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Science & Technology in childhood Obesity Policy

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D7.5: Report on requirements and barriers to implementation of the Healthy Lifestyle intervention model in 5 countries

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Abbreviation	Definition
BMI	Body mass index
NCDs	Non-communicable diseases
OB	Obesity
OW	Overweight
PA	Physical activity
PE	Physical Education

Dissemination Level

PU	Public	☒
PP	Restricted to other programme participants (including the Commission Services)	
RE	Restricted to a group specified by the consortium (including the Commission Services)	
CO	Confidential, only for members of the consortium (including the Commission Services)	

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1 Background of the Healthy Lifestyle intervention

In the school year 2010/11 Slovenia started implementing the Healthy Lifestyle intervention in primary schools for children between 6 and 14 years of age. Healthy Lifestyle was a nation-wide intervention in Slovenia in the period 2011-2018, focusing on increase of physical fitness of children by increasing organised physical activity in school.

The intervention was not implemented as an experiment, but its effects on chldren's development have been annually evaluated by the Faculty of Sport with the help of the SLOfit national surveillance system of somatic and motor development of children and youth (Jurak et al., 2020). Although the intervention was conceptualised with the help of the experts in PE didactics at the Faculty of Sport at the University of Ljubljana, the schools and teachers implementing the programme in their local settings did not receive any feedback on the effectiveness of the interventions apart of the usual annual feedback on physical fitness. The intervention in individual school was therefore not controlled or steered centrally by the outside experts but was executed autonomous in every school with regard of established common framework of the intervention, set by the experts from the Faculty of Sport, Ministry of Education, Science and Sport and representatives of school directors.

The intervention was not very complex and was based on increased opportunities for physical activity under supervision of PE teachers. It provided two (grades 1 to 6) to three (grades 7 to 9) additional lessons of PE per week—thus providing one PE lesson per day—to children aged 6 to 14.

In grades 1 to 5, in which predominantly generalist teachers are delivering PE lessons in Slovenia, the PE specialist teachers were delivering additional physical education lessons. Each school had to employ an additional PE teacher (half-time employment was financed by the program).

The additional lessons were organised immediately after school. Schools were allowed to include children of two consecutive grades in one class (e.g. children from grade 1 and grade 2) and they had to adhere to legislative demands regarding the maximum number of children per class, which meant between 16 and 30 children per class. Classes that specifically included children with difficulties in somatic and motor development were organised as separate classes in which the maximum number of children was limited to ten in order to provide more individualised teaching approach.

The focus of Healthy Lifestyle program was the improvement of physical fitness and encouragement of active lifestyle. The exact contents were not strictly prescribed and enabled PE teachers a high degree of autonomy. The intervention framework only required from teachers to provide at least twelve different sports per triennia but they had to prioritise the three most established sports in the local environment. It also encouraged the introduction of urban sports, that were not specifically covered in the physical education curricula at the time, and the teachers had to provide also basic information on healthy dietary and lifestyle habits.

Every year the national coordinator of the intervention program—Slovenian Sports Agency Planica—published an annual public call for inclusion of new schools in the program. Every school had a possibility to apply for funding. This meant that new schools were joining the program every year: the first round comprised 78 schools in year 2010/11, included additional 32 in 2011/12, 19 in 2012/13, 17 in 2013/14, 16 in 2014/15, 33 in 2015/16, 8 in 2016/17 and 13 in 2017/18 (Table 1).

Table 1: Quantitative description of the Healthy Lifestyle intervention

School year	2010/11	2011/12	2012/13	2013/14	2014/15	2015/16	2016/17	2017/18
Newly included schools (N)	78	32	19	17	16	33	8	13
Included children (N)	18,993	24,202	26,000	27,600	30,261	29,549	35,640	32,245
Lessons (N)	33,190	60,505	68,306	70,866	72,054	53,527	69,613	51,893
Annual costs of teachers' salaries (EUR)	1,156,32	1,754,08	2,007,29	2,026,94	2,070,68	1,752,96	2,618,38	2,341,55
Annual costs per child (EUR)	60.88	72.48	77.20	73.44	68.43	59.32	73.47	72.62

The intervention was available to all children and was organised in the form of elective course. The involvement in Healthy Lifestyle was therefore voluntary and accessible to all but it especially encouraged the inclusion of children who were not yet exercising in the local sports clubs or who had been experiencing difficulties in somatic and motor development. Parents were the ones who gave consent for their child to be involved in the intervention. Parents did not carry any additional costs for their child's participation.

The intervention was financed by the European Social Fund (ESF) with the aim to increase the first employment opportunities of recently graduated PE teachers this is why all the funds were used for their salaries. Schools were granted funds for half-time employment per teacher but had to provide sports facilities and equipment free of charge, which did not present any difficulties for schools since all primary schools in Slovenia have their own sport facilities which are standardly well equipped. Every school typically has one big sport hall, one small sport hall and outdoor sport facilities, typically consisting of a basketball court, tarmac football pitch, running track and green areas.

Every year, the schools had to report the list of children that were involved in the program, how many lessons were organised, what contents did they include, and the financial report. Their reports were checked by the administrators at the Slovenian Sports Office Planica to ensure that the schools did not deviate from the intervention framework.

