OECD FUTURE OF EDUCATION 2030

Making Physical Education Dynamic and Inclusive for 2030

INTERNATIONAL CURRICULUM ANALYSIS







OECD

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Foreword

This thematic report is the culmination of the OECD's first comparative education policy focus on physical and health education in school systems around the world. Conducted under the auspices of the OECD Future of Education and Skills 2030 project as part of the International Curriculum Analysis, this report presents new insights into the physical education curriculum in 18 countries and jurisdictions.

Schools the world over are under pressure to improve student learning outcomes in traditional academic subjects. But schools are not just places where students go to pursue academic achievement: schools should be nurturing environments that develop the whole child, including their social, emotional, physical and mental well-being. If children and young people are to become responsible, productive and happy members of society, they need a holistic education that prepares them not just for cognitive tasks, but for the broad gamut of personal, social and professional opportunities, challenges and duties in life.

In this context, physical and health education curriculum reform has become a policy focus in many OECD and partner countries and jurisdictions looking to promote student health and well-being.

However, while student health and well-being are a priority, robust research evidence and policy knowledge on which policies and practices in physical and health education support student health and well-being are lacking. The evidence base on comparative policy in physical and health education curriculum is comparatively under-developed relative to core academic learning areas such as literacy and numeracy.

The OECD therefore launched a comparative stock-taking exercise as part of its international curriculum analysis to shed light on this important curriculum area. The resulting collaborative study covering 18 countries and jurisdictions included desktop research, international working groups, an international comparative survey on physical education, and national/jurisdictional case studies with input from experts, academics, policymakers, teachers and school leaders.

Acknowledgements, contributors and credits

This curriculum analysis exercise on physical and health education was launched through the initiative of the government of Korea, under the leadership of the former Ambassador of the Korean delegation to the OECD, Mr. Jong-Won Yoon. He initiated a discussion with Andreas Schleicher, Director for Education and Skills, Directorate for Education and Skills, that the OECD Future of Education and Skills 2030 project should launch a thematic curriculum analysis focusing on physical education, along with its analysis on mathematics, so as to ensure the project's balance valuing whole child development, i.e. covering both academic and non-academic subject areas. Without the leadership and guidance of the Korean Delegation, in particular Ambassador Jong-Won Yoon and Minister Moonhee Kim, this OECD initiative would not have been possible.

International experts in physical education led the research programme, analysis and structuring of the physical education/health education curriculum analysis strand of the OECD Education 2030 project. Special contributors to this report include Richard Bailey, Claude Scheuer and Jorunn Spord Borgen, international experts in physical education who contributed with original papers that were used for the development of this report. International experts from countries and jurisdictions in this study completed a Comparative Physical Education questionnaire, and authored the national/jurisdictional case studies, including Tracy Zilm (Australia); Fangli Liu (China); Miguel Cornejo (Chile); Kristy Howells and Richard Bailey (England [United Kingdom]); Maret Pihu (Estonia); Chi-Kong Chau (Hong Kong, China); Tomoyasu Kondoh (Japan); Azhar Kabdulinova (Kazakhstan); Keejoon Yoon (Korea); Claude Scheuer (Luxembourg); Jorunn Spord Borgen (Norway); Catherine Mahler and Nicki Keenliside (Ontario [Canada]) Aldo Matos da Costa and António José Silva (Portugal); Ozlem Kalkan (Turkey); Andrey Selskiy (Russian Federation); Suzanne Hargreaves (Scotland [United Kingdom]); Rose-Marie Repond (Switzerland); and Nalda Wainwright (Wales [United Kingdom]).

The Physical Education Curriculum Analysis of the OECD Future of Education and Skills 2030 team was led by Miho Taguma (Project Manager), Esther Carvalhaes (Analyst), and Joaquín Cárceles (Consultant). Andreas Schleicher (Director, Directorate of Education and Skills) and Yuri Belfali (Head of Division, Early Childhood and Schools) provided substantive support and comments. Phoebe Downing (Consultant) contributed to the earlier drafts of the report and Yiran Zhao (Consultant) reported on existing the meta-analyses of physical education, physical activity and cognitive outcomes presented in Chapter 3 and Annex B.

The report was edited by Julie Harris, Leslie Greenhow and reviewed by Alison Burke. Special thanks to Prof. Uwe Puehse (Head of the Sport Sciences Department at the University of Basel) who kindly presented the findings of this report at its launch event on October 23, 2019 as part of the 10th 2030 Informal Working Group (IWG) meeting of the OECD Future of Education and Skills 2030 project.

Reader's guide

The OECD Future of Education and Skills 2030: Project background

The OECD Future of Education and Skills 2030 (OECD Education 2030) project aims to help countries find answers to the question of what knowledge, skills, attitudes and values are needed for today's students to thrive and shape their world, as well as how instructional systems can effectively develop them.

OECD Education 2030 Learning Framework

The OECD Education 2030 Learning Framework (launched as "OECD Learning Compass 2030") sets out an aspirational vision and goals for education systems for future, and established a common language among countries, local authorities, schools, teachers, students and other stakeholders to support global, multi-stakeholders' dialogues on the future of education.

Making Physical Education Curricula Dynamic and Inclusive for 2030

This exercise marks the first time that the OECD has focused on physical and health education as part of its policy analysis. It takes stock of research evidence on the effects of physical and health education (PE/HE) and brings forward new knowledge on the state of PE/HE policies, curriculum, practices and perspectives in various countries.

The research programme for this thematic review occurred under the auspices of Phase 1 of the OECD Education and Skills Education 2030 project. This includes key E2030 initiatives, including the Policy Questionnaire on Curriculum Redesign (PQC) and the Curriculum Content Mapping (CCM).

To advance our global understanding of comparative physical and health education curriculum, and in partnership with key and partner countries and jurisdictions, the OECD developed an International Comparative Review of Physical Education questionnaire. Eighteen countries and jurisdictions completed the questionnaire, contributing unique comparative data on the design and content of their national physical education curricula: Australia, Chile, England (United Kingdom), Estonia, Japan, Korea, Luxembourg, Norway, Ontario (Canada), Portugal, Scotland (United Kingdom), Switzerland, Turkey, Wales (United Kingdom), China, Hong Kong (China), Kazakhstan and the Russian Federation[1]. The responses for Australia, Chile, England (United Kingdom), Luxembourg, Switzerland and Wales (United Kingdom) were not provided by their government officials or their nominated experts, but from researchers/academics. Therefore, they are not an official representation of these countries' curriculum.

Experts from ten of these countries and jurisdictions also contributed original national/jurisdictional case studies to furnish complementary qualitative data to deepen the insights from the International Comparative Review. These national case studies are available on the OECD Education 2030 project website. These exercises complemented numerous analytical papers contributed by physical education experts from around the world.

In sum, this analysis allows for the creation of new knowledge on the state and status of physical and health education policies, curriculum, and practices from an international perspective

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Chapter 1. Overview

This chapter presents an overview of key findings from a broad stock-taking exercise on national physical and health education curricula across participating school systems. Key report findings, which are summarised in this overview, are based on three substantive areas: 1) a comparative analysis of key characteristics of the physical and health education curricula from 18 countries and jurisdictions 2) the research evidence on relationships between physical education, physical activity and student outcomes; 3) major directions and policy considerations emerging from recent and ongoing curriculum reforms in physical and health education in these school systems. The aim is to generate new knowledge in this comparative curriculum area, and to promote peer learning and information exchange among policy makers looking to improve the quality of physical and health education to promote student health and well-being through evidence-based curriculum reform.

Introduction

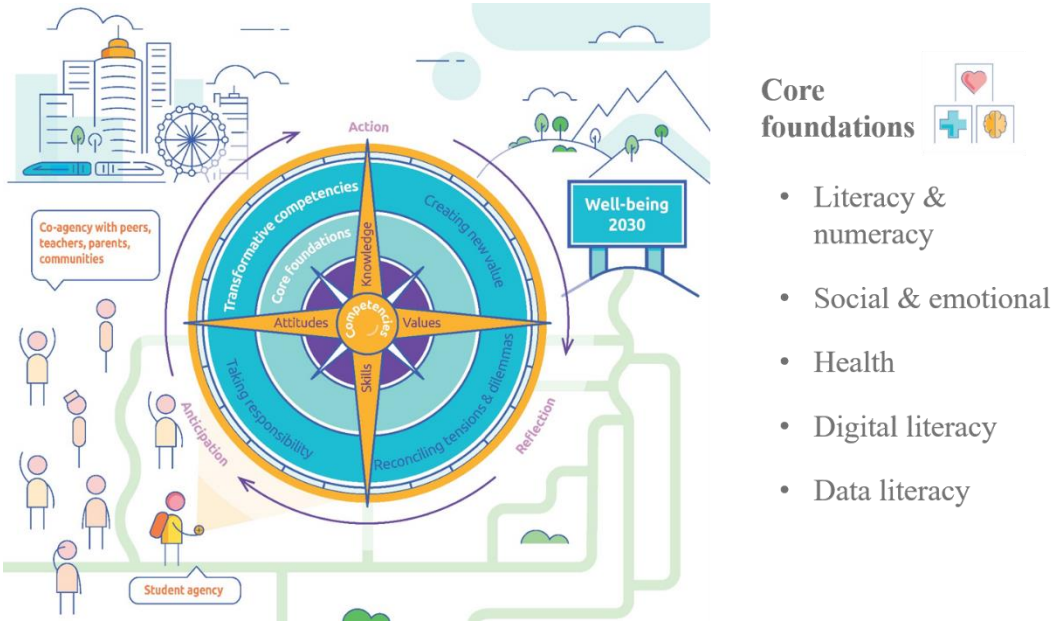
Children today will inherit a world characterised by unprecedented rates of change in all areas of life. Ceaseless social, environmental and economic uncertainty will be their reality as they enter the world of work and adulthood. The kinds of challenges and opportunities that these young people will face in 2030 and beyond will call into question – and indeed have already called into question – the ability of traditional curricular models to adequately prepare them for their adult lives.

Traditionally, schools around the world have emphasised academic achievement, motivated by the imperative to prepare children for the job market. Parents and politicians have put students under pressure to test well in narrowly defined learning areas. In this process, some schools have even detracted time from physical education or recess to increase time dedicated to other subjects.

This approach, however, both presumes a false dichotomy between physical education, cognitive development and student learning in the classroom, and downplays the role of quality physical education in the holistic development of the whole child. Indeed, if children are to grow into well-rounded, active and engaged citizens, schools need to do more than focus exclusively on traditional learning outcomes.

To move the needle and spark change, the Education 2030 includes physical and mental health as core foundations on its Education 2030 learning compass, as well as a focus on social, physical and psychological competencies that students will need to navigate the world of tomorrow (Figure 1.1).

Figure 1.1. Education 2030: Including social, physical and psychological competencies



Source: Future of Education and Skills 2030 Learning Compass

Dedicated to exploring pathways to develop the whole child within schools, this report marks the first time that the OECD puts the spotlight on physical education. The study leverages research from academic experts and country experiences to provide nuanced

evidence on the broad impacts that physical education can have on key outcomes and competencies for students. The report also presents a snapshot of the current state of physical and health education policies from an international perspective as well as future avenues for change.

Why this report matters

Despite growing global interest in the holistic development of students and their well-being, there is no consensus regarding which education policies or curriculum will enable this change in paradigm, or on the role that physical and health education curriculum can play therein.

