to be a resource and potential that can contribute to giving individuals more control over their health and health-influencing factors. Studies show that a lack of health competence is associated with more behaviour that is detrimental to health and with more negative health effects (Okan et al. 2015).

Although health competence includes skills, knowledge and interdisciplinary aspects such as critical thinking and problem-solving ability that are taught in many school subjects, it is not guaranteed that what is learned in the school subjects will be applied in a health context. This discrepancy could be an indication of a phenomenon known to experienced teachers, namely that competences are not necessarily transferable. It could also point to the fact that a high degree of health competence requires time and other resources to develop. In other words: health competence cannot be acquired “on the side”; it requires a proper framework to be effective in the moment and in the future, for instance in the context of work.

As the central place for children and young people to acquire competences at school (both subject-specific and general competences), the classroom can be considered a place of systematic and planned learning. This is because the acquisition of subject-specific and general competences requires logical, systematic learning processes. Although general or interdisciplinary competences are harder to organise in such strict systematic fashion, the goal is to keep consciously and systematically confronting students with such situations, for instance, situations that are critical for health and safety (Lersch, 2010). In this way, teaching and teaching development can be assigned a central role in the promotion of safety and health in schools.

3.6 Conceptual examples: The “good healthy school” concept and SHE “health-promoting school” approach

Below, two approaches are described that are currently shaping prevention work in schools. The first approach is the “good healthy school” approach, which plays a big role in the German-speaking countries Austria and Switzerland and in particular Germany, and the “health-promoting school” approach, which is offered to schools by the European network “Schools for Health in Europe (SHE)”. Both are holistic approaches, have similarities to education for sustainable development (ESD), are orientated to a greater or lesser degree on the educational role of schools and have the common goal of not only improving health and safety, but the educational quality of schools in general. As such, it is no longer just about the prevention of accidents, injuries and illnesses as well as the reduction of “social disorders” (EU-OSHA 2013, 87) and the general promotion of health, it is about health in a broader sense, the environment and sustainability as well as about improving teaching and learning, leadership and management as well as school culture and school climate (Szych 2005, 12). It is primarily the stronger relationship to education that characterises the further development of these two approaches compared to the combined whole school approach as put forward in the EU-OSHA report “Occupational safety and health and education: a whole school approach” (2013).

In turn, the difference between the “good healthy school” and “health-promoting school” concepts lies in the fact that the “good healthy school” is more holistic and above all “educationally integrative”. It links health promotion and prevention measures with measures of pedagogical school development and the improvement of teaching and learning quality (Rathmann & Schricker 2021, 31).

However, it must be noted that both these approaches as well as the holistic perspective are only implemented in very few countries.

“Although there is considerable evidence about the relevance of such holistic approaches (for example, WHO’s Health Promoting Schools), few countries have successfully implemented them to scale” (Jourdan et al. 2021, 296).

3.6.1 “Good healthy school” concept

The providers of statutory social accident insurance for students responsible for OSH in schools in Germany have been working with the “good healthy school” approach for around ten years (DGUV 2013). Due to its proximity to schools and its scientific basis, this approach is also recommended by ENETOSH for the implementation of safety and health in schools.

Not least due to this conceptual approach and the measures that build on it, the statutory accident insurance providers in Germany, in cooperation with other partners, succeeded in giving fresh momentum to the topic of health promotion and prevention in schools and sustainably anchor the promotion of health and safety in many schools (Böttcher, Posse & Wiesweg 2012);

<https://www.bug-nrw.de/>; <https://mbjs.brandenburg.de/bildung/gute-schule/gute-gesunde-schule/gute-gesunde-schule-landesprogramm.html>; <https://www.ggs.bayern.de/>;
<https://www.berlin.de/sen/bildung/unterstuetzung/praevention-in-der-schule/gesundheit/>;
<https://www.unfallkasse-nrw.de/sicherheit-und-esundheitsschutz/themen/schulentwicklungspreis.html>;
<https://www.bertelsmann-stiftung.de/de/ueber-uns/was-wir-erreicht-haben/anschub>).

The perspective of the “good healthy school” approach is based on the quality dimensions of school education and raises the question of how much health promotion and prevention in schools can contribute to school quality in general. The approach rests on the assumption that there is a degree of interdependence in schools between health promotion and prevention on the one hand and the development of educational quality on the other. Good education promotes health, and good health is a requirement for good educational results. In a good healthy school, that’s why prevention and health promotion take care of health-related design and use all dimensions responsible for good school quality: material and organisational conditions, leadership and management, school culture and school climate as well as teaching and learning. In practical health promotion and prevention in schools, this means taking care of the following, among other things:

- Anchoring health-related content in the individual school subjects.
- Designing teaching–learning processes in a health-promoting way.
- Rhythmicising the school day and lessons.
- Ensuring there is relaxation time and physical activity.
- Providing ergonomic workplaces for students and teachers.
- Performing comprehensive risk assessments in a timely manner.

“The good healthy school concept is no longer concerned purely with prevention and health promotion by the school, it is concerned primarily with the promotion of education through health. Health is put at the service of schools and used to develop good schools.”

Peter Paulus

For this purpose, it is necessary to design special, health-promoting and preventative measures on the one hand and on the other to assess the original pedagogical methods in terms of their preventative and health-promoting potential and, where appropriate, use them for improving the health of school members and improving the school system. The good healthy school concept is no longer concerned purely with prevention and health promotion by the school, it is concerned primarily with the promotion of education through health. Health is put at the service of schools and used to develop good schools (Paulus 2010).

The “good healthy school” approach is thus a school-based preventative approach which takes the independence and individuality of schools seriously. Prevention projects are based on the framework conditions, needs and opportunities of the interested schools. Any old prevention measures are not simply drawn up and imposed on schools to reach a health target. Rather, measures are selected or designed that support schools in the fulfilment of their educational duties. The fact that schools are not instrumentalised for prevention and health promotion but are supported in their work increases the likelihood that they will be more open to matters of health promotion and prevention.

A detailed description of what constitutes good health is provided by Brägger and Posse (2007) in a quality tableau. It comprises a total of eight dimensions and forty quality areas with key indicators that are based on the three basic dimensions: “performance quality”; “process quality”; and “health quality”. With this method of categorisation, the quality table of the good healthy school resembles the reference frameworks for school quality that are mandatory for all schools in Germany (Harazd, Gieske & Rolff

2009, 115). On the one hand, the quality dimensions and areas involve safety- and health-related approaches. On the other hand, they themselves have an influence on the development of psychosocial protective factors and thereby on the willingness and ability to perform.

Alongside this holistic and educationally integrative perspective, other elements of the “good healthy school” approach are also of importance:

- Setting approach
- Risk and resource orientation
- Participation
- Empowerment
- Closeness to reality

The school development process described in Chapter 2.1 is the central process for implementing health promotion and prevention in the “good healthy school” concept.

3.6.2 SHE “health-promoting school” approach

The “good healthy school” approach is to a large extent reflected in the “health-promoting school” approach of the network “Schools for Health in Europe (SHE)”.³ This approach is also very well suited to work in and with schools. The network supports its 41 member countries inside and outside of the EU in the development of national and regional networks focused on restructuring schools to systematically integrate health and well-being in school life.

The SHE approach is open and comprehensive. It was developed to bring together the two areas of education and health (Bartelink & Bessems 2019, 1). It is based on the understanding that health promotion in schools can be described as “any activity undertaken to improve and/or protect the health of all members of the school community” (Vilaca et al. 2019, 13). This means that the approach and the materials for prevention and health promotion developed for it can be used both in a health-promoting project school that primarily works with individual measures as well as in a good healthy school that implements prevention and health promotion in the scope of a long-term school development approach. This comprehensive approach corresponds with the idea that every school is individual and has its own needs, goals and possibilities. In this, for SHE too, a health-promoting school is more than a school that offers health-promoting activities. The SHE approach is likewise a holistic school approach (Bartelink & Bessems 2019, 13): a holistic school approach that is not just about health education and learning in the classroom, but about a healthy material and social school environment, health-related school guidelines and policy as well as the consideration of health and safety in the curriculum. Furthermore, it places a lot of importance on the involvement of all members of school as well as the cooperation between parents and partners from the communal environment.

For the practical work in and with schools, SHE recommends concentrating on the following six fields of action:

1. School health policy
2. The physical environment of the school
3. The social environment and ethos of the school
4. Individual skills and ability to act
5. Relationships to parents and the local community
6. School health services.

Additionally, standards and criteria were developed for these fields of action that can be used for planning and implementation as well as for monitoring and evaluation.

³ The Schools for Health in Europe Network (SHE) exists since 1991 and started as a WHO-supported network. From 2017, SHE is an independent NGO with its own legal entity, hosted by University College South Denmark, co-funded by the EU and supported by WHO EUROPE.

The method proposed by SHE for the implementation of health promotion and prevention is, on the school level, in keeping with the school development cycle of the good healthy school (see Chapter 3.2). This means that the implementation is a continuous process, with results only realistically to be expected in the mid and long term.

As the implementation of health promotion and prevention in a school can never be viewed out of context, there are numerous ways in which a health-promoting school can be realised. SHE illustrates this diversity using different spectra through which schools can navigate:

- Top down – Bottom up
- Addressing a single Health Promoting School core component – Addressing multiple Health Promoting School core components
- Adopting existing Health Promoting interventions – Developing new Health Promoting interventions
- Non-disruptive – Disruptive
- Add-on – Add-in
- Randomized Controlled Study – Action-oriented research
- Local dissemination – National dissemination

(Bartelink & Bessems 2019, 3 ff.)

For practice, the SHE network provides interested schools and other involved parties with various work materials on its website (<https://www.schoolsforhealth.org/resources>).

4 Importance of exercise and physical activity for prevention

In the following, exercise and physical activity are used as synonyms. In the international literature, the term “physical activity” is often preferred.

Box: Definition of physical activity

WHO defines physical activity as any bodily movement produced by skeletal muscles that requires energy expenditure. Physical activity refers to all movement including during leisure time, for transport to get to and from places, or as part of a person’s work (WHO 2020a, 1).

The WHO definition takes account of the fact that the health-promoting and preventative effects of physical activity are not only achievable through dedicated training, but also through sufficient (everyday) activities in the three areas of leisure, transport and work (Czerwinski 2019, 7).

Physical activity is credited for general positive effects on a person’s performance and, in particular, on their health, but also on their social and economic development as well as for reconciliation and peace (UNESCO 2015a, 1). The exercise habits that are formed in childhood are usually also retained during adolescence and adulthood. The early development of a physically active lifestyle can therefore pay off in later life.

- It is not only important that children and young people exercise often in the course of their development, it is also important that they perform seated work as rarely as possible. “Active playing (such as pursuing an unstructured physical activity outside in leisure time), active transport (cycling or walking) and participating in sports are the most important elements of promoting exercise in children” (WHO Europe 2020a, 2).
- Additionally, an increase in physical activity, for example, more walking, cycling, active rest, sport and playing, can also help reach the 2030 sustainability goals (WHO Europe 2018b, 6; WHO 2018, 7).

In 2013, the WHO issued its first ever exercise recommendations (WHO Guidelines on Physical Activity and Sedentary Behaviours) for different population groups, which were then updated again in 2020. The WHO recommendations serve as a point of orientation for national exercise recommendations in many countries, such as Austria, Canada, Switzerland and United Kingdom.

Box: WHO exercise recommendations (2013, 2020)

According to the WHO exercise recommendations, 5- to 17-year-old children and adolescents should:

- engage in a weekly average of at least 60 minutes of moderate- to high-intensity, usually aerobic, exercise per day,⁴
- include intensive aerobic activities and activities that strengthen the muscles and bones at least three days a week,
- limit the time they spend sitting down, especially time they spend in front of screens in their free time.

(WHO 2020c, 25 ff.)

Despite all known advantages of physical activity and despite internal and national exercise recommendations, there is still a trend towards being less active per day (WHO Europe 2016b, 2).

⁴ Moderate intensity means that it is still possible to talk during exercise; high intensity means that it is only possible to talk in brief exchanges of words before running out of breath.

According to the results of the HBSC study for the 2017/18 school year, not even every fifth young person in the countries participating in the study met the WHO recommendations of at least 60 minutes of moderate to vigorous physical activity (MVPA) per day. Since 2014, the values have sunk in around one third of the countries (WHO Europe 2020b, 1).

The global figures paint a similar picture: around the globe, 81 percent of adolescents between the ages of 11 and 17 are not physically active to a sufficient degree (WHO 2020a, 7).

To counteract this lack of exercise, which also pervades other groups of the population, there are numerous international and national initiatives to reduce physical inactivity. The school setting plays a central role in this regard. On the international level, it is recommended to implement a comprehensive programme for the promotion of physical activity with a high-quality PE class as its central pillar. Such a programme should ideally include activities that take place before, during and after lessons (CDC 2011, 28; UNESCO 2015a, 2; WHO 2020a, 7).

4.1 **IMPORTANT: The correlation between physical exercise and physical and mental health**

Almost all relevant studies show a close, usually positive correlation between physical activity and health.