2 Assessment of requirements and barriers to implementation of the Healthy Lifestyle intervention model in 5 countries

The educational systems of European countries pursue similar goals and try to provide children and youth with competencies that enable independent, healthy, and productive life in adulthood, but there are many specifics in every national, and sometimes even regional setting. This means that every educational system may also have specific barriers or facilitators regarding the implementation of various interventions.

The main focus of this assessment are the objective conditions in which a physical activity intervention programme, similar to the Slovenian Healthy Lifestyle, could function, while at the same time we are acknowledging the specifics which could present an obstacle in the implementation of

the intervention. In this regard, the analysis covers the specifics of educational systems in five European countries including Estonia, Finland, Italy, Portugal, and Spain, which could potentially present an obstacle or incentive for long-term interventions, aiming to provide more regular intensive physical activity to children within school settings.

2.1 Requirements for implementation of physical activity intervention programme

For any intervention to work, certain requirements have to be fulfilled. The challenge becomes more demanding with the growing scale of interventions. The existing evidence shows that effective physical activity interventions, have typically been implemented only in small, controlled settings (Hallal et al., 2012). In our meta-analysis of the effectiveness of school-based interventions targeting physical activity, physical fitness or sedentary behaviour on obesity prevention (Podnar et al., 2021), which was the product of the STOP deliveries 7.1 and 7.2, we could not identify any interventions that were implemented on such a large scale and duration, although some smaller-scale interventions lasted up to 6 years.

However, due to growing global epidemics of childhood obesity, small-scale interventions are ineffective because they usually encompass specific, locally limited groups of children. There is an urgent need for development of knowledge and strategies for implementation, adoption, and sustainability of large-scale interventions (Milat, Newson, & King, 2014; Yamey, 2011). Unfortunately, the attempts of scaling-up of small-scale interventions have usually not succeeded in the real world and the interventions did not evolve to become embedded in a system once the funds for implementation and/or translation have expired (Reiss et al., 2016). However, despite the challenges, scaling up interventions that are capable of increasing levels of physical activity in populations across the varying cultural, geographic, social, and economic contexts worldwide is feasible, which was evident in the case of the Healthy Lifestyle intervention in Slovenia.

This intervention, which was not specifically targeting childhood obesity or specific group of children, has proved to be successful in reducing obesity prevalence in children on a large-scale and its planned process of scaling-up did work, starting with 78 schools in the school year 2010/11 and growing to encompass more than 200 schools in the school year 2017/18. However, with the help of the intervention, Slovenia was able to reduce the population prevalence of childhood obesity by 1 % every year (Sorić et al., 2020) despite the fact that less than 20 % of the entire population of children was included in it and that the reduction of obesity was not the focus of the intervention but rather an additional benefit of increased physical activity.

In their study of physical activity interventions globally, Reis et al. (2016) identified several factors that are important for successful scaling-up of an intervention but present different level of challenge for stakeholders (Figure 1).

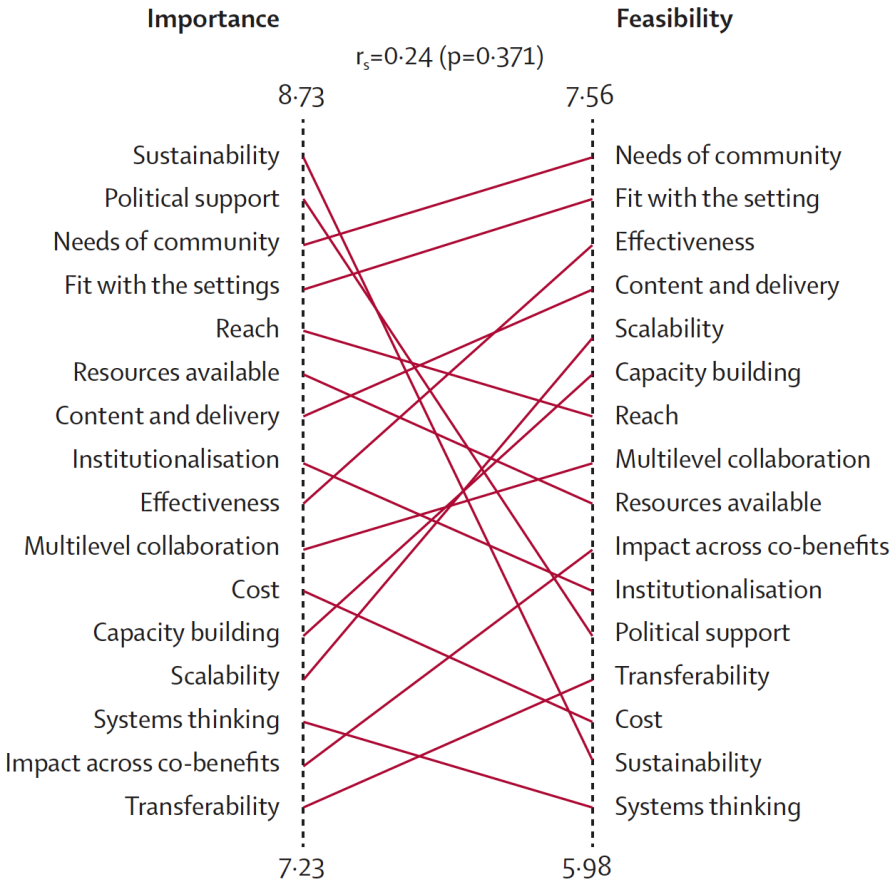


Figure 1: Pattern matches for importance and feasibility of scalability factors for physical activity interventions (Reis et al., 2016, p. 4).