In all OECD countries, physical education is part of the curriculum, with a traditional focus on physical fitness and hygiene. But there is considerable variation in how physical education is defined, how it relates to and encompasses health education, how the learning area is inscribed and regarded within the curriculum, and, importantly, how it is implemented and assessed in schools.

So, while there have been promising new approaches and practices in physical education curriculum, reform directions have in part been hampered by a lack of detail on physical and health education curriculum around the world. Given the potential of physical and health education to contribute both to academic and non-academic learning outcomes, it is crucial to understand the full role that this area can play within a holistic, future-oriented curriculum.

The research programme for this thematic review occurred under the auspices of Phase 1 of the OECD Education and Skills Education 2030 project. This includes key E2030 initiatives, including the Policy Questionnaire on Curriculum Redesign (PQC) and the Curriculum Content Mapping (CCM).

To advance the global understanding of comparative physical and health education curriculum, and in partnership with key and partner countries and jurisdictions, the OECD developed an International Comparative Review of Physical Education questionnaire. Eighteen countries and jurisdictions completed the questionnaire, contributing unique comparative data on the design and content of the national physical education curriculum. Experts from ten of these countries and jurisdictions also contributed original national/jurisdictional case studies to furnish complementary qualitative data to deepen the insights from the International Comparative Review. These exercises complemented numerous analytical papers contributed by physical education experts from around the world.

In sum, this report allows for the creation of new knowledge on the state and status of physical and health education policies, curriculum, and practices from an international perspective. The overall aim is to facilitate peer learning among policy makers looking to promote physical and health education within a holistic curriculum that values and develops in all children the full breath of competencies they will need to thrive in and shape their world.

Scope and organisation

The report is organised into four substantive chapters.

This overview (**Chapter 1**) presents a summary of the rationale and content of this report on physical and health education.

Chapter 2 presents an international perspective on key characteristics of the national physical and health education curriculum as recorded in key policy documents (including education acts and curriculum frameworks) and regulations. This comparative analysis, which builds on data gathered through the International Comparative Review of Physical Education questionnaire, focuses on curriculum design, content and inclusions/exclusions pertaining to the provision of quality physical and health education across participating countries and jurisdictions.

Chapter 3 summarises the conclusions of a literature review that examines the available research evidence on associations between physical education and physical activity and a range of physical, lifestyle and health, psychological and affective, cognitive, and social outcomes in children and young people. After presenting evidence on the impacts of physical education in each outcome, the chapter also shows whether countries are tackling these outcomes in their curricula.

To complement the review of the evidence, Annex B also presents a meta-analysis of the association between physical education/physical activity, and cognitive outcomes in children and young people, with a specific focus on studies examining academic achievement.

Chapter 4 presents a comparative analysis of key directions and future avenues in physical and health education curriculum reform across participating countries and jurisdictions that contributed an original national or jurisdictional case study. These countries and jurisdictions have, for the most part, recently undertaken or are currently undertaking reforms in the subject/learning area, and so provide an invaluable insight into policy-making decisions, direction reforms and policy considerations for the effective implementation of forward-looking reforms.

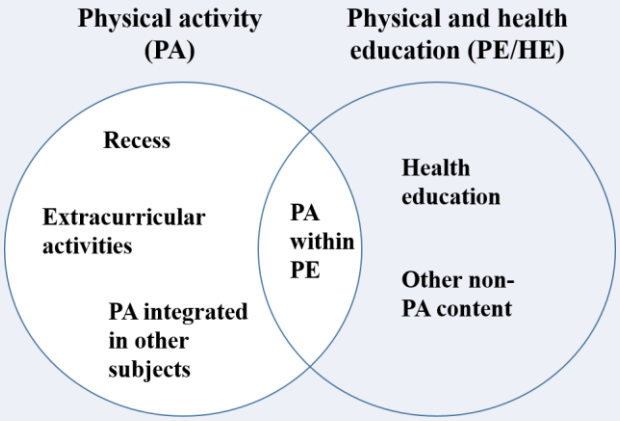
Box 1.1. Health education and physical education: Key definitions

Physical education (PE) has an unusually wide range of interpretations, and this is evident in the varied content of policy documents gathered as part of the OECD Education 2030 initiative. However, in this report, our main focus will be on physical education as a school subject, and not just on physical activity (PA). These concepts are usually intertwined, but there are important differences between them.

Physical education is usually associated with physical activity, but its scope as a subject is usually wider. For instance, the comparative curriculum analysis in this exercise has indicated that most countries and jurisdictions include some health-related content in the physical education curriculum. Therefore, this report may refer to physical and health education (PE/HE) to reflect the more holistic and interrelated nature of the content and scope of this learning area and its changing nature.

This conceptualisation is also important for exploring future avenues of change within PE/HE. Traditionally, most research has focused on the impacts that PE/HE can have on students by increasing their physical activity levels. These impacts are crucial, and should not be discounted. It is also important, however, to gauge other pathways through which physical education could trigger holistic, lifelong development.

Lastly, it is important to note that one common concern across participating countries and jurisdictions is to ensure that students reach recommended weekly physical activity levels. Physical activity can take place during physical education, but also at other times, like recess or outside of school. These interactions between PE/HE as a subject and other common fora of physical activity are relevant for policy making. As a result, this report will also touch on these interactions to drive physical activity levels among students.



Source: Education 2030 International Comparative Review of Physical Education questionnaire (2018), Curr1. 4a. A.

Highlights

Physical and health education has the potential to become one of the cornerstones of the education of tomorrow that contributes to the holistic development of students, fostering the development of crucial competencies and the physical and mental health of students.

Countries and jurisdictions report different approaches for combining health education and physical education

Most countries and jurisdictions embed health-related topics and content within multiple subject areas in different ways, including – but not limited to – physical education. As a

result, health education may also be embedded in, for instance, natural and social sciences. Six countries (33%) report including health education content, mainly combined within physical education, in one subject (**Australia**, **Ontario [Canada], China, Japan, Korea,** and **Wales [United Kingdom]**).

Physical education classes can contribute to making students more "physically active" in, outside, and beyond school

Research shows that students are more active on days they attend PE/HE, but higher attendance rates are also associated with increased physical activity outside of school and into adulthood. Worrying trends in cardiovascular diseases among students mean we should keep these impacts in focus. Inadequate physical activity is one of the four main risk factors associated with non-communicable diseases in children, young people and adults, including cardiovascular diseases, chronic respiratory diseases, cancer and diabetes (Granger, 2017).

Appropriate physical education provision can have a strong, positive effect on students' social skills and social development

Strong social skills are set to emerge as critical in the world of tomorrow. Even today, some of the biggest social challenges we face include social isolation or bullying in schools, for which social skills are important mediators. Research shows that physical education is a crucial forum for promoting face-to-face social interactions among students. Trust, a sense of community, empathy, co-operation and positive attitudes towards school are some of the social outcomes where physical education has been shown to play an important role.

Countries and jurisdictions explicitly promote a greater range of social outcomes than any other outcome areas in health and physical education curricula. However, research shows PE/HE can best foster social outcomes when co-operative and student-focused teaching methods (rather than teacher-directed approaches) are leveraged (Haugen, Safvenbom and Ommundsen, 2013; Macdonald-Wallis et al., 2011).

Spending more time in school-based PE/HE classes, and relatively less time on other school subjects does not adversely affect academic performance

Physical education has been shown to contribute to the development of crucial cognitive outcomes like problem solving, self-awareness, goal setting, memory, self-regulation, planning and creativity (Alvarez-Bueno et al., 2017a; Singh et al., 2012; Biddle and Asare, 2011). The effects of physical activity within PE in this line have also been shown to be greater than other forms of physical activity.

All countries and jurisdictions in this study, except **Russia** and **Turkey**, promote at least one explicit cognitive outcome in their physical education curricula, although these are not always consistent. Only **Australia, Chile, China, Japan, Portugal** and **Switzerland** include improved academic performance as an outcome of PE/HE.

Physical education can affect self-esteem and self-efficacy as well as assist students with severe psychological conditions; good pedagogical approaches are crucial, however

Research shows that student stress is on the rise. Affective and psychological outcomes play a vital role in youth well-being by mediating the relations between stress and psychological adjustment (Haine et al., 2003). However, effective planning, teaching and relationship building seem necessary for consistently positive outcomes: teachers' pedagogical approaches are crucial in this sense (Camiré, Trudel, and Forneris, 2012; Goudas and Giannoudis, 2008, 2010; Mandigo, Corlett and Ticas, 2016).

Most countries and jurisdictions in this study include psychological well-being, broadly defined as an objective of PE/HE. However, only a small sub-set countries and jurisdictions explicitly target specific psychological health conditions like reduced anxiety, reduced stress and reduced depression (**Ontario [Canada]; China; Japan; Luxembourg**).

PE/HE could be a lever for reducing inequalities in knowledge around dietary and lifestyle habits

A wide range of external factors influences lifestyle choices. Socio-economic status, traditions, cultural norms, quality of family relationships and role modelling are especially crucial in this regard, but the role of information is also important. In this sense, students from socio-economically advantaged backgrounds tend to be more aware of the importance of healthy habits than disadvantaged students (OECD, 2017). PE/HE can provide an important lever for reducing the role that differences in knowledge play in these inequalities.

There is considerable variation across the explicit lifestyle and health outcomes identified by countries and jurisdictions, showing the different approaches for incorporating health education within the PE/HE curriculum.

PE/HE is increasingly becoming an interdisciplinary subject/learning area, which puts the promotion of students' well-being at its core

PE/HE content has traditionally been narrowly defined and attached to physical fitness rather than learning, developing competencies, or promoting a lifelong, active life. However, recent reforms of PE/HE in many countries are starting to change this paradigm by making efforts to put student well-being at the centre of this learning area.

Inclusiveness should be kept in mind when redesigning the physical education curriculum

Many countries and jurisdictions indicate that equity and inclusion in physical education present a challenge for schools. For many disadvantaged students, PE classes may be the only opportunity to engage in structured, supervised, physical activity. In this sense, there are increasing calls for ensuring that equity and the benefits from PE/HE extend to all students, regardless of gender, race or background.

Challenges in gender inclusion within PE/HE are particularly reported by countries, with lower participation rates and physical activity levels among female students (**Australia, England [United Kingdom], Japan** and **Korea**). Other challenges in this area include a scarcity of female PE teachers in many countries and entrenched gender stereotypes within approaches to the subject. Despite this, only 44% of countries reported having requirements or guidelines regarding gender issues in PE/HE (**China, Estonia, Korea, Norway, Ontario [Canada], Portugal, Scotland [United Kingdom]** and **Turkey**).

Beyond gender, countries have focused on driving inclusiveness within PE/HE for children with disabilities or special learning needs. In this line, many (78%), but not all, countries and jurisdictions reported having guidelines or requirements in this area

There is a move towards knowledge-rich, competency-based curricula

Many countries are responding to the needs of preparing students for the future by incorporating more and more cross-curricular themes and competences in their PE/HE curriculum reforms.

The incorporation of these new concepts does not mean that content-based curriculum design concepts are being discarded. Content- and competency-based curriculum models

are not categorical alternatives: most countries and jurisdictions in this study combine elements of each within the overall PE/HE curriculum.

In this sense, there has been a false dichotomy between "content-based curriculum" and "competency-based curriculum". The effective development of competencies requires nurturing knowledge, skills, attitudes and values. Thus, an integrated model of a "knowledge-driven, competency-based curriculum" is starting to emerge as a response.