The effects of physical activity on the physical health of children and young people can include:

- positive effects on blood fat levels, blood pressure, the metabolic system, preventing obesity and on bone density (Czerwinski 2019, 8);
- improved oxygen uptake and a general preventative effect on the cardiovascular system as well as on the immune system (Czerwinski 2019, 8 f.; WHO 2020a, 1);
- an improvement in various sport motor skills such as endurance, strength, flexibility and coordination, leading to a long-term increase in exercise confidence in children and young people (UNESCO 2015a, 3).

The effects of physical activity on the mental health of children and young people can include:

- an improvement in general mental well-being and is associated with a reduced occurrence of anxiety, depression and stress;
- a positive effect on self-image and self-concept, self-esteem and self-confidence (Brägger et al. 2017, 26 ff.);
- protection against neurodegenerative illnesses (such as Alzheimer's) in the long term (Czerwinski 2019, 9; WHO 2020a, 1).

In general, the studies reach the conclusion that the positive effects of physical activity on mental and physical health increase with the intensity level of the physical activity (Czerwinski 2019, 28).

With regard to children and adolescents, the potential risk of injury when performing sporting activities is a factor that slightly spoils the otherwise positive picture. Following estimates from the Robert Koch Institute, around 50 percent of all accidents in children under 15 in Germany can be traced back to sports accidents. This percentage is mirrored in comparable international findings (Czerwinski 2019, 10). The percentage of accidents during PE classes in the scope of German Social Accident Insurance for Students was around 35 percent in 2019 (DGUV 2020a, 5).

4.2 **CENTRAL: Prevention of MSDs through exercise**

In the scope of a multi-factor causal relationship (see EU-OSHA 2019 as well as Chapter 3.1 above), too little exercise and incorrect exercise as well as too much exercise can all lead to illnesses and disorders of the musculoskeletal system, such as disorders of the bones, muscles, tendons and ligaments. It is not only adults that are affected by these disorders, but also children and young people – and by no means to an insignificant extent (see also Chapter 2.2.1 above).

Current findings indicate, however, that illnesses and disorders of the musculoskeletal system can be prevented and minimised first and foremost through exercise (EU-OSHA 2021). Accordingly, alongside

the ergonomic design of a given environment, movement-oriented intervention plays a large role in the prevention of MSDs. This goes for the world of work, where workplace health is promoted through offers such as back exercise sessions or recreational sport, as well as for schools, which is the “place of work” of children and adolescents. Motivating and enabling school students to get enough exercise with healthy physical activities is an important, fundamental duty of schools in the scope of the sustainable prevention of MSDs.

Exercise knowledge

To achieve the positive effects of exercise, the activity levels of children and young people must at least meet the recommendations of the WHO as a minimum (WHO 2020c). It is also necessary for people to learn how to exercise properly. On the one hand, this means learning how to perform body movements correctly in all situations. This goes for both everyday movements, such as how to pick up heavy items, and sports movements, such as somersaults in gymnastics. On the other hand, this means learning to exercise based on one’s skills and abilities so as not to cause any overload injuries. This knowledge of exercise is necessary to stay or become healthy; however, unfortunately it seems to be lacking in all too many cases, as can be deduced from the current findings on the health competence of children and adolescents (see Chapter 3.5. above).

Promoting exercise, play and sport

As such, a school strategy for preventing MSDs in students which should retain its effectiveness long-term in later life stages requires, alongside ergonomic prevention measures, measures that promote exercise, play and sport in schools, such as:

- daily PE class as a place of systematic learning and intentionally planned and implemented exercise education;
- other exercise opportunities in school outside of PE classes, such as sports on offer in breaks;
- high-quality support for students with posture problems, impaired endurance and impaired coordination as well as support measures for unmotivated, low-performing and disabled students;
- training for all teachers in how to promote exercise;
- training of (physical education) PE teachers in the early detection of postural and physical deficiencies.

4.3 PROVEN: The importance of exercise for learning

Exercise in childhood and adolescence has a positive effect on the mental and physical health of young people. It also influences their health in later life. But what is the effect of exercise on learning? Is exercise also important for learning in school, thus making it relevant for education and not just for healthcare?

Exercise and academic success

A look at the relevant scientific studies and the publications of the WHO and other organisations on the topic shows that the answer is a resounding “yes”: “Regular physical activity, increasing PE and active classrooms not only protect schoolchildren’s health but also improve their academic achievement” (WHO Europe 2021a).

With this sentence, the WHO’s regional office for Europe introduced a press release in February of 2021 in which it presented the results of a survey on the topic of exercise behaviour and academic success. A corresponding factsheet shows a large effect of exercise on language learning and learning in geography, as well as a moderate effect on learning in mathematics, reading and spelling. This survey study reaches the conclusion that academic performance increased over the course of a week, presumably thanks to a longer PE class, a switch from sitting activities to a lesson model with more movement as well as more exercise – walking, dancing and sport (Barbosa et al. 2020).

The results of the OECD Programme for International School Assessment (PISA) also show a positive correlation between average academic performance and the number of days on which 15-year-old school students perform moderate physical activity outside of school. The OECD project “21st-Century

Children” found that children who get regular exercise, eat well and sleep well are more likely to participate in class and be successful in school (OECD 2019, 50).

On a national level as well, there is an increasing number of studies that provide indicators and evidence for the notion that exercise in schools can improve academic performance as well as concentration, cognitive abilities and attention (U.S. Department of Health and Human Services 2012, 9; Hille & Walk 2017, 81 ff.). Accordingly, the US health protection agency, the Centers for Disease Control and Prevention (CDC), and the Association for Supervision and Curriculum Development (ASCD), found:

“No matter how well teachers are prepared to teach, no matter what accountability measures are put in place, no matter what governing structures are established for schools, educational progress will be profoundly limited if students are not motivated and able to learn” (ASCD & CDC 2014, 3).

Building personal and social skills

Exercise also promotes learning and academic success indirectly by helping children and young people build personal and social skills such as teamwork, fairness, empathy, self-discipline and honesty. These skills are, in turn, beneficial for academic learning and a moral and ethical way of thinking and acting (OECD 2019, 51; EC 2015, 9).

Newer scientific studies also show that the so-called “executive functions” that are of great importance for learning are associated with and can be promoted by various methods and forms of physical activity.

Box: Executive functions

Executive functions are cognitive skills that let people consciously control their thoughts and behaviour as well as their attention and handle their own feelings and emotions in a controlled way. They can be broken down into updating (working memory), cognitive flexibility and inhibition (impulse control). These central functions can be promoted through physical activity and sport interventions, especially complex movement tasks, but also through yoga, attention training and meditation (Hille & Walk 2017, 86).

All in all, exercise and sport are credited with high educational relevance, first and foremost in terms of directly exercise-related skills, but also in terms of indirectly sport-related skills in the social, political and cognitive areas. However, it appears that the potential of exercise to boost learning in schools is not even close to being fully utilised. Exercise in school is given only marginal importance. Only 10 percent of the entire lesson volume and half of the lesson time for mathematics is set aside on average for sport and PE in European schools (EC 2015, 5f.). Additionally, a lack of time and material diversity are common reasons preventing additional exercise being offered in lessons, for example, active lessons or active breaks (Logstrup Ottesen & von Seelen 2019).

5 Conditions for successful implementation

If external institutions such as healthcare or occupational safety and health institutions are to initiate and implement development processes, programmes and projects in schools, it is always a challenge, not least because the school system is complex and every individual school is unique. Furthermore, change and development entail leaving behind existing habits and being open to new ones, in other words, leaving one's comfort zone and getting started in new structures and routines. Change and development can, however, also bring with them stresses and conflicts that involved parties must endure and work through. Irrespective of whether there is high intrinsic motivation from the education sector to change and develop itself in the envisaged sense, or whether authorities and schools view an externally imposed measure with caution or even scepticism: generally, a lot to very much commitment, perseverance and sensitivity as well as staff and financial resources are always necessary to tackle the intended project and realise the intended developments and changes. Schools are the classic example of an especially conservative system that is resistant to change. The observation of Canadian educational scientist Michael Fullan "Schools change slower than churches" (Michael Fullan, cited by Hundeloh 2012) alludes to this general resistance of the school system to change. How great and how extensive the commitment has to be always depends on the concrete framework conditions, such as if there are concrete reasons and starting points or how complex and ambitious the goals are.

5.1 Prerequisites and conditions for successful implementation

Previous experience has shown that the acceptance and success of prevention measures depends on the following prerequisites and conditions: awareness, cooperation of teachers, resources and networking.

Creating awareness

The academic and social relevance of exercise education is, on the one hand, recognised in Europe, which is documented in particular by its integration in the formal curriculum of primary and secondary education. This fact is shown by the general political support for PE and sport in Europe (EC 2015, 5f.). However, the importance placed on health promotion and prevention in the education sector is not all that high, despite relevant ministerial and administrative guidelines as well as national programmes on health promotion and preventions (see Chapter 2.2. above). The existence of such guidelines does not mean that they are also being taken into account and implemented in an appropriate way on the various levels of the school system. The reasons for this can be diverse: from a lack of resources; in particular, time, staff and money, and a lack of qualifications and competence to a lack of knowledge and lack of awareness for the topic and its importance for a good school and education quality as well as future employability.

Gate keepers

For successful prevention work in schools, it is therefore necessary to ensure that the decision-makers and people in charge have an awareness of the intended measures and the changes they should bring about. In other words: they must be willing, or become willing, to accept change. In the case of national or regional measures, it is those in charge at the political level; in the case of activities in individual schools, it is the teachers, and above all the school head and school management committee. A series of studies from the field of school and education research show that school heads have an important role as "gatekeepers" of change in schools (Dadaczynski 2018, 6; Paulus & Hundeloh 2020, 200). Without their active support, there will be no sustainable change. For this reason, in its "Quality Physical Education Guidelines", UNESCO also points out that national strategies must ensure that school heads and parents and other stakeholders must be aware of the benefits of PE (UNESCO 2015b, 47).

Partnership at eye level

Ideally, a partnership at eye level should be formed with those in charge in the education sector. For this, it is necessary:

- to build trust and to make it clear that, as an external person or institution, the aim is ultimately to support the school in its work as well as
- to build a relationship that enables effective cooperation.

Social integration represents a basic human need whose fulfilment is of central importance for well-being in a general sense and for successful work and education processes in a more specific sense (Hagenauer & Raufelder 2021, 9). The prerequisites for this are:

- dialogic communication
- interest in the school situation
- reliability
- participatory and transparent working and
- knowledge of the school system, its duties and problems. The latter is also necessary to avoid unrealistic expectations, whether they be too high or too low.

Creating awareness for, and thereby also acceptance of, externally initiated prevention measures can be made simpler if the measures can be integrated into existing or planned school measures or combined with other current policy topics and goals, such as the sustainable development goals of the United Nations, in particular UN goals 3, 4 and 8 (Bollmann, Gründler & Holder 2018, 44 ff.). Additionally, it is necessary to embed the prevention project in a pedagogical concept.

5.2 Training and CPD for teaching staff

Without the support and active cooperation of teachers, hardly any prevention measure would be able to be successfully implemented long term in schools. In the scope of preventative change processes, teachers are often the ones that are supposed to:

- directly implement the intended change,
- motivate children and young people with their exemplary behaviour as role models and
- help children gain the necessary health and safety competence to change their health and risk behaviour.

Teachers have a key role, particularly in the (health-promoting) education of children and young people – that is, essentially, what schools are there for.

“While technology may become a superior vehicle for transmitting knowledge, the relational aspects of teaching – being a good coach, a good mentor – will remain human capacities of enduring value” (OECD 2019, 17).

Indeed, it is the relationships and social interactions between teachers and students that shape everyday school life and decide over the success of the school’s duty in education and teaching (Wettstein & Raufelder 2020, 28).

Experience shows that reasons for teachers to object to or neglect to support preventative change processes include lack of information about the content and goals of the measures, an incorrect or inaccurate understanding of their effectiveness and a lack of acceptance of health promotion in general or of a specific measure. The fear that they lack certain competences needed to face the change or work effectively as soon as the change is implemented can also be a reason (Jourdan et al. 2008, 36). Furthermore, teachers’ perception of their role in relation to students’ health has an influence on the way they approach health and is a factor for them contributing to health-related change processes (Jourdan et al. 2021, 298).

As such, teachers should be sufficiently prepared for the change processes and for the often little-known topics of health and safety as a part of their qualifications as well as through further training and Continuing Professional Development (CPD). They have to learn how they can implement new things and integrate the desired behaviour into their everyday working lives. Qualification measures can also be used to explain the expected chain of effects of the interventions – that is, the individual steps that must be achieved to ultimately achieve the desired improvements in school conditions. In other words: if prevention measures are to be implemented, in particular those intended to make noticeable changes to a school and require the cooperation of teachers, it must be ensured that the teachers are trained and equipped accordingly (EU-OSHA 2009; EU-OSHA 2011; EU-OSHA 2013). It is often required to provide targeted training and CPD on how to handle the challenges of health and physical activity as well as provide appropriate support in relationship management and class and course management

(Schaal 2020, 93). Alongside workshops, seminars, information events, subject conferences and symposia in physical and digital form, practical manuals and information brochures, as well as clear guidelines, are also suitable for facilitating the implementation of a prevention measure (Bada et al. 2019, 24). The EU-OSHA report “Training teachers to deliver risk education” from 2011 contains further information on how qualification measures on health and safety can be successfully implemented.