Sustainability and political support proved to be the most important prerequisites for scaling-up of the interventions but at the same time the stakeholders acknowledged they were some of the most difficult to achieve.

Our assessment of the requirements for implementation which includes scaling-up of the Healthy Lifestyle implementation include the factors, identified by Rise et al. (2016), which show how successful the Healthy Lifestyle intervention was in fulfilling them. The assessment is based on our involvement in the conceptualization, monitoring and evaluation of the Healthy Lifestyle intervention, our close communication with schools included in the intervention, and on our previous analyses of the effectiveness and cost-effectiveness of intervention (previous STOP deliverables 7.3 and 7.4). The level of achievement is graded on the 1 to 10 scale with 1 failing to achieve and 10 fulfilling it in full.

Sustainability (grade 9) has been largely achieved because the intervention has been running for 8 consecutive years and did not fail even when its financing was delayed and reduced in the school year 2015/16. The annual cost of €70 per child in the Healthy Lifestyle intervention was considerably lower than the reported costs of other childhood obesity interventions which ranged between £108 to £662 (€127 to €781) (Hollingworth et al., 2012). Lower costs are at least in part the result of the existing school sport infrastructure which was available and did not present additional financial

burden, as well as the fact that the intervention used the existing network of schools. If the condition of stable financing of teachers' salaries for additional PE lessons is ensured, sustainability can be achieved. In the school year 2015/16 when the financing of the intervention was interrupted the large majority of the schools were able to independently ensure the financing to bridge the gap and less than 2% of the schools stopped the activities. Since 98% of schools successfully continued with the intervention, the intervention proved to be resilient to temporary financial disturbances.

Political support (grade 3) was not ideal because it involved only the Ministry of Education, Science and Sport, but not the Ministry of Health nor the Ministry of Social Affairs, which could ensure stronger political support by utilising the intervention effects to achieve wider public health goals and reduce inequality in access to physical activity. The Ministry of Education, Science and Sport took the initiative in coordinating the setting up of the intervention and ensuring the financing of the intervention through the European Social Funding (ESF), but it did not succeed in involving the Ministry of Health and the Ministry of Social affairs to ensure possible additional financing and consequently enable the inclusion of even larger number of schools.

Needs of community (grade 9) was strongly expressed since the enrolled schools were mostly coming from the local environments with lower than average physical fitness and consequently also potentially higher childhood obesity prevalence. In the annual calls for participation, schools from the regions with lowest physical fitness of children received additional points and thus the advantage in qualifying for funding. In this way the needs of the community in local settings have been largely addressed.

Fit with the settings (grade 10) was fully achieved since schools were autonomous and were encouraged to independently choose of the contents to fulfil their specific needs. The framework of the intervention only demanded from schools to include the sport contents that have traditionally been present in the local settings and to include new urban sports that are popular among children but are currently not explicitly covered in the existing national PE curriculum. In this way, the schools were able to independently choose the contents that corresponded to their local needs and available conditions (infrastructure, sport equipment, etc.).

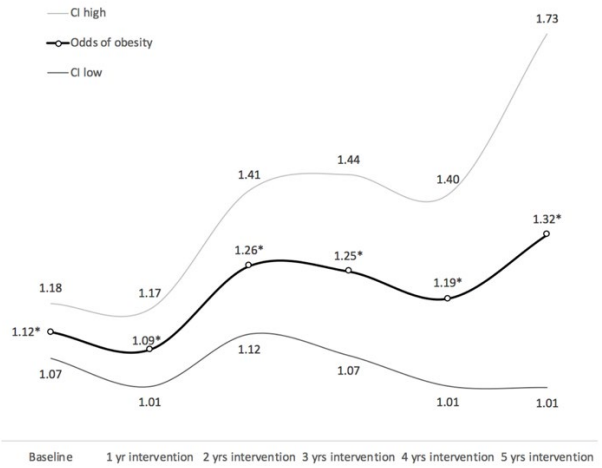
Reach (grade 8) was not entirely accomplished because not all children from participating schools were included in the intervention. Since the additional PE lessons were introduced immediately after the end regular school lessons, many children did not stay in school due to their other obligations (sport training, music classes, other extracurricular activities, etc.). This problem grew with age. Many children who started with inclusion in Healthy Lifestyle intervention gained new experience, learned the basic knowledge of a certain sport or improve their previous knowledge, and then proceeded to regular training in local sport clubs, hence leaving the intervention, which was a favourable outcome. There was, nevertheless, a part of children with low physical fitness who did not participate in the intervention because the intervention was not organised within the time when all children are in school.

Resources available (grade 3) was the most vulnerable part of the intervention. Although the Ministry of Education, Science and Sport was successful in acquiring the ESF grant, it failed in providing additional funding from the state budget. This limited the ability of the intervention to encompass all schools and made it vulnerable to changes in ESF funding. With the new financial perspective introduced in 2016, the ESF funding was delayed and it impacted the effectiveness and functioning of the intervention, and it also discouraged some schools to be newly enrolled. Other material resources (sport infrastructure and equipment) were readily available due to the overall high

standard of school infrastructure throughout the country. The indoor and outdoor school sport facilities were occupied immediately after the regular school classes ended and this use did not incur additional costs for schools. The intervention was thus carried out in the time between the end of school and afternoon period when schools typically rent their facilities to local sport clubs or self-organised recreational groups of adults.