Addressing curriculum gaps by aligning goals, pedagogies and assessments is important for effective curriculum implementation

An increasing number of countries is embarking on forward-looking PE/HE curricular reforms, incorporating competency-based design concepts or diverse learning outcomes in their curricula. The effective implementation of these new curriculum ideas requires that aligning intended curriculum goals, teaching practices in schools and expected student learning outcomes.

In this context, the role of adapting assessments and pedagogies within PE/HE to transformations in curricula is a key challenge reported by countries. Information and communication technology is expected to be critical in bridging these gaps, creating both opportunities and challenges for updating pedagogies and innovative assessments.

Valuing teacher agency and teacher well-being is critical to make new curriculum designs a reality

If supported, teachers can use their agency to make informed decisions about the most appropriate content, pedagogical approaches or assessments for students, given the context in which they operate. However, increasing responsibility is putting their well-being on the line in many countries. Mechanisms for allowing teachers to tap into resources within their communities can help to implement enhanced context-specific pedagogical approaches while safeguarding their well-being.

Monitoring implementation with a particular focus on student well-being, and piloting new curriculum contents, pedagogies and assessments are important but underused policy levers

Countries and jurisdictions usually report gaps for the introduction of new curriculum design concepts into classes. New curriculum contents, pedagogies and assessments are not always effective when taken into class settings, or they are difficult to scale. In this sense, piloting and monitoring mechanisms are useful tools for the effective implementation of new curricular reforms. However, their use is far from generalised across countries.

It is crucial to close the knowledge gap in physical and health education; further research is needed

While the evidence base on physical education, physical activity and child/youth outcomes is expanding, it nonetheless remains an under-developed area of research within comparative curriculum studies. The literature review, together with the experiences and expertise provided by participating countries and jurisdictions, highlight some key gaps in the evidence and priority areas for development and further research.

References

Alvarez-Bueno, C. et al. (2017a), "The effect of physical activity interventions on children's cognition and meta-cognition: A systematic review and meta-analysis", *Journal of the American Academy of Child and Adolescent Psychiatry*, Vol. 56/9, Elsevier, New York, pp. 729-738, https://doi.org/10.1016/j.jaac.2017.06.012.

Biddle, S. J. H. and M. Asare (2011), "Physical activity and mental health in children and adolescents: A review of reviews", *British Journal of Sports Medicine*, https://doi.org/10.1136/bjsports-2011-090185.

Camiré, M., P. Trudel and T. Forneris (2012), "Coaching and transferring life skills: Philosophies and strategies used by model high school coaches", *The Sport Psychologist*, 26(2), 243-260.

Haine, R. A. et al. (2003), "Locus of control and self-esteem as stress-moderators or stress-mediators in parentally bereaved children", *Death Studies*, 27(7), 619-640.

Haugen, T., R. Safvenbom and Y. Ommundsen (2011), "Physical activity and global self-worth: The role of physical self-esteem indices and gender", *Mental Health and Physical Activity*, https://doi.org/10.1016/j.mhpa.2011.07.001.

Goudas, M. and G. Giannoudis (2010), "A qualitative evaluation of a life-skills program in a physical education context", *Hellenic Journal of Psychology*, 7(3), 315-334.

Goudas, M. and G. Giannoudis (2008), "A team-sports-based life-skills program in a physical education context", *Learning and Instruction*, 18(6), 528-536.

Granger, E. (2017), "A systematic review of the relationship between physical activity and health status in adolescents", *The European Journal of Public Health*, 27(2), 1–7.

Macdonald-Wallis, K. et al. (2011), "School-based friendship networks and children's physical activity: A spatial analytical approach", *Social Science and Medicine*, https://doi.org/10.1016/j.socscimed.2011.04.018.

Mandigo, J., J. Corlett and P. Ticas (2016), "Examining the role of life skills developed through Salvadoran physical education programs on the prevention of youth violence", *Journal of Sport for Development*, 4(7), 25-38.

OECD (2018), *OECD Future of Education and Skills 2030 Conceptual Learning Framework*, OECD Publishing, Paris.

OECD (2017), *PISA 2015 Results (Volume III): Students' Well-Being*, OECD Publishing, Paris, https://doi.org/10.1787/9789264273856-en.

Singh, A. et al. (2012), "Physical activity and performance at school: A systematic review of the literature including a methodological quality assessment", *Archives of Pediatrics and Adolescent Medicine*, Vol. 166/1, pp. 49-55, http://dx.doi.org/10.1001/archpediatrics.2011.716.

Suhrcke, M., D. Pillas and C. Selai (2008), *Economic Aspects of Mental Health in Children and Adolescents: Social Cohesion for Mental Well-Being among Adolescents*", WHO Regional Office for Europe, Copenhagen.

Chapter 2. How physical and health education curricula differ across countries

This chapter provides a unique international perspective on key characteristics of the physical and health education curriculum from 18 OECD and partner countries and jurisdictions. It organises key comparative findings around eleven main areas: curriculum regulation; the scope of physical education; curriculum content; cross-curricular dimensions; instruction time and extra-curricular physical education and physical activities; settings and facilities for physical education; student assessments; workforce development, qualifications and teacher support in physical education; policies and regulations for inclusion; and policies and regulations for ensuring student safety.

Introduction

There is no consensus on the "right curriculum approach" for providing quality instruction and learning experiences in physical education, as indeed in any learning area. Diverse contextual factors influence curriculum development and implementation in physical and health education.

Debates focus on, for instance, the scope of, and relationship between, physical education and health education within the curriculum; the impact of attention to quantity (i.e. the number of physical education classes students attend per week) and on quality (e.g. are students learning and developing lifelong, healthy habits and attitudes?); and decision points around competency- and content-based approaches to curriculum design.

This chapter presents original data which were systematically collected by the OECD for the first time focusing specifically on physical education curricula on eighteen OECD and partner countries and jurisdictions.

Key topics in this chapter, specific to physical education, include: curriculum regulations; scope of curriculum; curriculum content; instruction time; extra-curricular activities, settings and facilities; assessment policies and practices; workforce development, qualifications, and teacher support; policies for inclusion; and policies to ensure safety.

Curriculum regulations

In all participating countries and jurisdictions, physical education is **a mandatory subject** at ISCED 1[1] and ISCED 2[2] levels and they have a national curriculum specific to physical education at ISCED 1 and ISCED 2, with the exception of **Switzerland**, which has a national curriculum on physical education for ISCED 1 only.

Physical education is typically regulated by legal instruments such as the constitution (**Kazakhstan** and **Switzerland**); general laws on education (e.g. the Education Act in **Ontario [Canada]** and **Wales [United Kingdom]**, and the School Education Law in **Japan**); the curriculum (**Chile, Estonia, Scotland [United Kingdom]**); or physical education-specific laws (**Korea, Luxembourg**).

Table 2. presents an overview of the policy instruments governing physical and health education (PE/HE) in participating countries and jurisdictions.

The scope of physical and health education curricula

While the focus of the study was launched as 'physical education', it has become evidence that 'health education' is often integrated into physical education. Participating countries and jurisdictions draw on one or more of three curricular models for incorporating physical and health education into their curricula (Table 2.1.)

1. Physical education and health education are separate school subjects.
2. Health-related topics and content are embedded in multiple subject areas, including but not limited to, physical education.
3. Physical education and health education are mainly combined within one subject area.

[1] International Standard Classification of Education Level 1, equivalent to primary education.

[2] International Standard Classification of Education Level 2, equivalent to lower secondary education.

Table 2.1. Curriculum regulatory frameworks and policies on physical education

		What major policies/legislation or other official documents regulate physical education?	Does the country/ jurisdiction have a national curriculum for physical education at ISCED 1 and ISCED 2?	Is the national curriculum for physical education regulated by policy and/or government legislation?	Is physical education mandatory for ISCED 1 and ISCED 2?
OECD country/jurisdiction	Australia	Melbourne Declaration (2008)	Yes	Yes	Yes
	Chile	National Curriculum directed by Chilean Ministry of Education	Yes	Yes	Yes
	England (United Kingdom)	National Curriculum for England Key Stages 1-4	Yes	Yes	Yes
	Estonia	National Curriculum for Basic Schools (Ministry of Education and Research, 2014) and National Curriculum for Upper Secondary Schools (Ministry of Education and Research, 2014)	Yes	Yes	Yes
	Japan	Enforcement Regulations for the School Education Law	Yes	Yes	Yes
	Korea	Physical Education and School Sport Promotion Act (2015)	Yes	Yes	Yes
	Luxembourg	Sports Law (MOE)	Yes	Yes	Yes
	Norway	Knowledge Promotion Reform (MOE, 2006)	Yes	Yes	Yes
	Ontario (Canada)	Education Act	Yes	Yes	Yes
	Portugal	Decree Law No. 139 (2012), with amendments in No. 91 (2013) and No. 176 (2014)	Yes	Yes	Yes
	Scotland (United Kingdom)	Curriculum for Excellence	Yes	Yes	Yes
	Switzerland	Constitution	ISCED 1 only	Yes	Yes
	Turkey	Guidelines from Ministry of Education	Yes	Yes	Yes
	Wales (United Kingdom)	Education Act (2002)	Yes	Yes	Yes
Partner country/jurisdiction	China	The Education Law of the People's Republic of China (1995); The Sports Law of the People's Republic of China (1995); Further Strengthening Physical Education in Schools (MOE, 2012); Opinions on Curriculum Reform to Deepen the Implementation of Setting High Moral Values and People Cultivation as the Fundamental Task of Education (2014); Strengthening Juvenile Sports and Building Up Juvenile Health (CCCP, 2007); Outline of Healthy China 2030 (2016) 13th Five-Year Health and Wellness Planning (2017)	Yes	Yes	Yes
	Hong Kong (China)	Curriculum Development Council Committee on Physical Education	Yes	Yes	Yes
	Kazakhstan	Constitution of the Republic of Kazakhstan; On Education Act (2007); On Physical Culture and Sports Act (2014); State Compulsory Educational Standards (SCES, 2015)	Yes	Yes	Yes
	Russian Federation	Federal State Educational Standard (FGOS); Exemplary Core Educational Program of Basic General Education (POOP)	Yes	Yes	Yes

Source: Education 2030 International Comparative Review of Physical Education questionnaire (2018), Curr. 1.1, 1.1a and 1.2.

These are not categorical or mutually exclusive options. Participating countries and jurisdictions take diverse approaches to relating and embedding content areas across physical and health education within the national curriculum. These curricular models apply to both ISCED 1 and ISCED 2, with the exception of Switzerland[1] (which has a national curriculum for ISCED 1 only).

Throughout this report, "physical and health education" or "PE/HE" is used to refer to the subject area to acknowledge the complementary and often intertwined nature of these learning areas. However, a key point of difference is the relationship between, and relative scope of, physical and health education.

Physical education and health education as separate models

Introducing health education within curricula as a standalone subject is not a common approach. The only example of this approach among across countries and jurisdictions in this study is **Estonia**, where the subjects are called "Physical education" and "Personal, social and health education".

Health education embedded in multiple subjects

When countries and jurisdictions do not have health education as a separate subject, most of them embed health-related topics and content within multiple subject areas in different ways, including, but not limited to, physical education. This is aligned with the approach recommended by the World Health Organization (WHO), which in 2008 set out recommendations on school health education as "taught as a specific subject, as part of other subjects such as science, home economics, mathematics and agriculture, or ideally as a combination of both" (see Box 2.1).

Health education mainly combined in the curriculum within physical education

Seven of the participating countries and jurisdictions (33%) reported that health education was mainly included in the curriculum combined with physical education in one subject area.