If more exercise and a more effective way of preventing MSDs in schools is to be realised, then teacher training as a whole must contribute to making every teacher capable of integrating movement into their lessons in a way that (a) accompanies learning and (b) promotes learning (WHO Europe 2018a, 9). PE teachers must additionally be experts of motor learning, with movement and physical activity being the object of learning (c).

Table 2: Overview – Integration of physical activity in lessons

Physical activity to accompany learning	Learning with movement Physical activity and sports have an accompanying, supportive function. This type of learning is more about a general activation of movement.	Example: Balancing exercise on a balance board when solving a cognitive task at the same time, such as reciting a poem, answering vocabulary questions, solving a maths problem.
Physical activity to promote learning	Learning through movement A learning object is made directly accessible through physical activity.	Example: The weight of a stone can be found when it is picked up; centrifugal forces can be best understood when they are physically experienced.
Physical activity as a learning object	Physical activity becomes a learning object in the scope of motor learning. New movements/movement sequences are learned and known ones consolidated.	Learning basic forms of movement, practising ergonomic lifting and carrying, learning and modifying techniques for one or more kinds of sport

On the other hand, teachers giving PE and sports lessons should be qualified and trained so that they do not only offer traditional sports, but also sports that are beneficial to health. If the health-promoting potential of PE is to be utilised in full, then more diverse, inclusive activities must be on offer and less traditional, competition-focussed sports that are often not suitable for all young people and particularly not for those that need physical activity the most (WHO Europe 2018a, 4).

For the effectiveness of qualification measures, it is also important that

- they are compatible with the goals and content of the relevant teaching plans;
- relevant accompanying materials such as manuals, guidelines or lesson materials are available;
- the development and implementation of the measure is carried out together with partners, in particular teacher representatives, teacher training institutions or school authorities;
- digital offers such as blended learning courses, internet portal and online forums are also offered (EU-OSHA 2011, 83).

In general, it is also important in this context that further training and CPD directly contributes to the professional satisfaction and health of teachers. Further training can thereby be seen as a preventative factor for maintaining capacity to work.

5.3 Availability of resources

Resources are generally always a problem in schools and educational institutions alike. Often, the resources available will prove decisive in the success or failure of a prevention measure. This is because

the appropriateness of the available resources in a change process partly determines how the involved parties perceive their own ability to make changes. If there are enough resources in the form of time, money, structural and cultural conditions, staff, material and information, those involved are more likely to think that they are able to effectively implement the change processes (Hauke, Schellewald & Ellegast 2020).

It is often the case, however, that financial and time resources are limited, hindering the implementation of all possible or the most suitable intervention measures. Furthermore, it may be the case that not all participating groups benefit in the same way, because they may have different budgets or temporal constraints that may hinder a change.

The resource of time, in particular, has proven to be a limiting factor in the implementation of prevention measures in the past. This is because, on the one hand, preventative change processes need time – with results often only being realistic in the mid and long term – while on the other hand, the everyday working lives of teachers and school heads mean that they have to concentrate their resources on two duties at once: the time-intensive and challenging everyday duties of teaching staff and on working on their own future viability. Everyday duties generally have complete priority, which almost always leads to the development task being neglected.

To set up a prevention measure so that it can be successful in the long term, it is essential to ensure sufficient resources. Otherwise, the measures will be predestined to fail. On the one hand, this relates to the financial backing of prevention measures. On the other hand, it means thinking about how the involved parties in schools can be given the time and support required to commit sufficient energy to the prevention measure, for instance by bringing external expertise.

5.4 Formation of networks and partnerships

“Health and education affect individuals, society, and the economy and, as such, must work together whenever possible. (...) Developing joint and collaborative policy is half the challenge; putting it into action and making it routine completes the task” (ASCD & CDC 2014, 3 and 9).

This finding from the ASCD and the CDC, applies for all levels and is also emphatically supported by other health organisations such as the WHO (WHO Europe 2016a; WHO 2018) and the European SHE network (Bada et al. 2019, 17), as well as EU-OSHA (EU-OSHA 2009; EU-OSHA 2011).

Also, from the point of view of occupational safety and health, for instance the ENETOSH network, it is deemed necessary to cooperate with the education sector if sustainability is to be achieved in the matters of health and safety.

“I would like to emphasise the importance of cooperation between educators and occupational safety and health experts. Teachers know how to teach. OSH experts know about occupational safety and health. They do not necessarily know about each other’s field of expertise. When they cooperate, they can raise the bar. (...) It is important that the cooperation functions on different levels: at ministerial level, within the social partners, organisations and unions at sector level, and educational institutions from top to bottom.” (Susanne Ulk, cited in Bollmann, Gründler & Holder 2018, 51f.).

However, an exclusive cooperation with the education sector alone will often not be enough to achieve prevention and health promotion that is successful in the long term. Studies, as well as practical experience from prevention work, show that primarily partnerships with communal institutions and organisations are required to promote the health and safety of children and young people long term. Not least for this reason, the prevention approach of the ASCD and CDC bears the title “Whole school, whole community, whole child” (WSCC).

The same applies for the cooperation with parents. The perspectives of civil society and external stakeholders, comprising predominantly parents and carers of pupils, have a big influence on defining educational priorities. It can therefore be of benefit to work together with parents and win them over to the idea of promoting health and exercise in schools.

As found by the SHE network, cooperation is necessary for the purpose of creating supportive policies for health and exercise promotion on the national, regional and local level, identifying synergies and building on existing strategies and mechanisms to achieve the goals of the WSCC model as effectively and efficiently as possible.

The cooperation is especially effective if it is institutionalised and involves people and institutions from the relevant policy fields, as is the case with the SHE and ENETOSH networks. In the field of OSH, networks are seen as key elements for the integration of health and safety in education. “Network” is defined here as follows:

“Networks are structures for cooperation between individuals or institutions over a longer period of time in order to attain joint objectives and to generate added value for its members” (Bollmann, Gründler & Holder 2018, 53).

As important as cooperation and networking is for the sustainable promotion of health, safety and OSH in the education sector, the following must still be considered:

- Education, public health and OSH often work with different understandings of cooperation relationships. Even within the individual systems, it cannot always be assumed that there is a common understanding.
- There are often already manifold partnerships in place between education, public health and OSH. However, these are mostly local and smaller bottom-up processes with the advantage of higher identification between those involved but with the risk of little long-term effectiveness.
- Those involved often have a lack of support for partnerships. The framework conditions are not yet geared towards such cooperation to a sufficient degree.
- Alongside favourable framework conditions, personal commitment and network coordination competence are central factors for success.
- Up until this point, the initiative for cooperation seems to come more from the public health and OSH side, while the education side has difficulty engaging with cooperation.
- The public health and OSH sectors must give consideration to the perspectives and working methods of education professionals in relation to health and OSH topics from the very beginning and incorporate them when designing measures and working together.

“Alongside favourable framework conditions, personal commitment and network coordination competence are central factors for success.”

Tim Tregenza

6 Practical examples

Practical examples for the promotion of exercise, play and sport in the context of schools are presented below. The selected examples show various implementation possibilities and are intended to illustrate that it is possible to intensify the promotion of exercise and sport within the scope of existing systems.

However, with the description of the examples it also becomes clear that there is currently obviously a lack of larger exercise programmes or projects that specifically address the prevention of MSDs. That being said, it is a matter of doubt as to whether such measures would be accepted at all in the current school system, because the prevention of MSDs is not seen as a part of the education and teaching role of schools.

6.1 Finland: Schools on the Move

The Finnish programme “Schools on the Move” (<https://schoolsonthemove.fi>) is a research-based programme to promote physical activity in schools. It has been implemented in Finnish comprehensive schools⁵ since 2010. The programme is provided by the Finnish Ministry of Education and Culture as well as the National Board of Education.

Aim

The aim of the Finnish “Schools on the Move” programme is to increase the physical activity of children and young people during their time at school. It does so by making school culture, and thereby everyday school life, more active. It is less about a specific focus and more about a general increase in physical activity during everyday school life, which should in turn lead to other positive developments. The primary aims are better physical fitness, promoting learning and an improved social climate. The prevention of MSDs is therefore not an explicit goal of the “Schools on the Move” programme.

Implementation

The programme aims to achieve its goal of increasing the physical activity of the students primarily by integrating exercise into everyday school life without disrupting the learning activities of the students or the teaching–learning process. On the contrary: learning itself should benefit from the students getting active. The programme comprises various components designed to make the school culture and school routine more active:

- Integration of movement in lessons
- Physical activity in breaks
- Reduction of sitting activities
- After-school clubs
- Events and promotions on the topic of physical activity, such as theme days
- Focus on sport pedagogy in physical education
- Active school commute with a bike or on foot

These components comprise measures both in terms of the situational circumstances, for example, designing open spaces or adapting school rules to promote movement, as well as in terms of the behaviour of school members, such as teaching and learning with active methods.

In line with Finnish school policy, which grants schools a high level of autonomy, the schools are themselves responsible for the implementation of the programme. The students should take on a key, active role as well. They receive support from a research centre that is also responsible for programme coordination. This support primarily comes in the form of further training and guidance, above all to promote the pedagogical competence of teachers. Furthermore, the schools have access to an instrument for the evaluation of the actual situation which can be used at the beginning of a change process as well as for monitoring the intended development project.

⁵ In Finland, children attend comprehensive schools for nine years from the age of seven.

The implementation of the programme is primarily limited to comprehensive schools. Although there is also a programme (Students on the Move) for upper secondary schools with students aged 16 to 19 as well as for colleges/universities, this is not (yet) as widespread. This might also have something to do with the fact that this kind of physical activity programme and the associated principle of “active learning” are difficult to implement with older adolescents and higher school years, because activity loses appeal with age, and teaching content in a playful way is not age appropriate and also difficult to execute due to the increasing complexity of the subject matter (Stefan 2012, 109 f.).

As with its comprehensive school counterpart, the programme “Students on the Move” also aims at increasing physical activity to

- support learning and studying,
- reduce problems of the musculoskeletal system and
- improve studying and working ability.

The implementation of the programmes is accompanied by scientific research and evaluation. In this way, strengths and weaknesses can be identified, thereby ultimately enabling continuous process optimisation.

Results

When looking at the past results of the “Schools on the Move” programme, the available sources (Niemi 2020; <https://schoolsonthemove.fi>) show that the programme is highly valued in educational policy and enjoys high acceptance in schools.

The programme is provided by Finland’s central stakeholder in educational policy, the Finnish Ministry of Education. Since its introduction in 2010, it has been a part of the implementation of the Finnish government programme four times and has been one of the government’s key projects in the area of knowledge and education for several years (Niemi 2020). This fact is testimony to the high value placed on it by educational policy and also represents important non-material support for its implementation at school level.

“In schools that work with the “Schools on the Move” programme, 77 percent of students actively participated in physical activities during the school day in Finland.”

Joonas Niemi

It is therefore not surprising that the acceptance of the “Schools on the Move” programme in Finnish comprehensive schools is very high. Since 2010, it developed from a pilot project to a country-wide programme that is used by more than 90 percent of Finnish comprehensive schools. Every second participating school has incorporated a long, movement-oriented break into their daily timetable. Additionally, some schools made their facilities and grounds more conducive to movement and physical activity. Schools also make better use of their surroundings to increase the physical activity of their students. The success of the programme is not only shown in soft data, either. In schools that work with the “Schools on the Move” programme, 77 percent of students actively participated in

physical activities during the school day (<https://www.schoolonthemove.fi>). This ultimately contributed to the number of Finnish children and young people aged 11 to 15 that get the recommended amount of exercise improving by 5 percent in boys and 11 percent in girls over the course of eight years (2010 to 2018) (Niemi 2020).

6.2 Austria: Moving School

The Austrian initiative “Moving School Austria” (<https://www.bewegteschule.at/>) is a programme initiated and provided by the University of Education Upper Austria. The implementation of the programme is supported by the Austrian Workers’ Compensation Board (AUVA) and the commercial education provider Education Group. The initiative is also supported by the education authorities in seven of the nine Austrian states.

The pre-history of the initiative stretches back to the 1990s. This is when efforts got underway in Austria to make school life more active. The beginnings of the initiative in its current form date back to 2010, when the Austrian state of Styria founded the “Moving School Austria” network.

Aim

The original aim of the initiative was to counteract the increasing number of health problems in students, in part caused by the amount of time spent sitting and the lack of physical activity, by offering more opportunities for exercise in schools. From this original health-oriented goal, the backing institutions gradually developed the goal of promoting learning through exercise in a holistic sense and supporting the development of schools and lessons (Leitner 2020). It used physical activity with the aim of helping improve the educational quality of schools.