Content and delivery (grade 9) was well achieved since the contents were delivered by the PE teachers with high level of competencies while the contents were oriented towards increasing habitual physical activity but was adaptable for every school setting. Since habitual physical activity largely depends on the local accessibility of sport infrastructure and organised sport programmes, the schools were encouraged to deliver the contents that would help children to get involved in available sport programmes in local sport clubs. Simultaneously, they learned and were encouraged to take up trendy urban sports which do not require special infrastructure and take advantage of the existing local urban environment. Strictly prescribed contents and delivery would create possible problems in the organisation of intervention programme in specific local environment as well as discourage children if the covered contents could not be practised in real life.

Institutionalisation (grade 10) was fully achieved since the intervention was embedded in schools who have stable organisational structure and programme, and all the necessary professional and material requirements. School environment is very uniform in Slovenia with 99.8% of schools being public schools while the few private schools are required to fulfil all the requirements of public schools. The intervention was embedded within schools, implemented by teachers employed in schools and supervised by school principals who are responsible for all activities, carried out in schools. Upon inclusion in the Healthy Lifestyle intervention, this programme became a part of official Annual work plan of every included school. This document is the basis for the financing of all school activities in individual year and is compulsory for every school.



*Curves denote odds, lower and upper 95% Wald CI, * p ≤ .05*

Figure 2: Odds of OB in control group vs. intervention group according to consecutive years of participation in intervention program

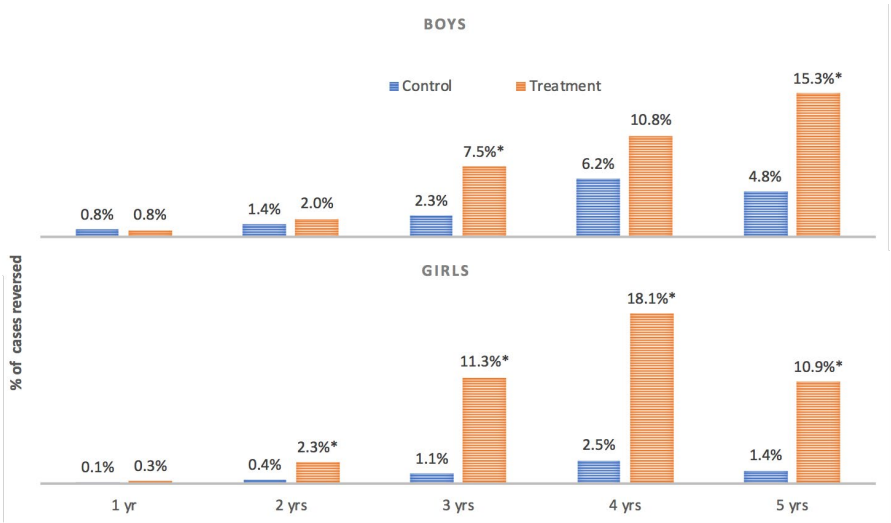
Effectiveness (grade 8) of the intervention in regard of reducing risk of childhood obesity was high but could be improved by involving all children. In this way also some children who would need additional physical activity but evaded it by leaving school immediately after classes, could benefit

from it. The analysis of the effectiveness of the intervention in reducing obesity was covered in STOP delivery 7.3 (Figure 2).

Figure 2 shows that after 2 years of inclusion the participating children from the same school had 1.2-times lower probability of being obese than the non-participating children and that this probability remained stable in the following years of inclusion in the intervention. The baseline higher probability of being obese in the control group shows that some children with obesity were not included in the intervention and the trends also show that only one-year intervention of this type would probably have no effect on prevalence of childhood obesity.

Multilevel collaboration (grade 4) had a lot of reserves. Slovenian Sports Office Planica as an agency of the Ministry of Education, Science and Sport, responsible for national extracurricular school sport programmes, school sport competitions and swimming literacy, established good collaboration with schools and local sport clubs but even within the educational field, the Slovenian Educational Office was not involved. The adoption of the intervention by the Slovenian Educational Office could further improve the effectiveness of the intervention since its advisers could provide additional support to young PE teachers who were implementing the intervention. At the same time Healthy Lifestyle intervention could serve as a model of further curricular enhancement and supplement of the existing PE teaching. The collaboration with other ministries (health, social affairs, economy) was non-existent.

Cost (grade 10) of the intervention was low in comparison to similar interventions. In our STOP delivery 7.4 (Figure 3) we showed that investing less than 80 EUR per year for 2 to 3 additional PE lessons per child can reverse more than 2 % of cases of children with obesity in two years, over 8 % in three years and over 12 % in 5 years.