Australia, China, Chile and **Ontario (Canada)** reflect the combined model through an official title that registers both learning areas (i.e. "Health and physical education" or "Physical education and health" or "Sports and health"); whereas **Wales (United Kingdom)** and **Korea** officially refer to the subject as "Physical education"; and **Scotland (United Kingdom)** has "Health and well-being" as a core part of the national curriculum.

Health education is also embedded in other subjects/learning areas in these countries and jurisdictions. However, in these cases, physical education is the main subject in which health education is integrated.

In the rest of the participating countries and jurisdictions, physical education is not the main subject for integrating health education, though physical education does contain some health content. Only **England (United Kingdom)** and **Portugal** reported not including any of the health topics within their curriculum (see Table 2.).

Box 2.1. Health education to promote student health and well-being: WHO policy recommendations

The World Health Organization recommended in 2008 that school health education aim to help students develop the knowledge and skills needed to make informed decisions, practice healthy behaviours and create conditions that are conducive to health. School health education can be delivered in several different ways, depending on a country's needs and available resources.

Health education can be taught as a specific subject, as part of other subjects such as science, home economics, mathematics and agriculture, or ideally as a combination of both.

Health education policies that focus on diet and physical activity should:

- provide knowledge and skills, and help to develop attitudes about the relationship between a good diet, physical activity and health
- address the safe preparation of food and its consumption as an essential, positive and enjoyable aspect of life
- allow students to have the opportunities to practice important skills, such as decision making about food and physical activity
- allow students to identify not only barriers to being physically active and making healthy food choices but also solutions to overcoming these barriers
- provide media and marketing literacy to students, especially related to foods and non-alcoholic beverages
- involve teachers who have received the best possible training and are equipped with the knowledge and skills necessary to effectively impart health messages to students.

To implement these policy recommendations, governments and local education authorities can:

1. develop, implement and/or strengthen the national school curriculum to include relevant information on healthy diets and physical activity
2. establish partnerships with teachers, parents, teachers' associations and other stakeholders to encourage the development of criteria and materials that provide an appropriate curriculum related to diet and physical activity
3. consider, as appropriate, the development of regulatory approaches for compulsory health education during the school year.

Source: World Health Organization (2008), *School Policy Framework: Implementation of the WHO Global Strategy on Diet, Physical Activity and Health*, WHO, https://apps.who.int/iris/handle/10665/43923.

Table 2.2. Approaches to integrating health education within curricula

		Physical education and health education separate school subjects	Health education embedded in multiple subjects (including but not limited to PE)	Health education mainly combined in the curriculum within physical education	Subject name
OECD country/jurisdiction	Australia	No	No	Yes*	Health and physical education
	Chile	No	No	Yes	Physical education and health
	England (United Kingdom)	No	Yes	No	Physical education
	Estonia*	Yes	No	No	Physical education
	Japan	No	No	Yes	Physical education (ISCED 1); Health and physical education (ISCED 2)
	Korea	No	No	Yes	Physical education
	Luxembourg	No	Yes	No	Physical education
	Norway	No	Yes	No	Physical education
	Ontario (Canada)	No	No	Yes	Physical education and health
	Portugal	No	Yes	No	Physical education
	Scotland (United Kingdom)	No	Yes	No	Health and well-being
	Switzerland	No	Yes	No	Physical education and health
	Turkey	No	Yes	No	Physical education
	Wales (United Kingdom)	No	No	Yes	Physical education
Partner country/jurisdiction	China	No	No	Yes	Sports and health
	Hong Kong (China)	No	Yes	No	Physical education
	Kazakhstan	No	Yes	No	Physical education
	Russian Federation	No	Yes	No	Physical education

Notes: In Australia, the implemented model depends on states and territories. In Estonia, HE has its own subject: Personal, Social and Health Education.
Source: Education 2030 International Comparative Review of Physical Education questionnaire (2018), Curr 2.6.

Key health-related content areas that are usually part of the physical education curriculum include: safety; food and nutrition; relationships education; and mental health, well-being and managing stress. However, many countries and jurisdictions put different focus on the content that should be included within PE/HE. For example, **Ontario (Canada)** includes a wide range of health-related outcomes, spanning from sexual education to mental health (see Table 2.).

Table 2.3. Health-related content areas included in PE/HE curricula

					Content includes			
		Physical education and health education separate school subjects	Health education embedded in multiple subjects (including but not limited to PE)	Health education mainly combined in the curriculum within physical education	Safety	Food and nutrition	Relationships education	Mental health, well-being and managing stress
OECD country/jurisdiction	Australia	No	No	Yes*	Yes	Yes	Yes	Yes
	Chile	No	No	Yes	Yes	Yes	No	No
	England (United Kingdom)	No	Yes	No	No	No	No	No
	Estonia	Yes	No	No	Yes	No	Yes	No
	Japan	No	No	Yes	Yes	Yes	No	No
	Korea	No	No	Yes	Yes	No	Yes	Yes
	Luxembourg	No	Yes	No	No	No	No	Yes
	Norway	No	Yes	No	Yes	No	Yes	Yes
	Ontario (Canada)	No	No	Yes	Yes	Yes	Yes	Yes
	Portugal	No	Yes	No	No	No	No	No
	Scotland (United Kingdom)	No	No	No	No	No	No	Yes
	Switzerland	No	Yes	No	No	Yes	Yes	No
	Turkey	No	Yes	No	Yes	Yes	Yes	No
	Wales (United Kingdom)	No	No	Yes	No	No	No	Yes
Partner country/jurisdiction	China	No	No	Yes	Yes	Yes	Yes	No
	Hong Kong (China)	No	Yes	No	Yes	No	No	No
	Kazakhstan	No	Yes	No	Yes	No	Yes	No
	Russian Federation	No	Yes	No	Yes	Yes	No	No

Notes: In Australia, the implemented model depends on states and territories. In Estonia, HE has its own subject: Personal, Social and Health Education.
Source: Education 2030 International Comparative Review of Physical Education questionnaire (2018), Curr 2.6.

Curriculum content in physical and health education curricula

Participating countries and jurisdictions reported including the following content areas in their physical and health education curricula (see Table 2.):

Table 2.4. Activities included in PE/HE curricula

		Games and sports, including individual and/or team sports	Activities and outcomes relating to recreation, leisure, outdoor education and lifestyle activities	Movement skills and concepts, including dance and rhythmic movement)	Key health-related content, including food and nutrition, safety etc.
OECD country/jurisdiction	Australia	Yes	Yes	Yes	Yes
	Chile	Yes	Yes	Yes	Yes
	England (United Kingdom)	Yes	Yes	Yes	No
	Estonia	Yes	No	No	Yes
	Japan	Yes	Yes	Yes	Yes
	Korea	Yes	Yes	Yes	Yes
	Luxembourg	Yes	No	ISCED 1 only	No
	Norway	Yes	Yes	Yes	Yes
	Ontario (Canada)	Yes	Yes	Yes	Yes
	Portugal	Yes	ISCED 2 only	Yes	No
	Scotland (United Kingdom)	Yes	Yes	Yes	No
	Switzerland	Yes	Yes	Yes	Yes
	Turkey	Yes	Yes	Yes	Yes
	Wales (United Kingdom)	Yes	No	No	Yes
Partner country/jurisdiction	China	Yes	Yes	Yes	Yes
	Hong Kong (China)	Yes	Yes	Yes	Yes
	Kazakhstan	Yes	Yes	Yes	Yes
	Russian Federation	Yes	Yes	Yes	Yes

Note: * In Switzerland, food and nutrition content is provided in Italian-speaking cantons only.
Source: Education 2030 International Comparative Review of Physical Education questionnaire (2018), Curr. 2.1

- **Games and sports, including individual and/or team sports** are included by all countries/jurisdictions. However, different dimensions are emphasised, including sports to promote healthy competition (**England [United Kingdom]**, **Scotland [United Kingdom]**), or to promote collaboration and teamwork (**Korea**).
- **Activities relating to recreation, leisure, outdoor education and lifestyle** (all countries and jurisdictions), e.g. orienteering, swimming climbing, skiing, and ice skating, depending on the climate, environment and availability of facilities.

- **Movement skills and concepts** (all countries and jurisdictions except for **Wales [United Kingdom]**); physical fitness (all countries and jurisdictions except for **Portugal** and **Wales [United Kingdom]**); and dance or rhythmic movement (all countries and jurisdictions except for **Kazakhstan**, **Russia** and **Turkey**).
- **Key health-related content areas** such as safety (**Estonia**, **Japan**, **Korea**); food and nutrition (**Switzerland**, **Turkey, China**); relationships education (**Australia**, **Norway**, **Ontario** [**Canada**]); and mental health, well-being and managing stress (**Luxembourg**, **Norway**, **Ontario** [**Canada**]).

The inclusion or absence of health-related topics should be interpreted with caution, however, given the mixed curriculum approaches to incorporating health education into and with physical education in the curriculum.

Instruction time

Required instruction time, referring to instruction time during compulsory primary and secondary general, is a key measure used in comparative curriculum analysis. This does not include learning outside of the formal school setting or extra-curricular activities (OECD, 2016).

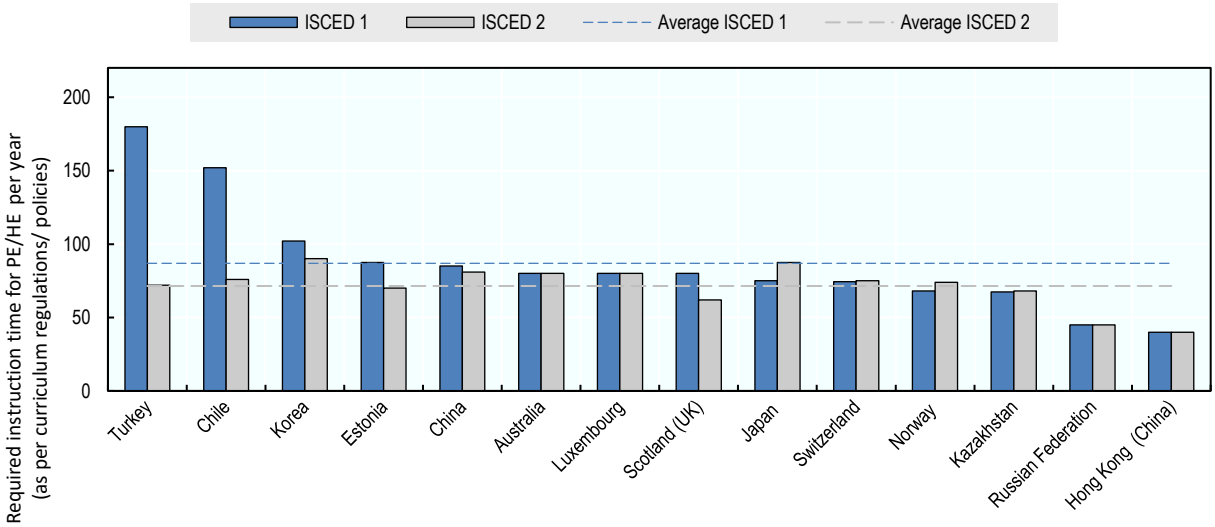
Intended instruction time allocated to physical education

Required instruction time will often differ from the actual number of hours of instruction that students receive, particularly in school systems with school-based curriculum development and latitude over implementation and timetabling.[2]

On average across participating systems, intended instruction time allocated to the physical education curriculum is 87 hours for ISCED 1 and 71 hours for ISCED 2 per year (Figure 2.1).