Implementation

The central implementation strategy at school level is the school development process with the aid of the so-called cogwheel model (Leitner 2020). The cogwheel model is made up of the three fields of action (cogwheels) “school as a place of learning and living”, “teaching and learning” and “management and organisation”. Changes can be made by the school members in each of these three fields of action. Each change in a field of action has an effect on the other fields of action and influences or changes the entire school.

In the scope of the initiative, the aim is to anchor the cogwheel model with its three fields of action as a school development concept throughout the country, such as in the Austrian Ministry of Education, in school authorities and administrations, in all pedagogical colleges and universities as well as in schools.

Through the initiative, interested schools are supported in the implementation of movement-oriented school development projects in diverse ways. Teacher CPD courses are at the centre of the support measures. Together with partners, the initiative has in recent years developed training on the two topics “active learning” and “active breaks”. It offers these to interested schools and teachers in various formats ranging from a half-day workshop to a year-long course.

Additionally, the initiative awards a seal of quality to those schools that have anchored physical activity as an important aspect of school life in their school profile and everyday routines. This is a form of recognition for permanent school development as called for by the Austrian Ministry of Education. The seal of quality is not to be seen as evidence of a completed process, but as an indicator of the current state of development and past results. With the help of these results, schools can assess in which areas there is still room for improvement and which tasks should be undertaken (Leitner 2020).

Additionally, on the initiative’s website, schools have access to tried-and-tested materials and ideas for active lessons and active breaks as well as for movement-oriented school development.

The central organisation of the initiative and the coordination of activities is carried out by the Division of Sport, Physical Activity and Health of the University of Education Upper Austria in Linz. It is supported by coordinators at the state level. In each Austrian state, there is at least one person who takes care of reaching out to schools and implementing measures.

Results



The “Moving School Austria” initiative is widespread throughout the country and is supported by important stakeholders from the education sector, in particular the state education authorities, as well as from the OSH sector, such as the AUVA. Of primary importance for the acceptance of the “Moving School” concept at school level and its implementability is the fact that it is supported by most of the state education authorities and therefore given high value in terms of education policy.

Unfortunately, there are no exact numbers indicating the acceptance of the “Moving School” concept in Austrian schools. However, it is to be assumed that a great many schools, particularly primary schools, have integrated at least parts of the concept into their everyday school routines. Of course, the number of schools that base their entire school development on the motto “Moving School” and who have obtained the “Moving School” seal of quality is lower. Around ten percent of Austrian schools currently bear the initiative’s seal of quality. Of these 549 schools, most of which are primary schools, 53 have reached the highest level (Level III), 234 have reached Level II and 262 have reached Level I (Leitner 2020).

6.3 Hungary: Daily physical education

The introduction of daily PE as part of holistic health promotion in Hungary shows how a general call from health and education organisations around the world can be implemented. This measure, which is not insignificant for the Hungarian school system, could ultimately only succeed due to persistent, continuous efforts primarily from the public health sector and an overarching cooperation between all relevant policy areas. Another important aspect for the realisation of the measure was the integration of the exercise-related activities into a concept of holistic health promotion.

Aim

In the scope of the holistic health promotion concept, Hungarian schools are tasked with

- teaching students a healthy way to eat;
- offering health-promoting PE lessons and other opportunities to get active;
- promoting the mental health of the students;
- supporting the students in the acquisition of health competence.

In the context and on the basis of a more medically oriented understanding of health, the daily PE initiative was introduced with the aim of reducing the physical inactivity of students in order to at least mitigate a central risk factor for non-communicable illnesses such as MSDs. The PE class is intended to contribute to the most important strategic aims of holistic health promotion in schools in the following ways: improved physical, mental and emotional health for all students, improved academic performance, improved integration and improved social well-being (Somhegyi 2018).

Implementation

The realisation of the daily PE class took place using a top-down approach. The starting point was an initiative of the Hungarian Ministry of Health in 2003 which looked to implement health promotion as a mandatory component of school education. This ultimately succeeded in 2012. Through its adoption into the Hungarian government programme in 2010 and into law and regulation by the Ministry of Education in 2011 and 2012, the institutionalised implementation of the holistic health promotion in Hungarian schools became mandatory (Somhegyi 2018).

Alongside this development, the healthcare sector was calling for daily PE as early as the late 1990s. In 2001, this call made it to the national programme for public health and was adopted in the national education policy in 2006, to then be adopted in the government programme together with the holistic health promotion strategy in 2010. After daily PE was adopted in education law (2011), it became mandatory for all Hungarian schools in 2015 after a four-year transitional period. Two of the total of five weekly PE classes can be replaced by participating in sports clubs (WHO Europe 2018b, 84).

The administrative guidelines from the Hungarian government do not just require a certain amount of physical education, they also require a certain level of quality. To ensure this, PE classes must fulfil specific criteria that were formulated by several medical societies and set down in the national educational guidelines. The criteria include the following, among others:

- Every student must participate in the daily PE classes. Non-participation is an exception and must be reduced to a minimum.
- Every PE lesson should contain as much movement and physical activity as possible for every student. Time spent sitting and waiting should be reduced as much as possible.
- Exercises on posture training and body strengthening should be a part of every PE class.
- The age-related strength of the spine and joints must be taken into account in the selection and execution of exercises.
- The PE class should help pave the way for lifelong enjoyment of sport, for instance through a good selection of activities and sports.
- When selecting sports and methods, every student should be taken into consideration with their individual skills and abilities so that everyone can experience the feeling of success and fun in movement.

- The PE class should strengthen the health competence of the students.

(Somhegyi 2021)

As the quality of PE classes is largely dependent on the quality of the PE teacher, the education guidelines stipulate that teachers teaching PE must be trained in the subject of sport. In order to ensure the qualification of teachers teaching PE, the Hungarian School Sport Federation has, on behalf of the government, issued seven handouts since 2013 which serve as an aid to teachers regarding how the goals of the new health-promoting PE classes can be achieved. Additionally, a total of almost 8,000 PE teachers participated in relevant CPD measures (Somhegyi 2021).

The daily PE class is achieving one of its central goals of improving physical fitness using the national school fitness test (NETFIT) for assessment. This test was developed in cooperation between the Hungarian School Sport Federation and the US Cooper Institute. Since the 2014/2015 school year, every school in Hungary is required to test the fitness of every pupil from year 5 onwards (WHO Europe 2018a). The school fitness test uses nine parameters to characterise students' endurance, strength, flexibility and body composition in four fitness profiles. Depending on the test, the results can be divided into two or three areas: health, development and extended development (https://www.netfit.eu/public/pb_netfit.php). The schools themselves are responsible for collecting and entering the data as well as for the analysis of the results and the resulting improvement measures. The government has made the necessary tools available to all Hungarian schools for this purpose (Somhegyi 2021). In 2016, the School Sport Federation issued an adapted version for students with special educational needs.

Results



Since 2011, from a legal point of view, and since 2015, from a practical point of view, Hungary has been so far the only European country where it is a legal requirement for students to receive a daily PE class. In doing so, Hungary is implementing one of the calls to action that is often raised by health, sport and education organisations on both the international and national levels. This success is partly thanks to political willpower. The development was significantly expedited through the adoption of the daily PE initiative in the government programme and its subsequent implementation in the scope of the Hungarian education law in force since 2011. It is also partly due to the development of a good cooperation between the policy areas of education and health and in particular between the sport teacher federation and medical bodies (Somhegyi 2021).

This has set the framework for more qualified physical activities on offer in Hungarian schools. However, the guidelines were not able to be implemented in all schools as intended. The reason for this is a lack of suitable sports facilities and the required equipment. As a remedy to this, sport should be taught and practised in alternative locations, for instance in the school playground or in communal parks (Somhegyi 2021).

The results of the motor tests carried out to date are not conclusive. On the one hand, there are improvements in the endurance area, though on the other hand the number of students with an excessive body mass index (BMI) is increasing slightly. The results of the sit-up test are the worst of all sub-tests in every testing round. Furthermore, the results get worse with age (Somhegyi 2021).

6.4 Germany: “Safety and health in physical education” initiative

The German initiative “Safety and health in physical education” (SuGiS) is likewise not specific to MSDs. It was launched in 2018 in cooperation between the Standing Conference of the Ministers of Education and Cultural Affairs of the Länder in the Federal Republic of Germany (KMK)⁶ and the German Social Accident Insurance (DGUV). The reason for the initiative was on the one hand the high number of accidents in German schools. With around 480,000 registered and compensated cases, the incidence

⁶ The Standing Conference of the Ministers of Education and Cultural Affairs of the Länder in the Federal Republic of Germany (KMK) is a voluntary assembly of the ministers and senators responsible for education and research and cultural affairs in all 16 German states.

and severity of school sport accidents in Germany is at a high level that has not changed much in years. Predominantly in secondary schools, up to two thirds of all school accidents in all states are related to school sports. On the other hand, experience and observations show that the health-promoting potential of sport in schools is not being used.

As the KMK and DGUV are aware that such an initiative requires additional support, they agreed to seek other partners for the initiative, particularly from the education, healthcare and sport sectors as well as the scientific field.

Aim

The “SuGiS” initiative is not so much about overcoming individual problems as it is about focussing on the culture of PE in schools – the values it is based on, the social interaction and the participation that takes place there. In this light, the KMK and DGUV pursue four concrete goals with their PE initiative (KMK 2018, DGUV 2018):

- Safety and health management should be introduced and established across all school levels. This should take into account in particular the safety and health competence of all those responsible for teaching PE in schools.
- The topics of safety and health should be more firmly integrated in the legal and curricular guidelines for physical education.
- A sustainable culture of prevention should be implemented in the school system, particularly at school level.
- There should be a significant decrease in both minor and severe sporting accidents in schools.

Implementation

The SuGiS initiative has an unusually long duration of up to 15 years. This was deliberately chosen by the backing organisations because past experience shows that short durations do not lead to any success and that successful organisational change processes are achieved not through one-off campaigns but through measures that build on one another logically and through longer-term development steps (Orrie 2019).

These measures are primarily carried out in a top-down approach. They are generally planned and designed by a central management committee. Implementation then takes place on both a national and state (regional) level. At the national level, primarily those measures are carried out that are related to topics and matters with nationwide relevance, for instance research projects, symposia and specialist conferences as well as handouts on safety- and health-related topics. Measures that relate to concrete work at school level, such as training and CPD as well as legal and curricular guidelines for schools, can only be prepared at national level. As school policy is a state matter in Germany, the implementation at the regional and even local level must take place in close cooperation between the competent local school ministries and authorities and the social accident insurance providers responsible for OSH in schools (Hundeloh 2019).

The following have been carried out or initiated as concrete measures:

- Publication on the topic of “Physical activity and learning” (2019)
- Publication on the topic of “Learning swimming at school – easy and safe” (2019)
- Symposium on “Teaching and learning swimming at primary school” (2019)
- Project on “Self-evaluation of school sports accidents” (2020)
- Research project on pedagogical training in safety and further education of sports teachers – development of online-supported training courses (2020)
- Seminar on the concept of “Physical activity – learning health” for school heads and teachers of all subjects (2021)
- Research project on psychosocial health in PE classes (2021)

These measures, as well as those that are intended for the future of the initiative, essentially aim to increase and improve the quantity and quality of physical activities on offer in schools. Measures that are dedicated to the topic of MSDs are not currently being planned by those in charge of the initiative.

Results



This initiative represents the first long-term cooperation between the education sector and OSH in Germany, specifically the German Social Accident Insurance (DGUV). This cooperation is without doubt a success for OSH, because it has created a potential basis for more intensive and above all sustainable prevention and health promotion that goes above and beyond PE in schools.

If and how the measures initiated so far will be adopted and implemented in schools can, however, not yet be predicted. Due to the Covid-19 pandemic, there has been practically no sport in schools in Germany since March 2020, so that no implementation could occur either at the regional level or at the level of each individual school.

Conclusion

The four selected examples⁷ describe measures that are complex and challenging. However, their aim is less concerned with MSD prevention specifically and more with a general improvement in the quantity and quality of physical activity in schools. With the exception of the Hungarian example, which focusses primarily on PE classes, the other three measures take on a multi-perspective approach by considering different points of access to the topic of "physical activity, play and sports".

On the basis of past experience, it can be assumed that these measures can contribute to the prevention of MSDs despite their general, sport-pedagogic orientation. All measures are evidence-based and are met with a positive response in many schools. As such they can contribute to improving the quality and quantity of PE in schools. Such an improvement can, in turn, directly contribute to the prevention of MSDs. According to experience gathered to date, prevention measures that have a more medical approach would not have the same effect.

The examples also make it clear how important it is to have cooperation with other institutions. The involvement of and commitment from the education side seems to be of particular importance. At the policy level, this is the cooperation of the school or education ministry, and at the school level that of the school head. Without their active involvement, prevention measures generally lack long-term effectiveness.