Legend: * $p < 0.05$

Figure 3: Percentage of children with obesity reversed in five scenarios of participation/non participation

Capacity building (grade 8) was well achieved since the intervention enabled newly-graduated PE teachers to acquire their first employment and to develop their practical teaching competencies in the environment that is not strictly bound to the official curricular contents but demands the

acknowledging the specifics of local sport environment and utilisation of trendy urban sports to attract children who have less interest in classical sport training in local sport clubs. However, the downside was that the employment was only part-time. The intervention positively influenced also the capacity building of local sport clubs since it focused on the sports that have traditionally been strong in individual local settings. Children who previously had no interest in practicing in local clubs due to their self-percieved poor knowledge were given the opportunity to enhance it and were shown the possibilities to further develop it in the local sport clubs. Lastly, it also influenced the capacity building in children and teachers by encouraging them to learn and teach sports that are not currently explicitly covered in the curriculum. The national curriculum for PE is well elaborated and covers the majority of traditional sports practised in Slovenia. However, despite the fact that the national PE curriculum allows teachers to include also contents which are not specifically mentioned in the curriculum, there are usually not enough time available to include additional contents that would be of additional interest to children. Additional available 2 or 3 lessons per week provided additional time to include new contents or devote more time to sports which have traditionally been popular in a local environment.

Scalability (grade 10) was fully proven since the intervention was scaled-up every year by including new schools. It started with 78 schools in its first year and ended with over 200 schools in its final eight year. It had the potential to include all schools in the country if sufficient funding was available. The adaptability to local needs, the autonomy regarding the contents and the utilisation of the existing network of schools and its resources made the intervention easily transferable to any local setting in the country.

System thinking (grade 8) was largely achieved with the Ministry of Education, Science and Sport originally perceiving the intervention as a vital step to introducing 1 hour of PE per day after the end of the intervention but for the time being failed to take further necessary steps towards this goal.

Impact across co-benefits (grade 8) have been proven by reduction of childhood obesity prevalence, improvement of children's physical fitness, lower absenteeism from school due to acute infections, higher participation of children in organised leisure-time sport activities. Unfortunately, the stakeholders from the public health were not involved and therefore did not register also possible other health-related benefits that could be detected and could raise interest of the Ministry of Health to put more emphasis and devote more funding also in prevention of noncommunicable diseases with physical activity.

Transferability (grade 10) of the intervention was fully realised. It was shown that the intervention is transferrable to any school regardless of economic status, geographical location, or urbanization level of local environment. The schools were able to adjust the contents of the intervention to their local needs and conditions, and were provided with ready-made model for implementation.

2.2 Barrirers or facilitators for the implementation of the Healthy Lifestyle-type physical activity intervention programme

Since Estonia, Finland, Italy, Portugal, and Spain have not implemented a similar intervention on the basis of which we could assess the feasibility of the above-described factors, we decided to analyse the objective requirements for practical implementation of the intervention in school settings against which the possible barriers in specific national settings could be identified. The indicators for assessing of requirements for implementation are presented in Figure 4.

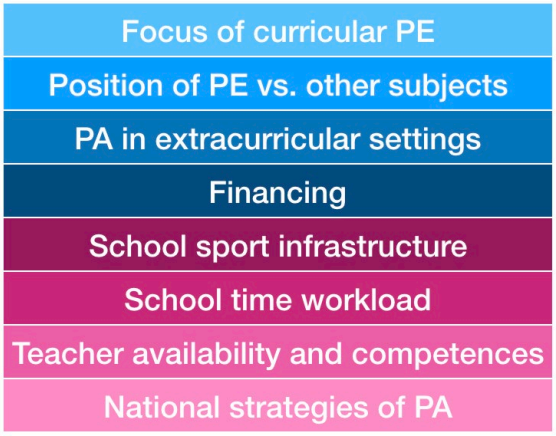


Figure 4: Requirements for implementation of intervention

In Slovenia, the focus of curricular PE is on holistic bio-psycho-social development of children, health and wellbeing to which the Healthy Lifestyle intervention was attuned to.

Formally, the PE is equal to other school subjects but informally many generalist teachers and teachers of other subjects perceive it as less important than other subjects or fail to deliver it at the same quality level as other curricular subjects that are taught in classrooms. Although all generalist teachers in Slovenia gain some competencies in PE teaching during their study, they are often uncomfortable delivering certain contents of PE which are more demanding or can potentially mean a higher risk of injury. In those schools in Slovenia where PE classes are delivered as joint teaching of PE teacher and generalist teacher also the generalist teachers raise their own confidence in delivering any curricular content. In order to ensure adequate professional approach and avoid possible risks of lower quality of content delivery by teachers with lower competencies, PE teachers were the only teachers allowed to teach the Healthy Lifestyle PE classes.

The extracurricular PA in Slovenia are organised in all schools. Schools are required to provide these activities to children on the school premises. In practice many PE teachers provide practicing of different sports after school, but many schools also sign contracts with local sports clubs to organize extracurricular activities in the form of basic sports training for their children on the school premises immediately after school. Healthy Lifestyle functioned similarly as other extracurricular sport activity but it attracted also children who would not typically enrol in extracurricular sport activities.

Financing of extracurricular activities is available to all schools by law. Schools receive funding from the municipalities but are autonomous to decide for which extracurricular activities it will be spent. The funding can be used for salaries as well as for covering material costs, excluding infrastructure

and equipment. If schools provide more activities than can be financed, they either apply for additional funding in municipal or national calls of the Annual Programme of Sport or ask parents for the participation fee. The funding of the Healthy Lifestyle was provided by the Ministry of Education, Science and Sport through the ESF mechanism and it covered the costs for part-time salary of PE teacher. Children's participation was free of charge.

School sport infrastructure is on a rather high level in Slovenia. Every Slovenian school has typically two gyms and outdoor playgrounds or has access to municipal sport facilities in their proximity. The gyms are well equipped. In the Healthy Lifestyle intervention, the schools provided their sport infrastructure and equipment free of charge.