The two countries that report the highest average number of hours per year for ISCED 1, **Turkey** and **Chile**, also report the largest differential between ISCED levels or grades. **Chile** decreases intended instruction time by half between Grades 4 and 5 (from 152 hours up to Grade 4, down to 76 hours from Grades 5-8); and **Turkey** decreases required instruction time by 108 hours from Grade 3 (180 hours) and Grade 4 (72 hours).

Figure 2.1. Required instruction time for physical education



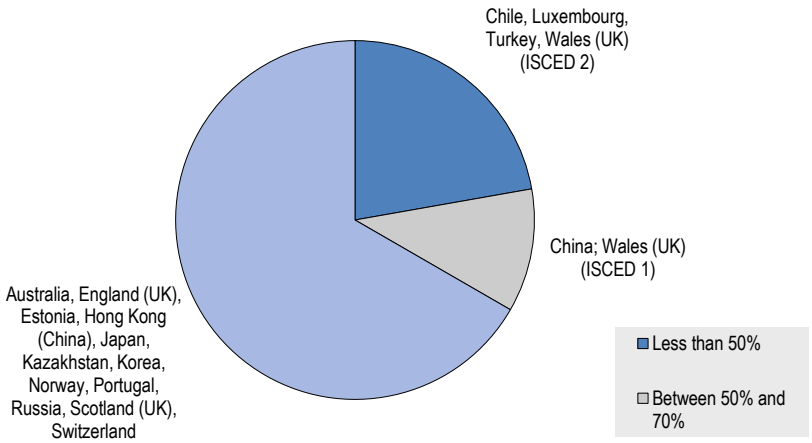
Note: Countries and jurisdictions are ranked in descending total hours of instruction time (arithmetic average) for ISCED 1 and ISCED 2 combined. ISCED 1 range of 70-105 hours averaged for Estonia. No data for England, Portugal, or Wales. Ontario (Canada) does not have a prescribed amount of instructional time for physical education, however, every student Gr. 1-12 must participate in sustained moderate to vigorous physical activity to the best of their ability for a minimum of twenty minutes each school day. The Gr. 9 Health and Physical Education course comprises of 110 hours of instructional time to address the entire curriculum.
Source: E2030 International Comparative Review of Physical Education questionnaire (2018), Curr.1.5.

Time allocated for physical activity within the physical education instruction time

With regard to the hours of physical activities included in the instruction time required for physical education, 12 of the 18 participating countries and jurisdictions (66%) reported that at least 70% of instruction time in physical education included physical activities for students in 2018 (Figure 2.2). On the other end of the spectrum, four countries and jurisdictions (22%) reported that students were physically active for less than 50% of instruction time.

Ontario (Canada) does not prescribe intended instruction time in physical education. All students must engage in 20 minutes of daily physical activity (DPA) to the best of their ability, while physical and health education for Year 9 in particular comprises 110 hours for the year.

Figure 2.2. Proportion of PE/HE instruction time that includes physical activities



Notes: Data for Luxembourg are based on research evidence. Data for Switzerland are for ISCED 1 only. Physical activity time in Ontario (Canada) is not prescribed and varies by school.
Source: Education 2030 International Comparative Review of Physical Education questionnaire, 2018.

If we consider these rates of physical activity within PE/HE and the average intended instruction time (87 hours for ISCED 1 and 71 hours for ISCED 2), PE/HE classes contribute between 43 and 61 hours per year of actual physical activity time for ISCED 1, and between 35 and 50 hours for ISCED 2, depending on the proportion of instruction time that children are physically active.

Extra-curricular physical education and physical activities

All participating countries and jurisdictions, except **Ontario (Canada)** and **Wales (United Kingdom)** have policies regarding extra-curricular physical activity and sports for ISCED 1 and ISCED 2 (**Norway** for ISCED 1 only). Some examples include:

- In **Australia**, jurisdictions and sectors have different policies and the sporting programmes organised and conducted by education systems are based on a range of programmes. In some schools, every student is expected to be involved in extra-curricular sports; in other schools, it is on a voluntary basis. Opportunities vary between intra-school sport and physical activities, regular inter-school competitions on a local level, one day state-wide or national sporting events, as well as participation in national championships for more talented students. The vast majority of schools engage in a formal inter-school sporting programme to some extent.

- **Norway** has a mandatory extra-curricular programme for students in Grades 5 to 7 consisting of 76 hours each year. The activities are used differently from one school to another, and the impact of this programme has not been evaluated so far. In December 2017, one hour of physical activity per day "within teaching hours" at ISCED 1 was decided. This means that teachers are obliged to use physical activity as a methodology during teaching. This decision has not yet been implemented on a national level.

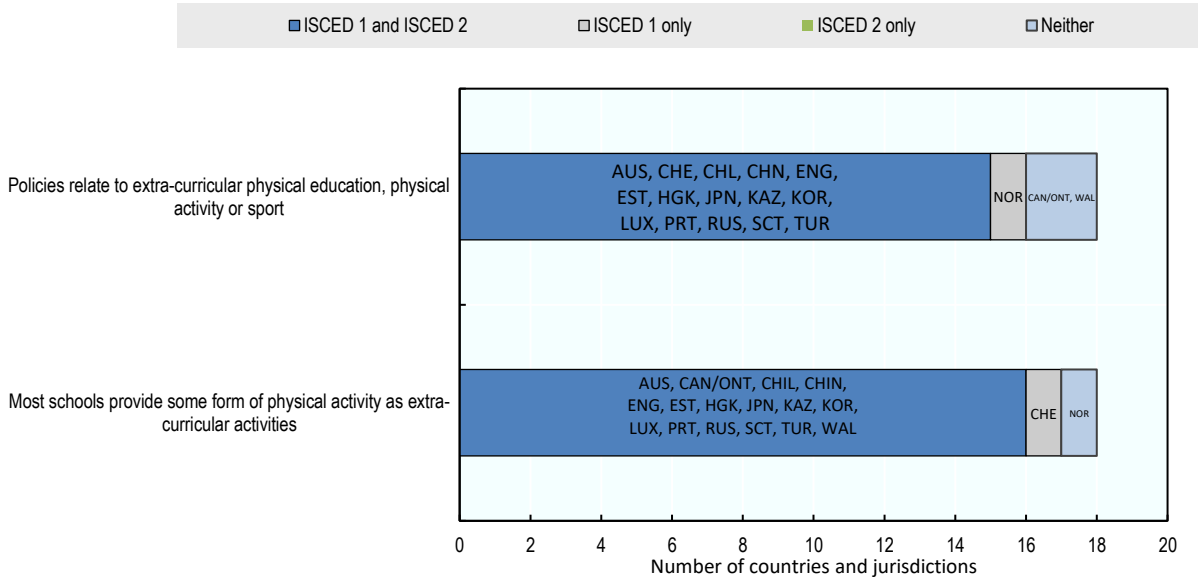
- In **Chile**, a Department of Extracurricular Education of the Ministry of Education is leading the extra-curricular sports offered by schools and colleges at a national level, supported by regional secretaries and community departments of

extra-curricular sports. Students are free to choose the activities they like the most, while there is only little connection with the PE curriculum. Furthermore, national school sports games are organised.

The large majority of schools in countries and jurisdictions offer extra-curricular physical activities, even in countries and jurisdictions without policies or regulations stipulating that they do so (**Ontario [Canada]** and **Wales [United Kingdom]**) (Figure 2.3). Some examples include:

- In **England (United Kingdom)**, every school is to provide some form of physical activity as extra-curricular activities, almost every afternoon after school. Most primary schools have after-school sports clubs, usually for students aged seven and over, and all secondary schools have a range of activities. In primary schools, the most common activities include football and netball. The same applies in secondary school, often with the addition of rugby union/league, dance, etc., depending on the teachers' expertise and the facilities. These policies might also include active transport, encouraging children and young people to walk or cycle to school.

Figure 2.3. Extra-curricular physical activity offered by systems



Source: Education 2030 International Comparative Review of Physical Education questionnaire (2018), Curr. 1.3 and Curr. 2.9.

- In **Hong Kong (China)**, schools are encouraged to organise extra-curricular sports (known as life-wide learning [LWL] activities). Schools are expected to enrich students' learning experiences beyond lessons and outside schools by organising LWL activities, such as participating in sports competitions or watching large-scale, local or international sports events.

Countries and jurisdictions report different approaches to increase physical activity levels among students on a daily or weekly basis, including binding and non-binding initiatives implemented through curricular PE/HE time, but also beyond, through physical activity integrated in other subject areas or extra-curricular activities (Box 2.2).

Box 2.2. Helping students reach recommended physical activity levels: Combining PE/HE, extra-curricular physical activities and integrated physical activities

Integrated physical activity within school hours

Some countries are looking at pathways other than curricular PE/HE to drive physical activity among students. For instance, **Estonia** reports that from 2018, there is a "School in motion" project in some schools to try out models based on the World Health Organization (WHO) recommendation of one hour of daily physical activity for better health among youth. The schools participating in this project have restructured their school days to create longer recess and outdoor breaks; they have focused their energies on the schoolyard to support pupils' physical activity and active transportation, and subject teachers use active breaks during lessons. **Korea** reports that in middle schools, one slot (45 minutes) of "creative experiential activities" is conducted as School Sports Clubs (SSC). This initiative was first launched in 2008 and targeted extra-curricular hours. After its positive impacts became apparent, the government decided to build the initiative into the school curriculum.

Extra-curricular physical activity

Some countries have sought to promote physical activity for students by emphasising the role of extra-curricular activities. **Portugal** reports that PE/HE curricular time was decreased in 2012. As a consequence, mandatory extra-curricular activities, including psychomotor activities, were promoted. As a result, almost all the elementary schools in Portugal (96.7%) have extra-curricular physical activities co-ordinated by the communities in co-operation with the schools.

Mixed approaches

Countries and jurisdictions like **Australia**, **Japan** and **Wales (United Kingdom)** combine within school and extra-curricular approaches to increase physical activity time. For instance, in **Japan**, the general curriculum regulation states that "each school should provide proper instruction on physical training and health promotion through all of the school's educational activities while considering the developmental stages of the students." This is stated in the elementary school, junior high school and high school curricula. Elementary school students in Japan have physical activities, e.g. long-distance running, jumping rope and physical exercise, every morning before or between classes. About 60-70% of junior high school students take part in school sports clubs at school, after school. About 40-50% of high school students take part in school sports clubs. Students play sports almost every day after school in these clubs.

There is no optimal approach for driving physical activity among students: context is crucial for fine-tuning approaches. However, some common policy considerations can be followed when defining approaches to ensure initiatives to drive physical activity are far-reaching. Data from the Programme for International Student Assessment (PISA) show that the share of disadvantaged students who report not engaging in moderate or vigorous physical activity outside of school is 4.5 percentage points higher than the share of advantaged students who reported doing so (OECD, 2017). Indeed, socio-economic background is often an important determinant of what activities students can access or how much time they have for doing so. In this sense, minding inequities in access to extra-curricular activities is important when designing approaches to drive physical activity among students.

Settings and facilities for physical education

Classroom settings

The proportion of intended instruction time in physical education delivered in a classroom setting is usually associated with inclusion of health-related content or assessment types in physical education. For instance, **Australia** indicates that while less than 20% of physical activity time is taught in the classroom, more than 50% of health content is classroom-based.