⁷ Other examples can be found on the ENETOSH website www.enetosh.net and in the publication "WHO (2018): Promoting physical activity in the education sector".

7 What needs to be done? – Bringing more movement to schools – Creating schools that move! – A conclusion

“What is now standard for the topics of diet, tobacco, illegal drugs, violence and mental health is not (yet) the case for the topic of MSDs.”

Heinz Hundeloh

The prevention of MSDs and promotion of musculoskeletal health in schools may be an important matter from the OSH and public health perspective. This is obviously not deemed to be the case from the education perspective. What is now standard for the topics of diet, tobacco, illegal drugs, violence and mental health is not (yet) the case for the topic of MSDs. The issue is obviously not seen as serious enough to warrant this kind of attention and above all is not viewed as being correlated to the core activity of schools and the academic success of students. As such, MSDs are not a focus of education in general and schools in particular. To take Germany as an example, this marginalised position can be recognised by the fact that special-needs sports lessons, which are intended for children and young people with physical impairments or postural deficiencies and which

are firmly anchored in the curricular guidelines of all 16 states, have been completely neglected and have not even been offered in many schools for decades.

Furthermore, the topic of MSDs is “hidden” by other health issues such as mental and psychosomatic health. This means that back pain is not perceived as an MSD, but rather as a psychosomatic disorder.

Despite this rather pessimistic appraisal of the situation, there is one starting point for promising MSD prevention in schools. And that is physical activity (Taylor 2020a), of which there remains a lack in schools (Weichselbaum et al. 2012, 265)! It is necessary to intensify efforts in this regard, especially considering that schools are the only institution which can contribute to the implementation of the WHO's exercise recommendations through PE classes and other physical activities (EC 2015, 3).

It is not only the WHO (WHO 2018) and other national health organisations – in Germany, for instance, the Federal Centre for Health Education and the German Alliance against Non-communicable Diseases (DANK) and in the US, for instance, the CDC – that emphasise the necessity of and call for (more) physical activity in schools, it is also other organisations and institutions such as the OECD (OECD 2019), UNESCO (UNESCO 2015a) and the European Commission in cooperation with WHO Europe (EC, EACEA & Eurydice 2013). They also call for higher quality exercise, in particular in PE classes in schools. With these demands and statements, the basis and framework has been set for greater commitment from the OSH sector for more physical activity in schools and thereby for a promising school-based approach for MSD prevention.

It can be considered a school-based approach – that comes naturally to schools – primarily because physical activity is no foreign concept in schools. Sport is ingrained in the educational canon in all European countries and is a part of curricular guidelines for primary and secondary education. Promoting exercise is therefore not an add-on or an additional duty for schools per se. Furthermore, exercise and physical activity have a positive influence on school performance and sustainable development goals (see Chapter 4.3 above).

It is promising firstly because many countries already have guidelines and programmes on promoting physical activity in schools (WHO Europe 2018b, 24 ff.). The OSH sector can build on these, get involved in their implementation or use them as a basis for its own initiatives. Secondly, the school setting is a highly suitable setting because the behavioural change in children and young people is highly influenced by the behaviour of their peers. In this way, the probability of a surveyed student reaching the exercise recommendations of the WHO increases if that student's peers report to each other that they were physically active for at least an hour on an average of one day more per week (Czerwinski 2019, 201).

However, it is important that the matter of promoting physical activity in schools and using it to prevent MSDs is integrated into a comprehensive concept of school prevention and health promotion, as is the case in the examples of the good healthy school concept or the concept of the SHE network, so that it becomes a long-term project for schools as well. It is also important to orient the preventative activities on the guiding pedagogical idea of physical education. In many countries, this can be described with

- promoting the development of children and young people through physical activity, sport and play and
- promoting a culture of physical activity and sport.

Additionally, the activity spectrum should generally cover all levels of action – national, regional, local and school – and comprise all intervention possibilities including political, advocacy-based and operative. It should ideally always be in cooperation with other institutions, organisations and individuals as a part of partnerships and networks and – very importantly – in cooperation with the education sector.

To bring more exercise into schools and thereby promote the quality of schools and ultimately prevent MSDs, the “Moving Schools”⁸ concept and its components can be used as a point of orientation and a source of inspiration:

- Physical activity integrated into lessons / Active learning / Topic-related physical activity in lessons
- Active learning breaks
- Physical activity in breaks
- Extracurricular physical activity and sport offers
- Active school festivals and campaign days
- Active, ergonomic work stations for teachers and students
- Active school commute
- Active, safe and ergonomic learning environment (rooms, grounds and equipment)
- Active school organisation
- Exercise and relaxation activities for teachers
- Daily physical education
- Physical activity as a learning object

Source: Hundeloh, Kottmann & Pack 2015, 61 ff.

The concept of the moving school combines measures of behavioural prevention with measures of situational prevention. Such a combination has greater chances of success than isolated individual measures (EU-OSHA 2021).

The cornerstone of a moving school is high-quality, daily PE (CDC 2011, 28; EC 2015, 13; UNESCO 2015b), because this is primarily where exercise skills are acquired. It is therefore also the place where teachers can, and must, make a key contribution to MSD prevention. PE lessons should equip school students with functional health knowledge and teach them healthy exercise behaviour. In this context, quality means that PE lessons are run by teachers trained in the field of sports and that the lessons do not only focus on traditional, competition-focussed sports, but also on sports that promote health. Additionally, PE lessons and all activities offered by schools should be inclusive and diverse, as not all students can benefit from traditional sport, particularly those that need physical activity the most (EC 2015, 10; WHO Europe 2018a, 4). Quality also means that methods, content and activities that undermine the confidence of students and bring with them disproportionate risks are not compatible with the integrity and potential benefits of physical education, physical activity and sport (EC 2015, 13; UNESCO 2015a, 7).

In this context, the role of the OSH sector should also include the training of teachers. CPD courses provided by the OSH sector are just as recommendable as the political effort to train specialised sports

⁸ The “Moving School” is a variation of the “Active School Concept”. The “Moving School” concept was developed in the German-speaking realm at the beginning of the 1990s. The Active School Concept is recommended by the European Commission and is already implemented in various countries in diverse variations (EC, 2015).

teachers in a health-promoting way as well as to integrate exercise promotion into the training of all teachers (EU-OSHA 2009; UNESCO 2015b, 50).

The measures listed are already, at least in part, a reality in several countries, as shown by the above examples and models of good practice.⁹ However, as shown by existing data (EC, EACEA & Eurydice 2013; WHO Europe 2018a, 9), this does not mean that there is no need for optimisation or action in these places.

In this context it can also be noted that it is often necessary to implement measures beyond those at school level, for instance at the community or peer level, that either support the school interventions or contribute to an independent change in the exercise behaviour of children and young people in their own right.

Table 3: Overview – General orientation of measures for the promotion of exercise and physical activity

Level	Measures (examples)
Individual	Building exercise skills Clarifying the benefit of exercise, sport and play Collecting diverse exercise experience and forming exercise preferences Counteracting a lack of exercise early and preventing physical deficiencies ...
Family	Strengthening exercise skills of parents Supporting parents in the realisation of physical activities in the family Counteracting a lack of exercise in the family ...
School	Offering high-quality PE classes Making school life and lessons more active Designing school buildings and the school environment in a movement-friendly way Exercise and relaxation activities for teachers Making physical activity a topic of cooperation with parents ...
Peers/community	Promoting membership in sports clubs Offering informal sports activities in the community or neighbourhood for all children and young people Promoting cooperation between school and sports clubs Providing open areas for physical activity, play and sport ...
Education and school policy	Implementing daily physical education Promoting the integration of physical activity into school learning Creating school sports teaching plans for students with different interests, abilities and opportunities Promoting the value placed on health promotion in the scope of school education and in particular in the scope of school sports ...
Societal context	Increasing acceptance for physical activity, play and sports in schools Counteracting the lack of exercise in all layers of the population Focussing on children and young people with little or no experience with physical activity ...

⁹ Further examples in: WHO Europe 2018a: Promoting physical activity in the education sector.

8 Strategic approach for promoting exercise and preventing MSDs in schools

The prevention initiative of promoting exercise in schools and thereby preventing or at least reducing MSDs in the short, mid and long term is aimed at school students as its target group. However, the required changes to staff and structure would not be possible without the teachers and school head,

because they are the ones that are usually needed to implement the required measures. They therefore constitute additional important target groups.

It must also be noted that European countries differ in terms of their economic, epidemiological and social conditions as well as their cultural sensitivities and the value they place on prevention and health promotion in schools and their implementation (WHO 2020b, 7). Accordingly, differences are also evident in their education and school systems and the value they place on health and exercise. In light of this, the following remarks cannot be taken as concrete instructions for implementation and are instead only recommendations and points of orientation. There are no instructions that fit under the principle of “one size fits all”.

Vision:

In ten years, all schools have daily PE and other physical activity opportunities in the different subjects and of an extracurricular nature.

Mission:

With the means available to us, we initiate, support and realise measures and efforts that are focussed on strengthening and boosting health-promoting, preventative physical activity and exercise and that are suitable for preventing or reducing the severity of MSDs.

Factors for the successful implementation of measures

To enable the most effective implementation of a measure, the following factors must be considered:

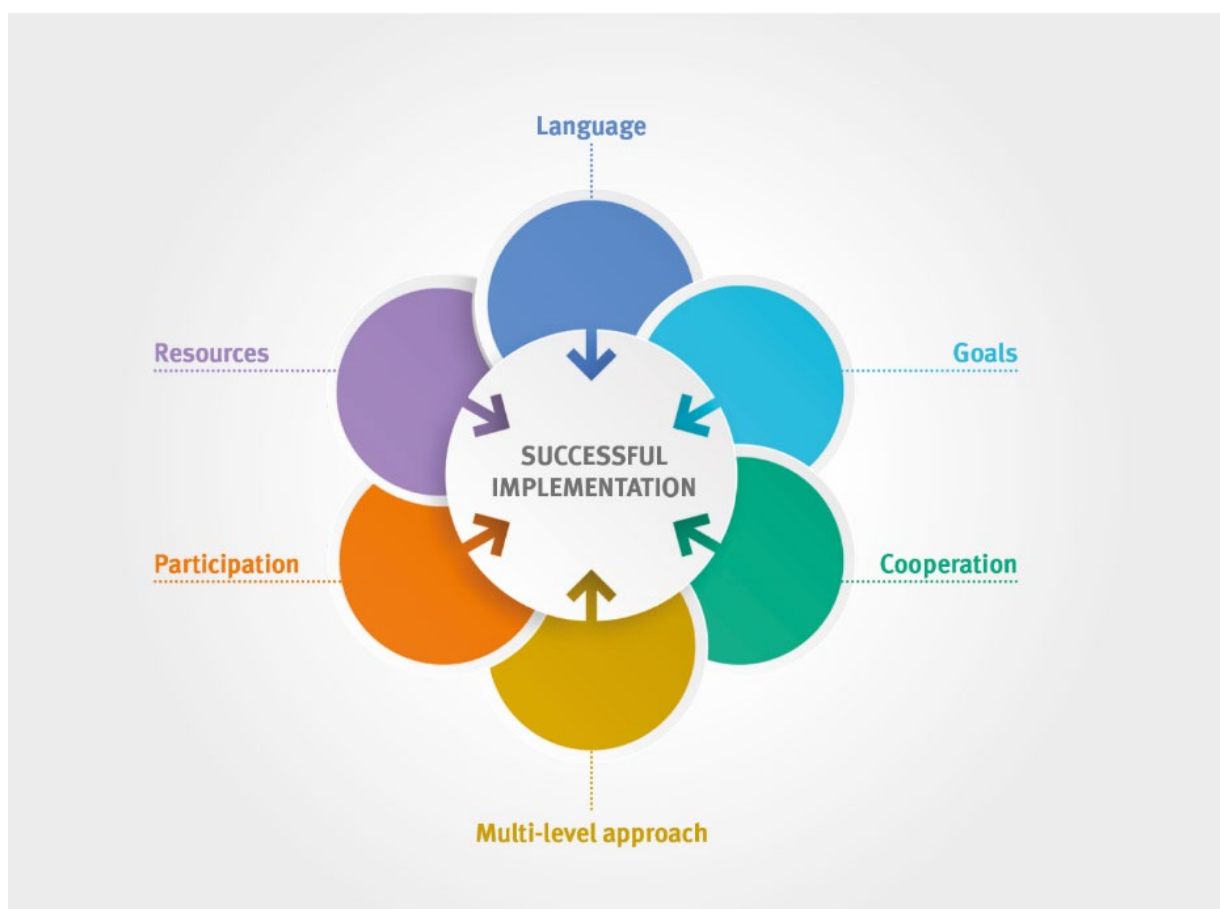
1. Speak the language of the school
 - Promoting physical activity must be integrated in a pedagogical concept of health promotion in schools. The promotion of physical activity should not just be about exercise-related skills, it should also be about strengthening personal and social resources.
 - The measure should also address key educational goals. The promotion of physical activity should contribute to schools fulfilling their role as educators as stipulated in national guidelines (school-based prevention approach).
 - If possible, the topics and content of the measure should be combined with existing school initiatives or integrated into them.
 - The measure should be founded in pedagogy, education science and development psychology.
 - The measure should consider other developments that the school is concerned with such as inclusion and digitalisation.
 - The language used in the concepts and publications must be that of the education sector and schools, not that of the OSH sector.
 - The measures must comply with both the understanding of quality in schools as well as the understanding of quality in the public health and OSH sectors.
 - Structures, for instance, for qualification, should be used that are known to schools and that are tailored to the needs of schools.
 - The special characteristics and needs of individual schools must be taken into account in the implementation of a measure.
2. Setting goals
 - A goal or several goals are necessary because they serve as orientation for the involved parties and provide additional momentum.