School time workload of Slovenian children is 6388 hours of compulsory curriculum in the first 9 years of schooling which typically means between 4 and 7 lessons per day. In the morning, the lessons usually start around 8:00 and end between 12:00 and 14:00. Typically, the Healthy Lifestyle classes were organised between 13:00 and 15:30.

PE teachers in Slovenia are specialist teachers, educated at the Faculty of Sport. Masters level is required to teach PE in school (3 years of bachelor study + 2 years of masters study). PE teachers in Slovenia typically teach in grades 6 to 9 in many schools they teach also grades 4 and 5 while some schools also practice joint teaching of PE and generalist teacher in grades 1 to 3. The schools have the autonomy to decide for the super-standard form of PE teaching but have to provide funding for it. In the Healthy Lifestyle intervention this cost was funded through the ESF mechanism.

During the period the Healthy Lifestyle intervention was running the National Programme of Sport 2014-2023 and National Programme of Nutrition and Physical activity 2015-2025 have been implemented. The former has been focusing on physical activity predominantly as a tool for prevention of childhood obesity. The first one, however, has been pursuing the goal to increase the share of children who are daily physically active for 10 % by promoting sport activities, has been focused on increasing physical exercise capacity of children, and has been trying to provide healthy development also to unprivileged children. The number of participating children in the Healthy Lifestyle intervention was used as one of the indicators for assessment of the National Programme of Sport 2015-2025.

In order to assess the possible barriers for the potential implementation of a physical activity intervention programme, similar to Healthy Lifestyle, we analysed the published evidence on educational systems and physical education in particular (European Commission/EACEA/Eurydice, 2013; European Commission/EACEA/Eurydice, 2021; World Health Organization, 2018a; 2018b; 2018c; 2018d; 2018e; 2018f), but we also asked the partners from the national health institutes of Estonia, Finland, Italy, Portugal and Spain to provide additional information on the possible barriers which they acquired from their national experts in the field of education and sport. The goal of this task was to compare the level of fulfilling requirements for the implementation of Healthy Lifestyle in Slovenia to the possibility in fulfilling them in the abovementioned countries.

2.2.1 Focus of curricular PE

The physical education curricula in the five countries are all focusing on physical literacy but along it, their curricula are inclined either directly towards health (Estonia and Italy) or towards physical fitness as moderator of health (Finland, Portugal and Spain). In this regard, the curricular focus is coherent with the goals of the Healthy Lifestyle intervention and would allow for implementation of similar physical activity intervention. Finland, Portugal and Spain, nevertheless, have curricular focus more similar to Slovenia than Estonia and Italy.

2.2.2 Position of PE

Physical education as a school subject is often informally perceived as a bit less important than other school subjects, which is for example pronounced in Italy, where physical activity and academic achievement are sometimes still perceived as being “antagonists” (Pesce & Ben-Soussan, 2016). In Portugal, generalist teachers are sometimes still disregarding PE although it is a part of the curriculum (Pereira, Santos & Marinho, 2020), while in Spain, also parents and children sometimes still share the view of inferiority of PE in regard to other subjects. Similar stereotypes of “lesser importance” of PE can be found also in Finland, but are less pronounced in Spain and Estonia. Such reserved attitudes can present a potential barrier. Namely, if teachers of other subjects and parents perceive physical education merely in function of ‘training of the body’ and do not acknowledge the numerous favourable effects of regular and sufficiently intensive physical activity, the intervention programmes of this kind could be perceived with less enthusiasm or even opposition, deriving from professional envy of other teachers for increasing the instruction time only for PE, or general perception of its triviality regarding the overall developmental needs of children. The importance of PE in society can be assessed also by the number of hours, devoted to the subject. In Estonia grades 1 to 6 have 2-3 lessons of PE per week and 2 lessons in grades 7-9. In Finland 2-3 lessons of PE per week are compulsory in grades 1 to 9. In Italy 2 lessons of PE per week is mandatory in higher grades only while in the lower grades PE will become compulsory in the fifth class only in 2022/23 and in the fourth class a year later. In Portugal, the number of hours of PE depends on the school’s capacity but can range from 1 lesson per week in grades 1-4 and 3 lessons per week in higher grades. Spain has 3 lessons of PE per week in all classes.

2.2.3 PA in extracurricular settings

In Estonia, extracurricular physical activity programmes depend on local situations in schools. It is not mandatory for schools to organise extracurricular sporting activities but decides on the principals and school boards.

In Finland, organizing extracurricular physical activity programmes is not mandatory for schools but in practice many municipalities do organise leisure physical activities in connection to school time and in cooperation with sport associations, societies and clubs, either on school premises or in sport

infrastructure in vicinity of schools. This, however is not the practice in all schools which leaves space for potential inequality in access to physical activity.

In Italy extracurricular physical activity programmes, focused on healthy lifestyle in regard of physical activity are organised in schools and in cooperation with local sport promotion agencies but it is not mandatory for schools to organise them.

In Portugal, the curriculum enrichment activities programme offers various extracurricular activities that complement compulsory physical education but the organisation of these activities are not mandatory for schools.