In more than half of participating countries and jurisdictions (61%), physical education at ISCED 1 is not taught in a classroom setting (**England [United Kingdom], Estonia, Hong Kong [China], Kazakhstan, Luxembourg, Norway, Portugal, Russia, Scotland [United Kingdom], Switzerland** and **Wales [United Kingdom]**) (Table 2.2). In a minority of cases (27%), less than 20% of instruction in physical education for ISCED 1 takes place in the classroom (**Australia, Chile, Japan, Korea** and **Turkey**).

When looking at ISCED 2, classroom settings become more common. More than half (62%) of participating countries and jurisdictions teach, at least part of PE/HE, in a classroom setting. On the other hand, physical education at ISCED 2 is taught outside of a classroom setting for seven countries and jurisdictions (**England [United Kingdom], Estonia, Hong Kong [China], Kazakhstan, Luxembourg, Russia** and **Scotland [United Kingdom]**).

Table 2.2. PE/HE teaching settings at ISCED 1 and ISCED 2

					PE/HE teaching settings		
		Physical education and health education separate school subjects	Health education embedded in multiple subjects (including but not limited to PE)	Health education mainly combined in the curriculum within physical education	PE/HE is not taught in a classroom	Less than 20% is taught in a classroom	20-50% is taught in a classroom
OECD country/jurisdiction	Australia	No	No	Yes*		ISCED 1 and ISCED 2	
	Chile	No	No	Yes		ISCED 1 and ISCED 2	
	England (United Kingdom)	No	Yes	No	ISCED 1 and ISCED 2		
	Estonia*	Yes	No	No	ISCED 1 and ISCED 2		
	Japan	No	No	Yes		ISCED 1	ISCED 2
	Korea	No	No	Yes		ISCED 1 and ISCED 2	
	Luxembourg	No	Yes	No	ISCED 1 and ISCED 2		
	Norway	No	Yes	No	ISCED 1	ISCED 2	
	Ontario (Canada)	No	No	Yes			
	Portugal	No	Yes	No	ISCED 1	ISCED 2	
	Scotland (United Kingdom)	No	No	No	ISCED 1 and ISCED 2		
	Switzerland	No	Yes	No	ISCED1		
	Turkey	No	Yes	No		ISCED 1 and ISCED 2	
	Wales (United Kingdom)	No	No	Yes	ISCED 1	ISCED 2	
Partner country/jurisdiction	China	No	No	Yes			ISCED 1 and ISCED 2
	Hong Kong (China)	No	Yes	No	ISCED 1 and ISCED 2		
	Kazakhstan	No	Yes	No	ISCED 1 and ISCED 2		
	Russian Federation	No	Yes	No	ISCED 1 and ISCED 2		

Notes: No data available for Ontario (Canada). Switzerland settings apply to ISCED 1 only. Country and jurisdiction projections of classroom-based instruction time in physical education may reflect anecdotal and anticipated data.
Source: Education 2030 International Comparative Review of Physical Education questionnaire (2018), Curr. 2.6.

Facilities

School facilities are the most typical setting for PE/HE and extra-curricular activities in countries and jurisdictions. Within school systems, the use of community facilities may vary depending on school location, and the availability of local and community resources. Use of community facilities is particularly prevalent for specialist and outdoor activities, such as swimming, ice skating and climbing. For instance:

- In **Switzerland**, community facilities are typical for physical education at ISCED 1 (there is no national curriculum for physical education at ISCED 2 in Switzerland).
- Only **Australia, Kazakhstan** and **Scotland (United Kingdom)** report that school facilities are usually made available for extra-curricular physical activities.

Assessment policies and practices in physical education

Assessment approaches for different purposes

Participating countries and jurisdictions report different approaches to the use of assessments, which can be classified in three main categories:

- **Assessment of learning or summative assessment** typically evaluates student learning at the end of an instructional unit and is expressed as a grade. Countries and jurisdictions usually give different uses to grades assigned in PE/HE. For instance, **Norway** uses PE/HE grades for external qualifications such as access to higher education, whereas grades in other countries are used only internally (**Australia, England [United Kingdom], Estonia, Korea, Luxembourg, Ontario [Canada], Russia** and **Wales [United Kingdom]**).
- **Assessment for learning or formative assessment** monitors student learning to provide ongoing feedback that can be used by instructors to improve their teaching, and by students to improve their learning. Typically formative assessment are leveraged to help students attain defined competencies. These assessments are usually implemented alongside competency-based curricula to help the student navigate in the direction of the expected outcome, with the help of formative assessment, self-regulation and meta-cognition.
- **Assessment as learning** occurs when students are in charge of assessing their own performance. In this approach, students monitor their own learning, ask questions and reflect on what they know and how can they use this assessment for expanding their learning.

The literature on different approaches to assessments is related to the shift in emphasis from teaching to student learning. In the context of PE/HE, the discussion has recently focused on the redesign of traditional assessments, which usually include physical fitness tests and subjective assessment criteria such as grading students' effort. Instead, López-Pastor (2013) proposes instruments that "involve students in actively solving realistic problems through the application of new information, prior knowledge and relevant skills."

As new learning goals are integrated into PE/HE curricula, assessments need to be adapted accordingly to avoid sending contradictory signals. That is, as curricula incorporate criteria-based and goal-oriented concepts, assessments could look beyond physical activity, competition and sport tests, which are reported by many countries. As a result, developing meaningful and robust classroom-level assessments of student learning in PE/HE, especially in terms of students' social, emotional and personal competencies, has been identified as a research and reform priority in some countries and jurisdictions (López-Pastor, 2013). To this end, clear and concrete illustrations, descriptions and examples of the type of learning that should be achieved, together with criteria to assess performance, can provide important support (OECD, 2017).

Assessment methods

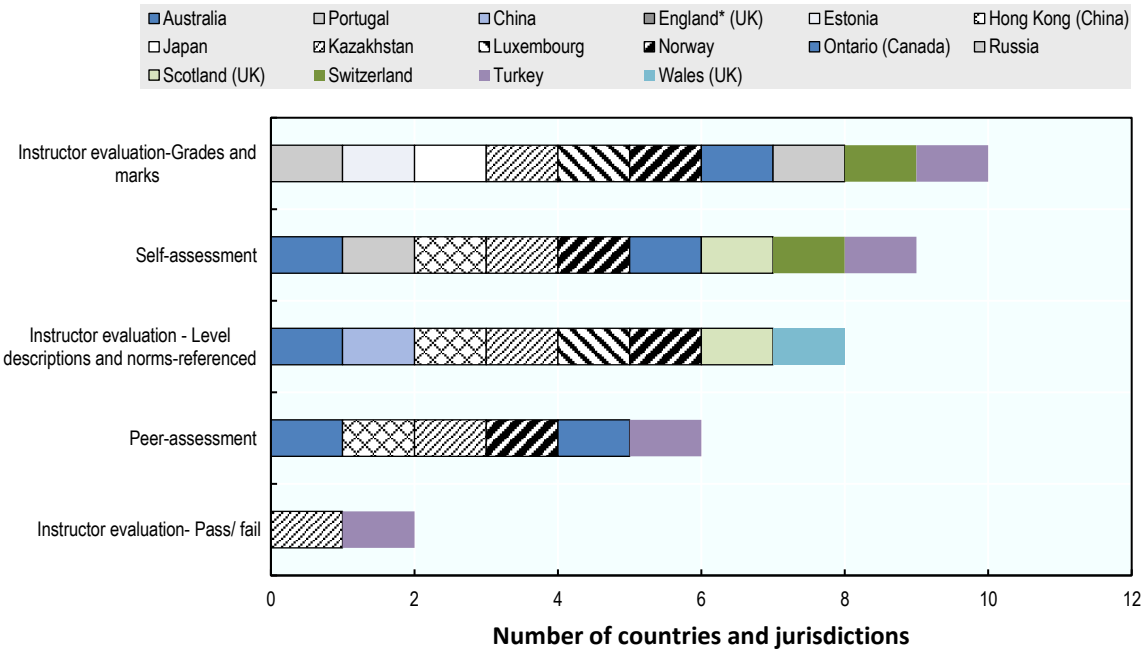
Countries also adopt different methodologies for assessment (see **Error! Reference source not found.**). Most countries and jurisdictions use a combination of the following:

- Grades and marks by instructors: More than half of participating countries and jurisdictions (61%) award students with grades and marks in PE. In **Japan, Korea** and **Russia**, grades and marks are the only form of student assessment in physical

education. Only **Chile** focuses on pass or fail assessments in PE, whereas **Turkey** complements this kind of assessment with others. **Russia** emphasises physical performance of its students, with a grade-scale ranging from 2 (lowest) to 5 (highest) (as assessed by teachers). In theory, failure to pass PE/HE as a result of bad performance in these assessments could prevent further study, as is the case with other subjects. This is not an extended approach, however.

- Self-assessment: Assigning agency to students for self-evaluation as a means for learning, it is increasingly used by a number of countries to complement traditional, instructor-led training (**Australia, Hong Kong [China], Norway, Ontario [Canada], Portugal, Scotland [United Kingdom], Switzerland** and **Turkey**).
- Level descriptions or norm-referenced assessment by instructor: Six countries/jurisdictions (33%) report using instructor-led assessments where students are evaluated against reference levels. In the case of **Wales (United Kingdom)**, the focus is primarily on this kind of assessment. For instance, during ISCED 1, rather than using grades, the national curriculum establishes three levels (bronze, silver and gold), followed by levels one to six. Each level has statements that are assessed at the end of the key stage, and there are outcome statements at the end of the Foundation Phase. These outcome statements are descriptive in nature and are intended to enable teachers to assess pupils' physical development at the end of four years in the Foundation Phase setting. Guidance materials support the assessment of pupils, which is a "best fit" to a level description. The majority of pupils would be expected to be at Level 4-5 leaving the Foundation Phase (at the age of approximately 7 years). **Scotland (United Kingdom)** has benchmarks which determine what learners should 'know' and be able to do from age 3 – 15.
- Peer assessment: In fashion similar to self-assessments, peer assessments move agency for evaluation to students with the objective of making assessments a means for learning. All countries and jurisdictions that report engaging in self-assessment also make use of peer assessments, with the exception of **Portugal** and **Switzerland**.

Figure 2.4. Rating systems used by teachers to assess students' performance in physical education



Notes: *In England (United Kingdom), assessment is decided at the school level. In Luxembourg, grades and marks guidelines apply to ISCED 2 only. In Portugal, summative and self-evaluations apply at ISCED 2 only. Scotland (United Kingdom) reports using formative assessment only.
Source: Education 2030 International Comparative Review of Physical Education questionnaire (2018), Curr. 2.12.

Workforce development, qualifications, and teacher support in physical education

The extent of teacher and school staff knowledge of physical and health education, and therefore their ability to develop and implement physical and health education curricula that incorporates relevant and up-to-date content is an important topic for all countries and jurisdictions in this study.

Workforce development and qualifications in physical education

A minimum level of qualification or training required to teach a subject at a given ISCED level is defined as the minimum duration and type of training required for entry into the profession. This definition does not include any further licensure or ongoing professional learning requirements.

All participating systems set a minimum level of qualification to teach physical and health education at ISCED 1 and ISCED 2 (Table 2.3). The minimum level of qualification varies by country, however:

- Teachers typically require a bachelor's degree or equivalent (ISCED 6) to teach the subject at ISCED 1 and 2.