- Goals that are beneficial and realistic while also challenging can contribute to establishing the necessary willingness to change amongst school members.
 - The goal or goals should be formulated and defined together with all involved parties.
 - The goal or goals should be carried out by all affected parties, or at least as many as possible, as well as by all involved parties.
 - The goal or goals should be specific, attractive, realistic and scheduled, or SMART.¹⁰
 - The goal or goals should focus on the essentials and a few core topics as well as set priorities.
3. Cooperating with all involved parties
- The measures should be implemented in cooperation with the education sector. Depending on the orientation of the measures – national, regional, local or school level – this means close cooperation and coordination in the design, planning, implementation and evaluation of the measure with the national education ministry, regional or local school authorities or the schools involved.
 - Cooperation with the community is often also a good idea, as a safe and supportive community environment, for example, in the case of an active school commute, can be beneficial both for the measure's integration into everyday school life and its sustainability.
 - Further partnerships, for example, with sport and health organisations or associations, architects, medical practitioners and physiotherapists, can form synergies and generate resources as well as increase acceptance in schools.
 - All cooperation partners should contribute equally in the management committee that is to be set up for the measure: this should increase commitment.
 - It must be ensured that all cooperation partners are pursuing the same goals and have the same level of knowledge and information.
4. Incorporating multiple levels of the school system
- The sustainable implementation of the measures in the school system is more likely the more levels of the school system are incorporated and – even better – actively involved. Such levels for the measure “Promoting physical activity” could include: students – class – school – local school authority – regional school authority – education ministry – educational policy.
 - If multiple levels are addressed, it may be necessary to develop and implement specific interventions for the individual levels.
 - Incorporating the different levels and their roles and duties should be systematically planned and therefore requires time.
 - For the school level, the school head is of central importance. It is the role of the school head to promote the measure in their school and increase acceptance amongst teachers.
 - Incorporating the different levels generally also ensures their support.
 - It is necessary that the measures take into account the social and structural framework conditions of the school system and the school institution.
5. Enabling participation of all those involved
- The participation of all involved parties from the beginning is the key to realising health-promoting schools (Bada et al. 2019, 6). If all relevant stakeholders are incorporated at the different levels, it makes implementation easier and more sustainable: participation creates ownership.
 - At school level, the students, parents, teachers or their representatives, the school head and the community as well as any external partners of the school should be involved in the planning and implementation of the measures.

¹⁰ SMART = Specific, Measurable, Achievable, Reasonable, Time-bound.

- The participation of students in the early stages is a lever for promoting their motivation to learn how to get enough exercise and prevent MSDs.
 - All stakeholder groups should be involved in a management group.
 - As participation also depends on a willingness, or the desire and ability to participate, it may be necessary to “inspire” the willingness of the involved parties.
6. Providing resources and support
- The availability of sufficient, suitable resources and support plays a key role in the involved parties believing that they can change the situation and commit to making a change.
 - Those that implement the measure at school level – that is, generally the teachers – must be adequately prepared, such that they must have the necessary social, communicative, subject-specific and didactic-methodological skills or, if this is not the case, be able to acquire these skills in the scope of teacher training.
 - It must be ensured that the different groups involved in a measure are actively supported by their superiors.
 - It must be ensured that the rooms and equipment provided for exercise and physical activity are safe and well maintained.
 - Open, transparent communication and information requires the social integration of the involved parties and their willingness to participate.
 - The interventions should always be specific to the target group and contain a sufficient degree of differentiation. Interventions that affect the students in particular should keep up with the development of children and young people.

Figure 5: Factors for the successful implementation of measures



Source: Hundeloh & Bollmann

The long-term effectiveness of a measure can be positively influenced by the following three principles:

1. Competence orientation

- Didactically, the measure should go beyond the mere experience of physical activity and the cognitive level of knowledge transfer; exercise- and health-related behavioural skills should be taught in a structured way and actually practised.
- The lesson is the central place of learning in schools where students can develop competences. In this light, it is beneficial if the measure also always considers the didactic and methodological design of the sports class/physical education.
- One long-term result of the measure should be students that are competent in physical activity and thereby also in health and that have the skills, confidence and understanding to continue participating in health-promoting physical activity and exercise over the course of their lives.
- The measure should also in particular address the general health competence and exercise skills of teachers and support them in their acquisition.

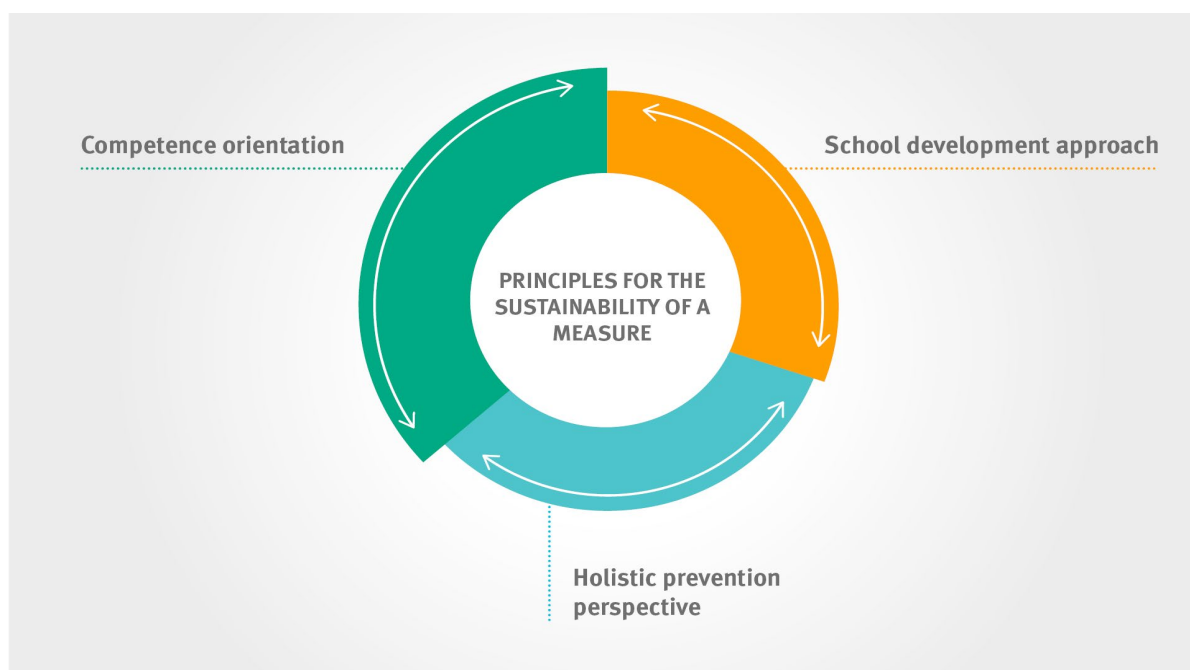
2. Holistic prevention perspective

- The measure should focus on both physical and health results and on education results.
- The measure should be multi-modal in nature, meaning it should not only aim at changing individual attitudes and behaviours, but also at modifying the legal, organisational, social and material framework conditions in relation to exercise and health.
- It should be ensured that the measure takes heed of the reciprocal relationship between physical/mental health and exercise as well as the correlation between learning and physical activity.
- Universal interventions for all target groups or for a specific target group should be combined with selective interventions for certain sub-groups, for instance children and young people with postural and physical deficiencies.
- All relevant stakeholder groups at the different levels should be involved and addressed in the implementation of the measure.
- The measure should look at all or as many fields of action in the school system and school as possible that are relevant for the topic, such as school and school sports policy, teacher training and CPD, curriculum development, teaching materials, infrastructure, lesson development, head teacher qualification, social climate and school culture.
- The measure should take both a pathogenic and salutogenic perspective on health and safety.

3. School development approach

- The measure should not be planned as a one-off initiative, but ultimately as a long-term intervention, and at the level of the individual school as an organisational or school development process.
- Accordingly, the measure should be implemented at school level with the school development cycle or a similar method.
- This process should be managed by a school management group. This method takes account of the fact that every school is unique and there is no intervention that works for every school.
- The measure should not be limited to PE classes; it should span all subjects.
- The measure should be designed in a way that helps individual schools help themselves. The school should be the driver of its own change.

Figure 6: Principles for the sustainability of a measure



Source: Hundeloh & Bollmann

Alongside the above criteria, it is also necessary to have good project management in place for the implementation and long-term effectiveness of a measure for promoting physical activity and preventing MSDs. Experience shows that many interventions in schools fail because this is lacking.

In addition to the above information, the recommendations given by the authors of the EU-OSHA report “OSH in the school curriculum: requirements and activities in the EU Member States” back in 2009 with regard to the implementation of health and safety in school curricula should generally also be observed (EU-OSHA 2009).

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Websites of the practical examples

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- Websites of the "Good Healthy School" concept in Germany at the Federal State level
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- Bertelsmann Foundation: <https://www.bertelsmann-stiftung.de/de/ueber-uns/was-wir-erreicht-haben/anschub>
- Website of the SHE concept "Health-promoting school" <https://www.schoolsforhealth.org>
- Website of the European Network Education and Training in Occupational Safety and Health (ENETOSH) www.enetosh.net

10 Glossary

Aerobic physical activity
(aerobic exercise)

Physical activities and exercises are usually divided into four different categories: aerobic and anaerobic as well as strength and coordination exercises. While some exercises clearly belong to a certain category, many activities fit in more than just one category. For instance, in many endurance sports (aerobic training) such as running, swimming and skiing, the body also builds strength, while certain strength exercises such as high-intensity interval training or strength training with weights can also improve balance and flexibility.

In aerobic activities, larger muscles and muscle groups work in rhythmic fashion over an extended period, for instance when walking, jogging, swimming and cycling. The energy required for this is obtained by burning carbohydrates and fats with the aid of oxygen.

Behavioural prevention

Behavioural prevention, also known as individual prevention, focusses directly on the person to influence their safety- and health-related behaviour. It involves avoiding behaviour that is risky for safety and health (such as smoking or excessive alcohol consumption), supporting health-promoting behaviour (such as healthy eating and exercise) and creating the best prerequisites for this through knowledge and attitudes. Examples for behavioural prevention measures include exercise offerings or nutritional advice.

Source: https://www.gkv-buendnis.de/glossar/?no_cache=1&filter=v&name=Verhaltens

Competence

In the wider discussion on education, the term competence is generally understood to refer to the connection of knowledge and ability in overcoming challenges. People that can generate currently required action on the basis of knowledge and abilities are considered skilled, or competent. People need numerous competences in order to be able to overcome the challenges of today's world. In this context, the OECD has defined a range of key competences. They are defined by the following characteristics:

- they contribute to valuable results for society and for the people
- they help people meet important requirements under different framework conditions and
- they are not just important for specialists, but for everyone.

Each of these key competences requires the mobilisation of knowledge, cognitive and practical abilities as well as certain social and behavioural components such as attitudes, feelings, values and motivations.

Sources: <https://www.bibb.de/de/8570.php>;

https://pubengine2.s3.eu-central-1.amazonaws.com/preview/99.110005/9781616762728_preview.pdf

Cooperation

Cooperation is a form of partnership between persons, groups or institutions which is characterised by a conscious, planned approach as well as mutual coordination processes. Important factors for success for cooperation are joint goal definition, regular exchange of information, mutual communication and support, constructive problem solving and a longer-term perspective so that the partners can develop mutual trust. Furthermore, there needs to be fair framework conditions as well as a certain amount of decision-making freedom and freedom of action, or independence of the involved partners, each with their own strengths and expertise.

Reasons for cooperation in the education sector include complementary expertise, cost savings, facilitation of work, improving quality, presence in educational policy (lobby), target group expansion, innovation and development.

Source: <https://www.netzwerk-stiftungen-bildung.de/wissenscenter/glossar/kooperation> accessed on 13/08/2021

Developmental tasks in childhood and youth

The educator and educational researcher R. J. Havighurst understands a developmental task as the cultural and societal expectations and requirements imposed on people of a certain age group. For every individual in certain situational life stages, they define objective problems that the person must overcome. The respective development tasks are not fixed as natural or social facts, they are influenced by physiological changes (such as puberty), defined by social and cultural requirements and interpreted through the own notions of the individual. From this perspective, a particular characteristic of the life situation of a young person is that they must process a series of typical problems and make decisions if they want to develop and “become an adult”.