In Spain, extracurricular physical activities are not school-bound. They are managed by the Higher Sports Council in collaboration with the Autonomous Communities, and aim to promote extracurricular sport in schools, clubs, associations, and other bodies. In many cases, the extracurricular sport activities are organised outside the school settings and due to strong involvement of sport associations, the extracurricular activities are oriented rather towards competitive sport than health and fitness. They are typically implemented by coaches from sport clubs, not by PE teachers from school.

Modest organisation of extracurricular physical activities can present a serious barrier against implementation of physical activity intervention but on the other hand, this can present also an opportunity for development of new practice. Since in all five countries extracurricular physical activities depend on entities outside of school this could present a potential barrier for successful implementation of the intervention. Namely, if such intervention cannot be supervised by the school teachers and organised in school settings there is a possible higher risk of non-participation of children from deprivileged environments.

2.2.4 School sport infrastructure

In all the countries, school sport infrastructure is less developed than in Slovenia. In Finland there are no schools who entirely lack sport infrastructure but not all the schools have sport gyms. The same situation was observed also in Italy, Portugal, Spain and Estonia. In Spain and Estonia between 5 and 10% of schools do not have a gym and in Italy some schools lacksport gyms or have poorly maintained gyms.

Availability and accessibility of sports infrastructure are vital for implementation of physical activity intervention programmes. Its lack can present an unbridgeable barrier because.

2.2.5 Financing of extracurricular physical activities

Financing of extracurricular activities in Finland can be covered from several sources (government, municipalities). Municipalities can apply for funding of extracurricular activities from The Ministry of Education and Culture as a part of the Finnish Model and from the board of education for extracurricular sports activities.

In Italy, extracurricular sports activities are financed by a combination of funds from the Ministry of Education and contributions from families.

In Spain, extracurricular sports activities are sometimes financed by Autonomous Communities but most often parents have to participate as well (Perreira, Santos & Morinho, 2020).

In Portugal, extracurricular sports activities are similarly financed by Regional Directions for Youth and Sports, and parents (Soares & Antunes, 2021).

In Estonia, local communities are co-financing extracurricular activities in municipal schools but parents contribute as well.

2.2.6 School time workload

School time workload determines the daily time spent in school. In this regard, Finland with 6385 lessons of instruction time in the first 9 years of schooling is very Similar to Slovenia with 6388 lessons and Estonia with 6432 lessons. Italy with 6-day school week has 8316 lessons of instruction in the first 9 years of schooling (6930 if only 5 days per week are considered) while in Portugal and Spain children experience the highest school time workload with 7935 and 7919 lessons of instruction time, respectively. Higher school tome workload means less available time for extracurricular physical activity, which prolongs time spent in school. Such prolongations can present a barrier against successful implementation of physical activity intervention programmes due to possible poorer participation rates.

2.2.7 Teacher availability and competencies

It is very important for the effectiveness of any intervention programme to be implemented by teachers highly competent in PE teaching. In the area of physical activity it would be advisable for the intervention programmes to be implemented by PE teachers rather than generalist teachers. As far as lower secondary level is concerned, PE is typically taught by specialists in all countries, but there are differences in the first 6 years of schooling. In Estonia generalist teachers typically teach PE in years1-4 of primary education but the schools have autonomy to have specialist PE teachers in those grades as well. In Finland and Italy, generalist teachers are teaching PE on the entire primary level (grades 1-6). In Portugal, generalist teachers are delivering PE classes in grades 1-4 while in higher grades specialist PE teachers take over the task. Spain is the only country that has specialist PE teachers delivering PE lessons in all grades although the PE teachers in primary and secondary schools are trained at different faculties. In grades in which PE is typically taught by generalist teachers implementation of physical activity intervention, delivered by PE specialist could lead to professional conflict between generalist and specialist teachers. Typically, the implementation of PA intervention would probably require employment of additional PE teachers which could possibly be perceived as a barrier.

2.2.8 National strategies of PA

In Estonia *Schools in motion* is a multicomponent approach to promote the physical activity in school through active lessons, active recess, active transport and PE lessons supporting lifelong physical activity. Measures have been introduced to improve indoor and outdoor environments for physical activity. A key element of the project is the involvement of all school personnel, students and parents in developing the interventions. In Finland *On the move* is a Government action programme initiated in 2010 to establish a physically active culture in Finnish comprehensive schools. The schools and municipalities that participate in the programme make their own plans to increase physical activity during the school day. Active breaks and before and after school activities are key elements. The programme is funded by the Ministry of Education and Culture and coordinated by the National Board of Education and LIKES Research Centre for Sport and Health Sciences. More than 90% of municipalities and of comprehensive schools (2116 schools) are currently involved in the program. In Italy *Scuola Attiva* and *Sport di Classe* are national campaigns led by the Ministry of Health, in collaboration with national sport associations, but are focused mostly on raising teachers competencies for delivery of physical activity. In Portugal numerous strategies have been developed recently but they are oriented more towards active travel and making urban environment more suitable for PA than towards improving PA in school settings. In Spain the latest strategies on physical activity have been directed towards pre-school children and not PA in school settings. Existing national strategies, directed towards improving PA in school settings are indicators of country's awareness of the importance of PA for adequate development and wellbeing of children. On the other hand, the lack of such focus can present a barrier against implementation of physical activity interventions. However, in the cases when a very successful intervention is already in place, like in the case of Finland, there is less need for another intervention.