- Some countries and jurisdictions require teachers at ISCED 2 to have a higher minimum level of qualification than teachers at ISCED 1. **England (United Kingdom)**, **Luxembourg**, **Portugal** and **Switzerland**, for instance, require ISCED 2 teachers to have a master's degree (ISCED 7), and ISCED 1 teachers to have a bachelor's (ISCED 6).
- **Estonia** and **Norway** have the highest overall minimum level of qualification, requiring all teachers of physical education (ISCED 1 and ISCED 2) to have a master's degree (ISCED 7). This will come into force in **Norway** from 2020 onwards.
- **Chile** and **Russia** have the lowest minimum level of qualification among participating countries and jurisdictions, requiring teachers of the subject at both levels to have an upper secondary (ISCED 3) and post-secondary, non-tertiary (ISCED 4) qualification respectively.

Table 2.3. What is the minimum type of qualification (ISCED 2011) required to become a physical education teacher?

Required teaching qualifications	Countries and jurisdictions
ISCED 3 (Upper secondary)	Chile
ISCED 4 (Post-secondary non-tertiary)	Russia
ISCED 6 (Bachelor's)	Australia; China; England (United Kingdom) (ISCED 1); Hong Kong (China); Kazakhstan; Korea; Luxembourg (ISCED 1); Ontario (Canada); Portugal (ISCED 1); Scotland (United Kingdom); Switzerland; Wales (United Kingdom)
ISCED 7 (Master's)	England (United Kingdom) (ISCED 2); Estonia; Luxembourg (ISCED 2); Norway; Portugal (ISCED 2); Switzerland (ISCED 2)

Source: Education 2030 International Comparative Review of Physical Education questionnaire (2018), Curr. 2.14.

In this context, the supply of qualified teachers is an often reported challenge. Countries and jurisdictions report difficulties with recruiting and retaining enough qualified teachers, especially as new concepts of health education enter the curricula. Three recurring points are evoked:

- Physical education teachers – whether specialists or generalists – are typically expected to teach health education, regardless of the curriculum model (health education and physical education as combined or separate subjects). Specialist health teachers are notably rare, as health education is a newer subject and is not mandatory for most systems unless combined with physical education.
- Teachers of physical and health education at ISCED 1 tend to be generalist teachers, i.e. teachers do not have a specialist qualification in physical and health education. As a result, there are concerns about the lack of specialist physical and health education teachers at ISCED 1 in particular (**Australia, Luxembourg**, and **Norway**).
- Countries and jurisdictions also report instances where schools or local education authorities hire non-teachers, i.e. coaches, physical education instructors without teacher qualifications, to teach physical education (**China**, **Luxembourg** and **Wales [United Kingdom]**).

Curricular resources to support teacher autonomy

Teachers usually employ their professional judgement to make decisions on lesson design, scope and sequencing; instructional strategies; and student assessment in physical and health education. In this sense, a key policy decision is the degree to which teachers are given the opportunity to exercise agency by providing them with increased autonomy over curriculum development and implementation.

A curriculum may include diverse support and resources designed to aid implementation at the school and/or system level. These curricular resources may include, for instance:

- implementation guidelines targeting different levels of the school system, such as schools and school boards, districts or regions, state or provincial authorities and central authorities/departments
- instruction guidelines for teachers, in the form of lesson plans, programming planning, and assessment guidelines, to name a few
- achievement criteria against which teachers can assess student performance and progress in the subject/learning area.

The inclusion and breadth/scope of curricular resources for implementation, instruction and student assessment vary between countries and jurisdictions (Figure 2.5):

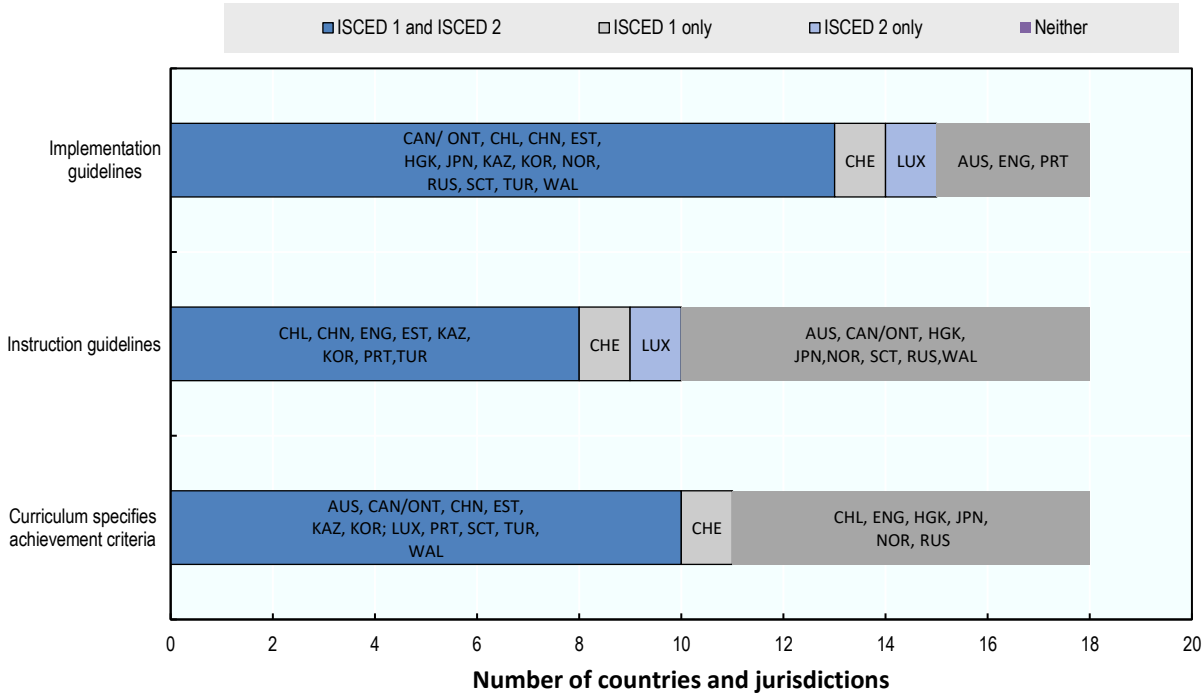
- The majority of participating countries and jurisdictions (83%), for example, includes some form of implementation guidelines (Switzerland for ISCED 1 only and Luxembourg for ISCED 2 only).
- Just over half (55%) of participating countries and jurisdictions also specify how the subject should be taught in schools, i.e. through instruction guidelines for teachers (Switzerland for ISCED 1 only, and Luxembourg for ISCED 2 only).
- In two-thirds (67%) of countries and jurisdictions, the physical education curriculum specifies achievement criteria against which teachers can judge students' performance in physical and health education (Switzerland for ISCED 1 only). Achievement criteria may be referred to as *achievement standards* or *standards* (**Australia**), *learning outcomes* (**Estonia, Kazakhstan**), *learning goals* (**Portugal**) and *level descriptions* (**Wales [United Kingdom]**).

Countries and jurisdictions in which the curriculum includes instruction guidelines report providing, for instance: general or prescriptive recommendations for student goals and important knowledge (**China**, **Estonia**); subject plans, including teaching strategies, best practices and assessment criteria (**Kazakhstan**); pedagogical concepts (**Luxembourg**); implementation/instruction guidelines (**Turkey**); and requirements regarding instruction for male and female students (**Estonia**).

In these cases, the inclusion of instruction guidelines does not necessarily preclude teacher autonomy or professional judgement. For instance, teachers have autonomy over 20-25% of the physical education curriculum in **Estonia**, despite the curriculum prescribing mandatory topics/content and instruction guidelines. In other cases, curriculum documents and resources may provide loose principles for learning and teaching in physical education that do not strictly constitute instruction guidelines for teachers (**Hong Kong, China**).

Figure 2.5. Implementation and instruction guidelines provided for PE/HE curriculum

Does the curriculum in physical education provide some guidance for implementation? Does the curriculum specify how physical education should be taught in schools (i.e. guidelines for teachers)?



Source: Education 2030 International Comparative Review of Physical Education questionnaire (2018), Curr. 2.4, 2.5 School and teacher autonomy.

Policies for ensuring student safety

Student safety within schools

There are a series of risks attached to PE/HE, especially in relation to physical activity, if the safety of students is not kept in mind at all times. Participating countries and jurisdictions showed a general concern about student injuries and in some cases, even fatalities incurred during physical education lessons, extra-curricular physical activities and sports. Particularly in countries with a focus on competitive sports in physical education (**England [United Kingdom]** and **Russia**), injuries are reported to influence student motivation, participation and learning outcomes.

This phenomenon is well documented in the literature. Kirk (2009) reports that PE/HE is subject to historical trajectories influenced by military drills, sports, and exercise physiology that can put students at physical risk. These physical risks, if unaddressed, can have impacts on students' health and other aspects, like motivation, participation or learning outcomes in PE/HE. Some initiatives that countries and jurisdictions have put in place, or are considering, to ensure student safety include:

- Reforming in-service teacher training programs, especially in countries where non-teachers can be in charge of PE/HE when qualified teachers are not available (**China, Luxembourg** and **Wales [United Kingdom]**).
- Establishing standards for playground or gym equipment. **Estonia** reports a collaborative project between the Institute of Sport Science and Physiotherapy and the Estonian Association of Architects to develop schoolyard facilities that are more suitable for physical activities since many existing schoolyards are not suitable for outdoor activities.

In **Russia**, schools in Moscow address these problems by having a teacher performance indicator related to the number of students' injuries.

Student safety outside of the classroom

Recent studies show that injury-related categories like drowning or falls are increasingly common causes of death for children and young people aged 5 to 15 outside schools (World Health Organization, 2015). Similarly, problems like violence against children are increasingly posing threats for student health within and outside schools. To promote student safety outside schools, some countries and jurisdictions are including innovative content within PE/HE, including:

- Ensuring early detection and effective treatment of mental disorders, particularly depression and alcohol disorders (**Ontario [Canada]**).
- Providing information to minimise violence against children. In this way, the curriculum of **Ontario (Canada)** provides information to students on topics like consent; online safety, including the risks of sexting; healthy eating; mental health and concussions.
- Promoting swimming, water safety and safe rescue, an initiative that is attracting special attention in different countries **(Australia**, **Korea**, **Norway** and **Portugal**). For instance, after a period of reported concerns that only 50% of 10-year-old students could swim and do lifesaving, **Norway** launched a new curriculum for swimming and water safety called the "swim package" in 2017. This was a joint initiative involving the Ministry of Education and Research, specialists in higher education, PE/HE teachers, swimming clubs and other non-education stakeholders. Similarly, **Portugal** included a mandatory programme of water competence and safety in elementary education under the PE/HE curriculum, which was encouraged by several non-governmental institutions.

Notes

1. Cantons in Switzerland have autonomy over curriculum development.
2. Instruction time can be reported in different units. Most countries and jurisdictions report required instruction time through the total number of hours required per grade, per year. For the purpose of curriculum comparison, the required instruction time of participating countries and jurisdictions has therefore been converted into hours per ISCED level per year.

References

Kirk, D. (2009), *Physical Education Futures*, Routledge, London, https://doi.org/10.4324/9780203874622.

OECD (2017), *PISA 2015 Results (Volume III): Students' Well-Being*, OECD Publishing, Paris, https://doi.org/10.1787/9789264273856-en.

OECD (2016), *Education at a Glance 2016: OECD Indicators*, OECD Publishing, Paris, https://doi.org/10.1787/eag-2016-en.

López-Pastor, V.M. et al. (2013), "Alternative assessment in physical education: A review of international literature", *Sport, Education and Society*, 18(1), 57-76.

World Health Organization (2015), *Injuries and violence: The facts 2014*, WHO, Geneva, http://apps.who.int/iris/bitstream/10665/149798/1/9789241508018_eng.pdf?ua=1&ua=1&ua=1.