Source: <https://www.bpb.de/lernen/grafstat/krise-und-sozialisation/224837/info-02-01-entwicklungsaufgaben>

Early education

Early education refers to the education of children up until they reach preschool age. In contrast to early special needs education, early education is about promoting the mental, moral, cultural and physical development of non-disabled children. It is usually seen as being closely linked to the childcare and rearing of the child. Early education comes in different institutional forms in different European countries (nurseries, preschools, infant school, school kindergartens, etc.). In these institutions, early education is made up of different educational areas, such as exercise, media, science education, language and communication. Early years pedagogy is the branch of pedagogy that is concerned with education and development in the early years.

Source: <https://www.fruehebildung.de/>

Education

Education is both a process and the product of a process. Today, the comprehensive concept of “education” goes far beyond the conveyance of knowledge and traditional school lessons. Education means the development of an entire personality, giving people the ability to see the world in a self-confident, individual way in the different stages of life and to actively participate in society. Education is ultimately understood as the process of becoming a human. However, education can also help balance out social differences and improve the future opportunities of a person whose initial situation is less favourable. Education not only enables people to use knowledge, skills and abilities, it also promotes critical thinking and independent orientation in thought processes.

Sources:

https://www.pedocs.de/volltexte/2014/6561/pdf/PaedKorr_1997_21_Ruhloff_Bildung_heute.pdf;

<https://lexikon.stangl.eu/12806/bildung>

Education for sustainable development (ESD)

Education for sustainable development (ESD) enables people to consider their own actions in global contexts and make responsible decisions for a sustainable present and future. Successful ESD creates situations in which people are given the possibility of questioning values and attitudes and actively participating in formation processes. In the scope of a holistic approach, ESD not only looks at learning content, it also involves pedagogy and the shaping of the learning environment.

Source: <https://www.unesco.de/bildung/bildung-fuer-nachhaltige-entwicklung>

Educational mandate

The educational mandate of schools is generally governed by a country's constitution and any supplementary laws. In general, this mandate encompasses a school's obligation to grant every young person, regardless of origin or economic situation, an education that suits their ability level and to prepare them to exercise responsibility, rights and duties in the country and in society as well as in their community.

In democratic countries, the educational mandate includes other duties alongside support in acquiring competences. These other duties include teaching values of freedom and democracy, teaching respect for dignity and the beliefs of others and preparation for the world of work.

Executive functions	<p>Executive functions are cognitive skills that let people consciously control their thoughts and behaviour as well as their attention and handle their own feelings and emotions in a controlled way. They can be broken down into updating (working memory), cognitive flexibility and inhibition (impulse control). These central functions can be promoted through physical activity and sport interventions, especially complex movement tasks, but also through yoga, attention training and meditation.</p> <p>Source: Hille & Walk 2017, 86</p>
Exercise	<p>Exercise is any activity of the musculoskeletal system that leads to higher energy consumption than rest. Exercise is physical movement of the body caused by contracting or tensing the muscles. The muscle is active either with or without a movement effect, as the case may be. Exercise and physical activity are often used as synonyms.</p> <p>Source: https://www.gesundheit.gv.at/leben/bewegung/koerper/was-ist-bewegung accessed</p>
Exercise education	<p>Exercise education refers to learning about one's own body and the way it moves as the topic of learning as well as in all educational processes that involve learning physical and exercise related skills.</p>
Exercise skills	<p>Exercise skills refer to the ability to use exercise to overcome challenges of a motoric, cognitive or social nature and optimise situations. In this context, it is not about whether a person can touch their toes with straight knees (= exercise ability) or run 20 kilometres without stopping (= exercise performance), it is about whether the person is able to use exercise to overcome challenges with the physical resources available to them in their respective development phase (= exercise skills). The basis of exercise skills is body experience.</p> <p>Exercise skills can be promoted in a targeted, sustainable way in all stages of human development. Good exercise skills not only lead to improved exercise behaviour, they also lead to improved self-efficacy, problem solving ability, health, motivation and better social interaction.</p> <p>Source: https://de.wikipedia.org/wiki/Bewegungskompetenz access</p>
Health	<p>Health refers to the dynamic state of a person's well-being, which is given if the person is mentally and socially in harmony with the possibilities and aims and the external life conditions present in each case. Health is the dynamic stage of balance of risk factors and protective factors that occurs when a person succeeds in overcoming both internal physical and mental as well as external social and material challenges. Health is a dynamic stage that conveys a person's well-being and joy of life.</p> <p>Source: https://leitbegriffe.bzga.de/alphabetisches-verzeichnis/gesundheits/</p>
Health competence	<p>Health competence is the knowledge, motivation and skills to find and understand information on health, critically assess this information and make informed decisions for health promotion, prevention and care as well as implement this in everyday life. Health competence is a factor that affects health and one of the few factors that can be developed and strengthened in a targeted way through educational measures, particularly in the school setting.</p>

For the long-term effectiveness of health competence, it is important to integrate it into a situational, preventative approach and consider the living environment of children and young people (for example, information infrastructure, information sources).

Source: <https://nbn-resolving.org/urn:nbn:de:hebis:66-opus4-8924>

Health-promoting school

A health-promoting school is a school that seeks to create a setting that promotes and maintains the health of students, teachers and non-teaching staff in relation to school as a place of learning and work. Alongside central basic principles of health promotion (including holistic health concepts, self-determination, participation and empowerment, salutogenesis), the health-promoting school is oriented towards the fields of action of teaching and learning, school life and the school environment, cooperation and service as well as school health management. Furthermore, the health-promoting school works on the different school levels (classroom, school building, school environment) and incorporates all groups involved in schools (pupils, teachers, school management, non-teaching staff).

Source: <https://leitbegriffe.bzga.de/alphabetisches-verzeichnis/gesundheitsfoerderung-und-schule/>

Health promotion

Health promotion represents a comprehensive social and policy process; it not only embraces actions directed at strengthening the skills and capabilities of individuals, but also action directed towards changing social, environmental and economic conditions so as to alleviate their impact on public and individual health. Health promotion is the process of enabling people to increase control over the determinants of health and thereby improve their health. Participation is essential to sustain health promotion action.

Source: https://www.researchgate.net/profile/Don-Nutbeam/publication/12979284_The_WHO_health_promotion_glossary/links/542022590cf203f155c2aa6e/The-WHO-health-promotion-glossary.pdf

Life course approach

The life course approach aims to increase the effectiveness of interventions throughout a person's life. It focuses on a healthy start in life and targets people's needs at key life stages from preconception through infancy, adolescence, working life and old age. It promotes timely investments with a high return on investment for health and the economy by addressing the causes rather than the consequences of disease. It does this through evidence-based intervention to minimise risk factors and strengthen protective factors.

The life course approach does not focus on a single condition at a particular stage of life, but considers the critical stages, transitions and environments where major differences can be made in promoting or restoring health and well-being. The approach thus takes a temporal and societal perspective on individual and generational health, including intergenerational determinants of health.

Sources: <https://www.euro.who.int/en/health-topics/Life-stages>
<https://publichealthmatters.blog.gov.uk/2019/05/23/health-matters-prevention-a-life-course-approach/>

Mainstreaming OSH into education

Mainstreaming OSH into education can be described as an integrated educational approach which lays in the intersection of health promotion, risk education and the safety of the learning and working environment. It does not refer to education of a certain level, but it can be implemented into preschool, primary, secondary and tertiary education.

The purpose is to ensure that pupils and students receive risk education and OSH education as part of their general education before they start work and that this is done in a systematic way. This is to make young workers more aware of risks and how to prevent them, to help reduce accidents to young workers and improve workplace safety culture.

Source: https://oshwiki.eu/wiki/Mainstreaming_OSH_into_education

Musculoskeletal disorders (MSDs)

MSDs is a collective term for a series of illnesses involving the impairment or damage of muscles, joints, tendons, ligaments, nerves, bones and blood vessels. This includes joint pain as well as back pain or damaged spinal discs.

A risk factor for MSDs is often incorrect loading, such as that caused by imbalanced loads when working in a seated or standing position for extended periods, for example. However, it is also a combination of several factors that lead to a health problem arising. Such factors include psychosocial risk factors from both private and professional settings (such as dissatisfaction at work). Additionally, acute trauma such as accident-related fractures can also lead to MSDs.

Source: <https://www.daimler-bkk.com/gesundheit-und-leistungen/ruecken/muskel-skelett-erkrankungen>

Musculoskeletal system

The musculoskeletal system is made up of two systems: the skeletal system and the muscular system. The skeletal system comprises bones, joints and ligaments, while the muscular system comprises muscles and supporting structures such as tendons, tendon sheaths, bursa and so on. The skeleton provides a frame for the musculature. The musculoskeletal system forms a link between the neuronal system and the mechanical system, which describes the formation and transfer of force to the mechanical world. Thanks to the ability of the muscle to contract, it is able to move bones that are connected to each other via joints. In this way, the musculoskeletal system enables movement, as well as keeps our body upright and protects the organs (such as the skull protecting the brain).

Source: <http://wiki.ifs-tud.de/biomechanik/muskel/mus05>

Network

A network is a structure for cooperation between individuals or institutions over a longer period of time in order to attain joint objectives and to generate added value for its members.

Source: <https://publikationen.dguv.de/widgets/pdf/download/article/3450>

Organisational development

Organisational development (OD) in the context of school means developing a school from the inside, primarily through the members of the school themselves. School heads have a central role in this regard and it is not uncommon for external process advisers to be brought in to help. OD always refers to school in its entirety and not to partial aspects. At the same time, however, it is emphasised that only gradual development is possible, tying onto subunits of the school as well as onto the cooperation climate, onto school management, onto break management, onto the school building and its equipment or onto the school programme. The structure and processes of a school are therefore at the centre of OD.

Source: Rolff, H.-G. (2016): Schulentwicklung, Schulprogramm und Steuergruppe [School development, school programme and steering group]. In: Buchen, H.; Rolff, H.-G. (eds): *Professionswissen Schulleitung*. Weinheim und Basel: Beltz. 296–364.

Participation In the Ottawa Charter, participation is seen as a fundamental principle of practical health promotion. The basic premise for this is that projects are more effective and more sustainable if the people that the health promotion and prevention measures are intended to reach are actively involved in the change process themselves, such as in the planning and implementation of appropriate measures. Participation is considered “genuine” if persons or groups have the power to make decisions. The more power to make decisions, the higher the degree of participation.

To assess to what extent participation is being implemented, models have been developed that help determine the degree of participation. The Berlin model for assessing participation has a total of nine levels:

- Non-participation: Instrumentalisation
- Teaching and treating
- Preliminary stages of participation: Information
- Listening
- Involvement
- Participation: Co-determination
- Partial decision-making ability
- Decision-making power
- Far beyond participation: Independent organisation

Participation is not an either-or scenario; rather, it is a process of development. In many settings, preliminary stages of participation must first be realised before direct involvement in decision-making processes is feasible.

Source:

http://www.sicherearbeit.at/cms/X04/X04_1.2.5.a/1471521107563/archiv/html-archiv-2011/sichere-arbeit-5-2011/partizipation-in-der-gesundheitsfoerderung

Personal competence Personal competence – also known as human competence – comprises social competence and independence. The term refers to the ability and willingness to develop oneself and shape one’s own life independently and responsibly in the given social, cultural or professional setting.

The term social competence refers to the ability and willingness to work together with others in a target-oriented way, understand their interests and social situations, deal with them and get along with them in a rational and responsible way and help shape the work and living environment.

Independence refers to the ability and willingness to act independently and responsibly, to reflect on one’s own actions and those of others and further develop one’s own abilities.

Source: <https://www.dqr.de/content/2325.php>

Physical activity The World Health Organisation (WHO) defines physical activity as any bodily movement produced by skeletal muscles that requires energy expenditure. Physical activity refers to all movement including during leisure time, for transport to get to and from places, or as part of a person’s work.

Health-promoting and preventative effects of physical activity are not only achievable through dedicated training, but also through sufficient (everyday) activities in the three areas of leisure, transport and work. Physical activity and exercise are often used as synonyms.