3 Conclusion

The implementation of large-scale physical activity interventions within school settings requires minimal material and non-material conditions, and sufficient dedication of stakeholders. In Figure 5 we are graphically depicting the current status of some indicators that could indicate potential barriers or facilitators for implementation of PA interventions.

The communication with experts from educational field of the included countries revealed that potential unavailability of funding is the most prevalent possible barrier. There was an overall agreement that large-scale PA interventions would be feasible if its funding was ensured. All the other possible barriers would more likely be bridged if the funding was granted. On the one hand the unavailability of funds for providing sufficiently intensive regular PA within school settings is worrying, and shows insensitivity of stakeholders and society as a whole towards developmental difficulties of contemporary children due to lack of physical activity and increased sedentariness in school and at home. On the other hand, however, this barrier could simply be bridged if national and local governments decided to invest in children and their development to ensure long-term sustainability of economy. They need to realise that low physical activity results in low physical fitness, low work capacity, poorer cognitive development, increased health risks and consequently increased pressure on health system and lower economic competitiveness.

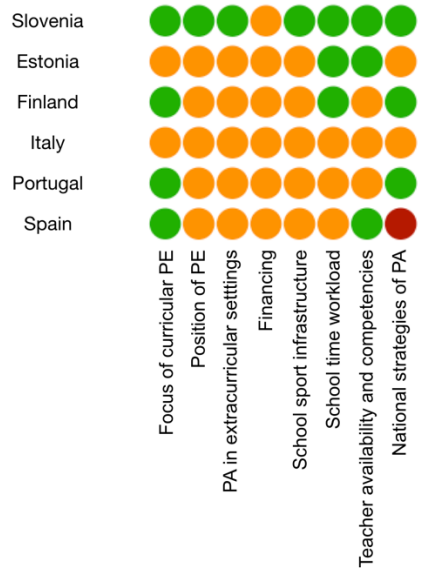


Figure 5: Feasibility of PA intervention

The position of PE in a country depicts the overall perception of the importance of physical literacy for the development of children. The idea of lesser importance of PE in comparison to other "academic" subjects was observed in all the countries which shows the widespread persistence of the idea of separation between somatic and cognitive development. Although this idea has been refuted by scientific evidence such idea could affect the popular acceptance of PA intervention programmes and could render them unimportant. This also depicts the need to better educate wider public in the numerous benefits of additional physical activity for children's development.

In comparison to Slovenia, all other countries are also facing the problem of inadequate availability of sport infrastructure in school settings. This shows that national and local governments have not yet succeeded in providing equal opportunities for somatic and motor development to all children, which means that potential PA intervention could be hindered by unavailability of sport facilities and equipment.

Since school-based physical activity intervention is most likely to be implemented in the form of extracurricular activities, the existing and well-established formalised system of extracurricular activities enable easier implementation. Among all the countries only Slovenian schools are bound to provide extracurricular activities to children by legislation while in all other countries, the school autonomy enables schools not only to choose the contents of extracurricular activities but also not to implement them at all. In this way, the availability of extracurricular activities is much more vulnerable and depending on the good will of school principals, school boards, local sport organisations and local communities.

The provision of additional hours of PE in the form of PA intervention could be affected also by overall high school workload of pupils. More hours of school instructions mean longer school time of children. This produces two-fold barrier for implementation of PA intervention: on the one hand, school facilities are occupied for longer period and thus unavailable for additional contents while on the other hand children might not be interested to stay in school for even longer period. In this sense Finland and Estonia have considerably lower school time workload, similar to Slovenia, and thus

more room for potential implementation of PA interventions. On the contrary, Italy, Spain and Portugal have considerably higher school time workload and might in this regard be less flexible in adapting school schedule to PA intervention.

The successful implementation of PA intervention in school settings depends also on the competencies of PE teachers. In comparison to Slovenia, only Spain and Estonia allow PE specialist teaching also in the lower grades of primary school while in Finland, Italy and Portugal this remains in exclusive domain of generalist teachers. Due to lower competencies in PE delivery, planning and organisation, obtained during their own study, generalist teachers would probably face more difficulties in implementing the intervention.

In general all the countries have a common denominator in their perception of physical activity in school settings (in the form of PE) towards holistic development of children including physical literacy, although Italy and Estonia are less inclined towards improving physical fitness as moderator of health.

Lastly, existing national strategies on physical activity can provide political background for various PA initiatives and interventions. Most of the countries do have strategies aiming towards increasing PA in schools although these strategies differ in their focus. While countries like Italy are aiming to improve the conditions by increasing teacher competencies for deliverance of PE contents, Portugal and Finland are aiming at increasing availability of adequate PA in school settings. Estonia also has its own strategy for increasing PA in schools but with no designated deadlines, which results in stalling and indefinitely postponing any actions, while Spain currently has no national strategy with this kind of goals at all.

When taking all the indicators in consideration, a PA intervention, similar to Healthy Lifestyle would currently face most difficulties in Italy and the least difficulties in Finland. Potential difficulties, however do not mean that such interventions are impossible to implement. Namely, the present qualitative analysis shows that the school environments in all the countries are constantly developing and that favourable conditions for implementation can be achieved. However, the analysis is also revealing that appropriate conditions could be established simply by dedication of decision makers on local and national levels to provide equal and optimal developmental opportunities to all children and to realise that investing in children’s PA within school settings would result in multiple positive effects on education, health, economy and wellbeing.

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