Sources: <https://www.euro.who.int/en/health-topics/disease-prevention/physical-activity/news/news/2020/12/who-study-finds-country-differences-in-physical-activity,-screen-time-and-sleep-habits-of-children>

https://pub.uni-bielefeld.de/download/2936303/2936304/Dissertation_Czerwinski.pdf

Prevention	<p>In the public health sector, prevention is an overarching term for targeted measures and activities intended to prevent illnesses or other health issues and lower the risk of disease or delay its onset. Preventative measures can be classed as primary, secondary or tertiary prevention depending on the point in time that they are implemented. Furthermore, preventative measures can be differentiated based on whether they focus on individual behaviour (behavioural prevention) or life situation (situational prevention).</p> <p>In the field of pedagogy, prevention refers to methodological, preventative measures and early special needs education that are usually used explicitly for the area of learning disabilities.</p> <p>Sources: https://www.bundesgesundheitsministerium.de/service/begriffe-von-a-z/p/praevention.html</p> <p>https://publikationen.dguv.de/widgets/pdf/download/article/3466</p>
Prevention culture	<p>Prevention culture is a pattern of assumptions and values on safety and health at work. It is in part only indirectly visible and is expressed in symbols, practices, rituals, stories and artefacts. Prevention culture is held up by employees, managers, safety and health experts as well as management. All groups named here share it to a high degree and reproduce it in their daily activities.</p> <p>Sources:</p> <p>https://www.kommitmenschen.de/fileadmin/user_upload/05_service/mediathek/weitere-broschueren-und-plakate/literaturanalyse/iges_publication_praeventionskultur.pdf</p> <p>https://www.taylorfrancis.com/books/edit/10.1201/9780429465253/safety-health-competence-ulrike-bollmann-george-boustras</p>
Promotion of physical activity	<p>Behaviour- and situation-based interventions aimed at positively influencing the physical activity behaviour of individual persons, population groups and the entire population to increase the amount of physical activity and help build exercise skills. Among other things, the promotion of physical activity should counteract a lack of exercise and the health risks that this brings.</p>
Quality cycle	<p>The quality cycle (PDCA cycle, Deming circle, survey–feedback method) is an instrument in the concept of organisational development which enables a targeted, systematic development process. With regard to school, it is a fundamental principle of action for sustainable school development. The quality cycle runs according to a set schedule and is divided up into recurrent phases and work steps.</p> <ul style="list-style-type: none"> ▪ Agree on goals and quality standards ▪ Plan measures ▪ Perform the measures ▪ Check and evaluate the measures <p>The knowledge gained then flows back into the next quality cycle.</p> <p>Source: Brägger & Posse 2007, 55</p>
Risk assessment	<p>A risk assessment is an assessment of all current risks to the safety and health of the people working at a company, administrative body or educational institution. All work process, work equipment and conditions – in schools: teaching–learning processes and other school activities – are then examined as to whether they are safe or conceal unacceptable risks. The person in charge for the company, administrative body or educational institution assesses the risks for the people working, learning or studying there, derives appropriate measures, verifies their effectiveness and adapts them accordingly. The entire risk assessment process and its results are documented. The risk assessment is a fundamental, essential component of a preventative, health-promoting strategy in schools and should involve all school stakeholders.</p>

Safety competence	<p>Safety competence includes skills, abilities and the motivation to predict or identify factors that can jeopardise, maintain or promote safety in diverse situations, take decisions to minimise risk or maintain or promote safety as well as manage oneself to implement these decisions responsibly and effectively.</p> <p>Sources: https://www.dguv.de/medien/iag/themen/sicherheits-und-gesundheitskompetenz-definition.pdf</p> <p>https://www.taylorfrancis.com/books/edit/10.1201/9780429465253/safety-health-competence-ulrike-bollmann-george-boustras</p>
School culture	<p>Every school has its own school culture. It is the product of active, continuous identity work on the part of the school's members and is realised in attitudes, mentalities, values, working methods and structures. School culture is the self-understanding lived by the people and groups involved which, on the one hand, is created by their actions and, on the other hand, has a formative effect on the personalities, processes and structures. Furthermore, the school institution's characteristic duty of conveying cultural knowledge and promoting cognitive, socio-cognitive and symbolic competence has an influence on the self-understanding processes of schools and their members. The culture of a school is therefore essentially also always a product of dealing with this duty surrounding it. However, how this process takes place and to which products of school culture it leads is then also dependent on the concrete parties involved, their (legitimate) interests and the way they work together.</p> <p>Source: https://kooperationen-bildungslandschaften.bkj.de/kulturelle-schulentwicklung/glossar/schulkultur.html</p>
School development	<p>School development refers to a process in which those involved in school as a learning institution diagnose, reflect and, if necessary, change certain structures and processes of their school on the basis of mutually developed visions for the purpose of demonstrably increasing the effectiveness of teaching and education and thereby also the quality of life of the members of the institution.</p> <p>Accordingly, school development means the systematic development of school with the overarching goal of improving the quality of the school. It is important to see school development as a permanent process and not one that has a definitive end. School development goes hand in hand with teaching development, organisational development and staff development.</p> <p>Sources: https://www.lpm.uni-sb.de/typo3/index.php?id=1128</p> <p>https://kooperationen-bildungslandschaften.bkj.de/kulturelle-schulentwicklung/glossar/schulentwicklung.html</p>
School performance studies	<p>In school performance studies, the competences of students are measured to ultimately evaluate the performance of schools. Criteria for measuring this performance include educational results, for example, the competences and attitudes of children and young people, as well as the factors that may influence these results, such as the teaching–learning conditions. What exactly is seen as good performance is a normative matter. This is based on findings from educational research and teaching methodology. On the other hand, it is to a certain extent also a political decision that defines which areas of an educational system must be looked at, at present or in the future. At the international level, the content is selected by expert groups and management committees.</p> <p>Source: Jude, N. (2021): 25 Jahre Leistungsvergleichsstudien. Erkenntnisse für Schule und Unterricht in Deutschland. [25 Years of Performance Comparison Studies. Insights for schools and teaching in Germany.] In: <i>Die Grundschulzeitschrift</i> issue 325/2021, pp. 12–14.</p>

School quality	<p>School quality is a dynamic term that cannot be defined without consideration of societal developments and interests as well as situational circumstances. It is about a general standardisation of the quality of schools and teaching. The definition of quality must be continuously reviewed and adjusted to the changing conditions.</p> <p>What is concretely understood when using the term school quality can vary from country to country. It is often described in so-called “reference frameworks for school quality” or “quality tables”. They use criteria and unlocking statements to demonstrate what is understood by school quality in central content areas and dimensions. These pick up on research findings from the field of education and teaching research as well as on aspects of current school quality discussions.</p>
Setting approach	<p>A setting is a social context which people navigate on a daily basis and which has an influence on their health.</p> <p>This social context is relatively permanent and its members are also subjectively aware. It is expressed by: formal organisation (for example, company, school, preschool), regional situation (for example, community, city area, district), the same life situation (for example, pensioner), joint values or preferences (for example, religion, sexual orientation) or a combination of these aspects.</p> <p>As such, a setting always also refers to a separated social system that is defined for the purpose of a health promotion intervention and in which the decisions and expert measures necessary for the concrete health promotion measures are made.</p> <p>The setting approach focusses on the living environment of people and thereby on the framework conditions under which those people live, learn, work and consume. It takes into account the knowledge that health problems in a population group are the result of a reciprocal relationship between the economic, social and organisational environment as well as personal lifestyle. Settings are social systems and are therefore to be differentiated from technical systems in the sense of “trivial machines”.</p> <p>Source: https://leitbegriffe.bzga.de/alphabetisches-verzeichnis/settingansatz-lebensweltansatz/</p>
Situational prevention	<p>Situational prevention pursues the aim of having a positive influence on health and safety by shaping the social, ecological, economic and cultural conditions of life, work and the environment. With situational prevention, it is recognised that the health and safety of people and their health-related behaviour are determined by factors that they themselves cannot influence. Situational prevention measures therefore draw on framework conditions.</p> <p>Examples include legal regulations, school structural measures on exercise promotion as well as measures of organisational development in preschools, schools or companies.</p> <p>Source: https://www.gkv-buendnis.de/glossar/?no_cache=1&filter=v&name=Verhaltens</p>
Social competence	<p>Social competence encompasses all social skills and abilities that satisfy one's own wishes and needs in interpersonal interactions as well as takes into account the wishes and needs of others, such as the person being spoken to. Then a social interaction is seen as being successful. These skills help enable a satisfactory way of living together in society or in a community. Which social competences are required in a concrete case of social interaction depends on the requirements of the situation, the resources and the personal needs of the parties involved as well as societal norms.</p>

Sport Sport is understood as all forms of physical activity that contribute to physical fitness, mental well-being and social interaction. These include play; recreation; organised, casual or competitive sport; and indigenous sports and games.

Source: *UNESCO* 2015b, 9

Staff development Staff development is, alongside staff onboarding, staff deployment, staff assessment, staff acquisition and staff management, a component of human resources and one of the three fields of action in school development alongside organisational development and teaching development. Staff development refers to all measures that serve the individual professional development of employees and that give them the qualifications required to fulfil their current and future duties with consideration to their personal interests. This means that staff development has the task of ensuring that teachers and other staff are sufficiently skilled, motivated and healthy to fulfil their educational mandate as well as all other school duties.

Source: *Hundeloh* 2012, 89

Teaching development Teaching development can be understood to mean the systematic, targeted and self-reflective process of those involved in the lesson, in particular the teachers and students. On the one hand, teaching development is the result of the interpretation of legal and regulatory guidelines of school activity. On the other hand, teaching development is based on the co-constructive preparation of teaching experiences, on a systematic strength–weakness analysis based on internal and external evaluation processes as well as on professional exchange processes between teachers and specialists in the individual school or beyond the individual school.

The aim of teaching development is the further development of teaching quality, which in turn should be felt in an improvement of the disciplinary and interdisciplinary learning of the students.

Teaching development is dependent on the development of the competences of teachers as well as the capacity of the individual school to initiate teaching and staff development processes and support them long term. Local framework conditions of the school, such as material or staff resources and support structures (for example, disciplinary advice, coaching), are decisive for the successful implementation of teaching development.

Source: Maag Merki, K. (2016): Unterrichtsentwicklung als zentrales Element von Schulentwicklung. [Teaching development as a central element of school development.] In: *Pädagogik*, 68(4), pp. 44–47.

Well-being Well-being puts the focus on the individual, his or her perceptions, situational definitions, cognitive evaluation and emotional state. In loose terms, well-being means long-term, general satisfaction with one's own life.

Differentiation is made between hedonic and eudaimonic well-being. Hedonic well-being is a multi-dimensional concept that relates to the cognitive evaluation of one's own life in general (such as life satisfaction) as well as to positive and negative feelings.

Eudaimonic well-being is divided into psychological and social well-being. The psychologist Carol D. Ryff defined six elements of positive functions which make up psychological well-being: self-acceptance, personal growth, purpose in life, ecological sensitivity, autonomy, and positive relations with others. The five dimensions of social well-being according to Corey Lee M. Keyes (1998) are: social acceptance, social actualisation, social contribution, social coherence and social integration.

Source: https://www.nachhaltigkeit.info/artikel/wohlbefinden_well_being_1817.htm

Whole school approach	<p>A whole school approach aims to raise quality and standards across the entire school. For this approach to be effective, schools need to identify and address the needs of the school community and engage in continuous, cyclical processes for improvement.</p> <p>A whole school approach to OSH integrates risk education and school safety and health management throughout the school's activities and the way it functions, making them part of school life. It also actively involves staff and students in school safety management. The approach improves both risk competence and the learning environment for staff and pupils.</p> <p>Sources: https://osha.europa.eu/en/publications/occupational-safety-and-health-and-education-whole-school-approach/view; https://oshwiki.eu/wiki/Awhole-school_approach_to_OSH_education; https://ec.europa.eu/programmes/erasmus-plus/project-result-content/360e3a02-40e9-4c17-b4f9-ca552f0cd970/A%20Whole%20School%20Approach.pdf</p>
Willingness to change	<p>Willingness to change is a personality trait that describes the general attitude of people towards change measures in an organisational context. The changes in question can be of a task-related nature (such as onboarding in a new area of work) or environment-related nature (such as redesign of the physical workspace). The willingness to change relates to inter-individual differences of experience and behaviour in view of these changes.</p> <p>Organisation members that are willing to accept change connect the change with positive emotions; their evaluation of the situation is predominantly positive and they have the intention of actively contributing to the realisation of the change.</p> <p>Sources: https://dorsch.hogrefe.com/stichwort/veraenderungsbereitschaft-dispositionale http://www.handbuch-lehrergesundheit.de/downloads/Leitfaden_Gelingensbedingungen.pdf</p>
Work ability	<p>Work ability is defined as the ratio between an individual's ability to perform and the actual job requirement imposed by the organisation. It focusses on the potential (strengths and weaknesses) of employees to complete a specific work task at a given time. If the job requirements imposed by the organisation are in balance with the individual performance conditions, the employee's work ability will be good, as will productivity and quality of work. In case of an imbalance, work ability will be impaired. The long-term consequences of poor working conditions are illness and the risk of a permanent imbalance.</p> <p>Source: https://www.arbeitsfaehig.com/de/</p>



The European Agency for Safety and Health at Work (EU-OSHA) contributes to making Europe a safer, healthier and more productive place to work. The Agency researches, develops, and distributes reliable, balanced, and impartial safety and health information and organises pan-European awareness raising campaigns. Set up by the European Union in 1994 and based in Bilbao, Spain, the Agency brings together representatives from the European Commission, Member State governments, employers' and workers' organisations, as well as leading experts in each of the EU Member States and beyond.

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