World Health Organization (2008), *School Policy Framework: Implementation of the WHO Global Strategy on Diet, Physical Activity and Health*, WHO, Geneva, https://apps.who.int/iris/handle/10665/43923.

Chapter 3. The education goals of physical and health education and why these matter

This chapter examines the available research evidence on the relationships between physical education, physical activity and a range of student developmental outcomes, including: physical outcomes; social outcomes; cognitive outcomes; psychological and affective outcomes; and lifestyle and health outcomes. The chapter concludes with an identification of key gaps in the evidence and suggests areas for development to advance our understanding of this important curriculum area.

Introduction

A healthy mind and body are central to the core foundations in the OECD Learning Compass 2030 as they provide the building blocks for developing the competencies that students will need to navigate the world of tomorrow (OECD, 2018). In this sense, physical education and health education (PE/HE) is considered a core component of a whole school approach to promoting the well-being needs of the whole child. Its effects have been shown to extend beyond physical fitness: it has the potential to shape students' current and future mental health, as well as influence cognitive and social outcomes.

The broader goals of physical and health education curricula

The main goals or intended student outcomes, commonly set in physical and health education curricula, include the following, in the order of the frequency cited by participating countries and jurisdictions (Figure 3.1).

- physical outcomes and physical health (18/18)
- psychological and affective outcomes and mental health (16/18, except **Estonia** and **Russia**)
- social outcomes (16/18, except **Ontario [Canada]** and **Russia**)
- cognitive outcomes (15/18, except **Hong Kong [China]**, **Russia** and **Turkey**)
- lifestyle outcomes (18/18)

Existing research, as will be explored in this chapter, suggests the impacts of physical education on some of these outcomes.

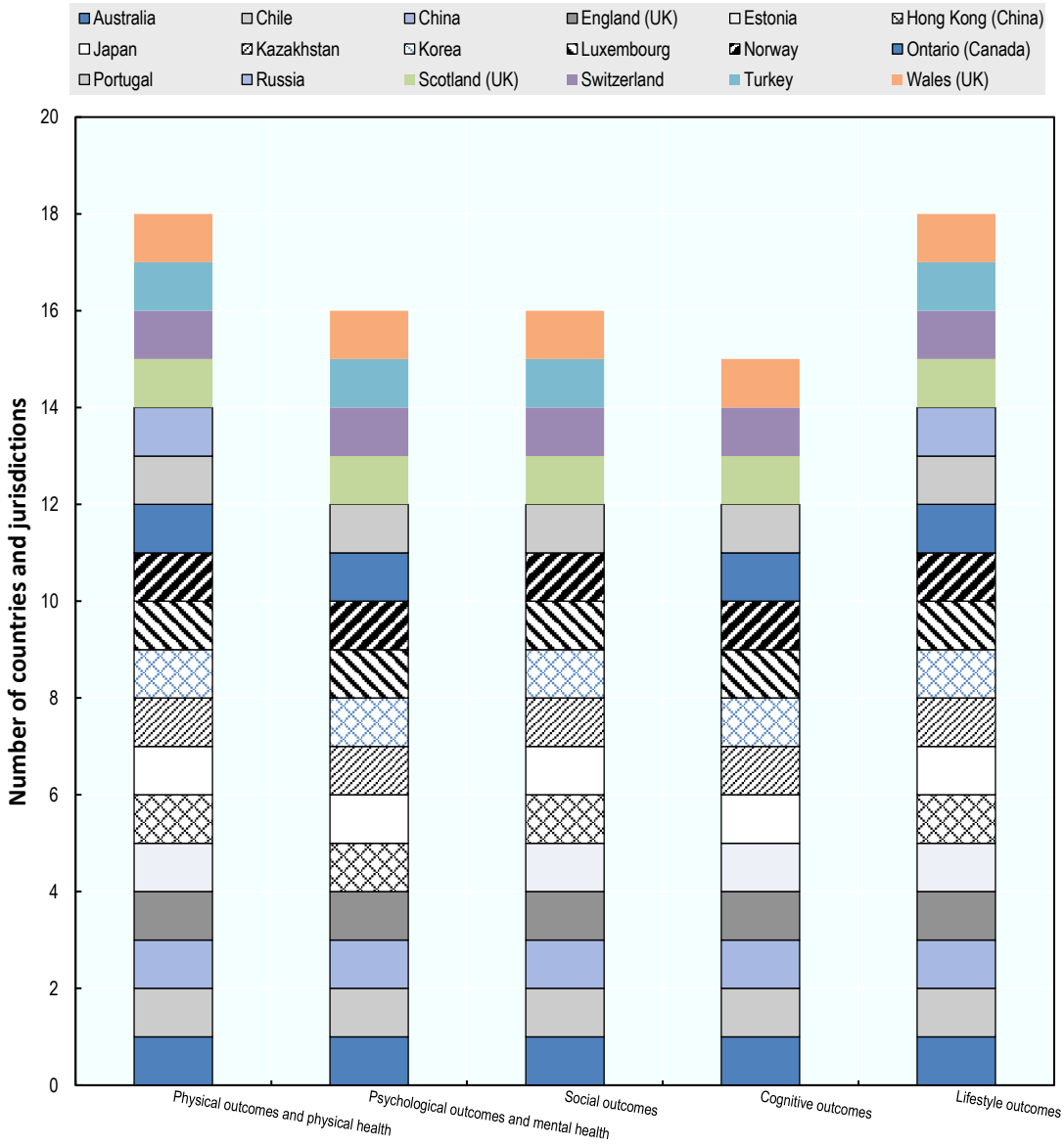
Physical outcomes and physical health

The number of overweight or obese children and adolescents around the world has been increasing over the past few decades, particularly in developed countries (Lobstein et al., 2014). More broadly, non-communicable diseases are on the rise among children and young adults, which is particularly troubling, as these have historically been categorised as adult diseases (Van Buren and Tibbs, 2014). In many countries, rising sedentarism is at the core of this worrying trend (Bauman et al., 2012).

To contain this phenomenon, the World Health Organization (WHO) recommends that children aged 5 to 17 do at least 60 minutes of moderate to vigorous[1] physical activity each day to maximise positive outcomes associated with physical activity (WHO, 2015). However, research shows that participation in structured physical activities in general is declining and that participation in physical education within schools has declined from 1993 to 2013 (Bassett et al., 2015; Booth, Rowlands and Dollman, 2015).

Schools can play a role in helping children develop an active lifestyle and can contribute to the overall physical activity level they achieve each week because school has the most continuous and intensive contact with children of any single institution for the first 20 years of their lives (Story, Kaphingst and French, 2006). Physical education (PE) can also provide students with information, skills and tools to enjoy lifelong, healthier lives. The OECD Future of Education and Skills 2030 project has defined "physical literacy" for 2030. While the scope of the physical literacy itself is defined focusing on physical activities, the intended outcomes of the literacy are broadly defined, i.e. a healthy and active life.[2]

Figure 3.1. Main goals of the national physical and health education curriculum in participating countries and jurisdictions



Source: Education 2030 International Comparative Review of Physical Education questionnaire (2018).

What the research says about the kinds of physical outcomes and physical health returns that can be enhanced through physical education

Becoming more "physically active" in, outside, and beyond school

Research shows that children are more physically active on the days they attend PE classes at school than days they do not (Meyer et al., 2013). Thus, increased physical activity is one of the main avenues through which physical education impacts physical outcomes.

Clearly, students can engage in physical activity on different occasions during the day, like recess. However, physical education classes are one of the few opportunities that students have to practice physical activities with qualified supervision, on a regular basis, with

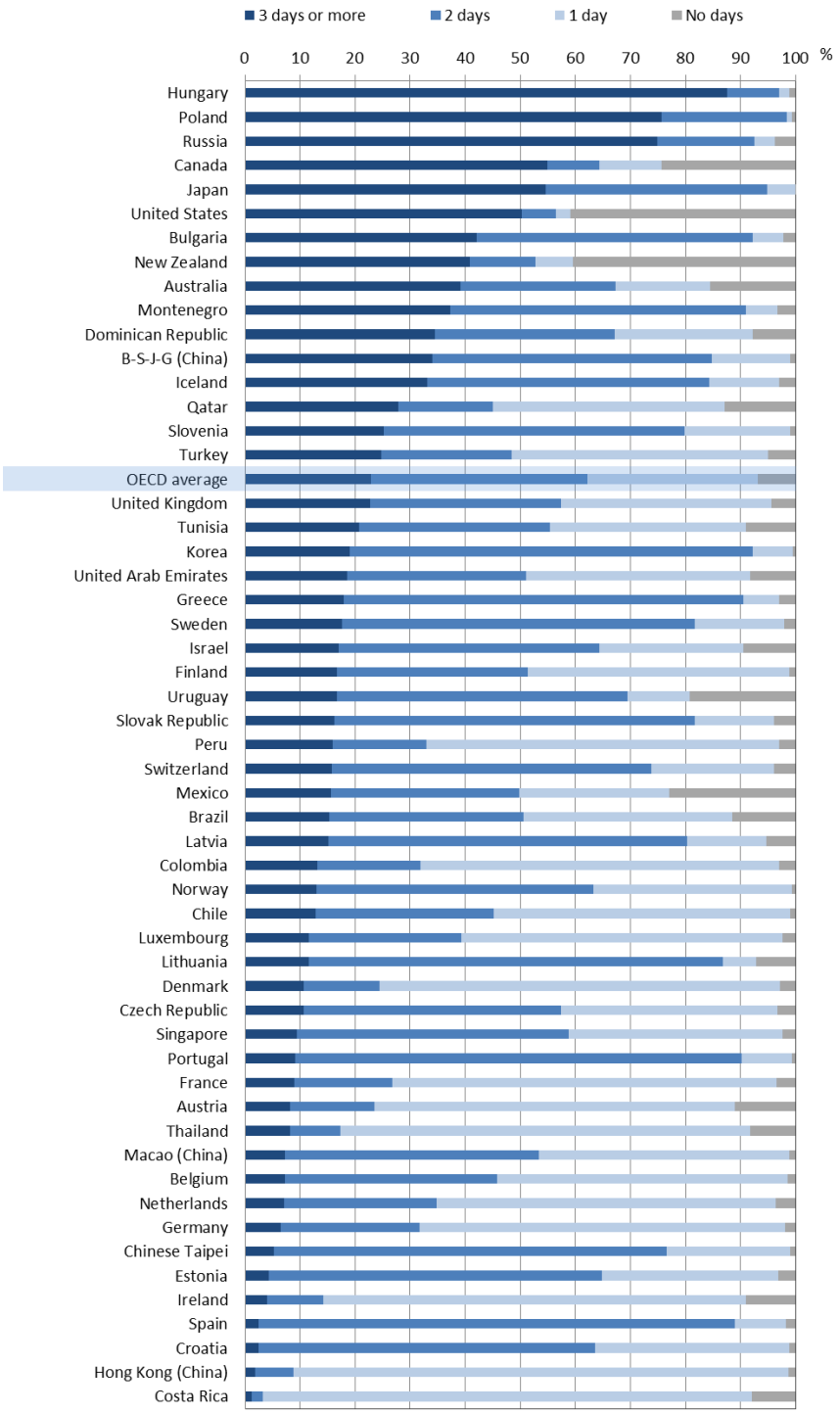
certain intensity, if designed, etc. in a structured way. In this context, the role of physical education in promoting physical activity among students appears particularly relevant. For example, for 5.7% of boys and 7.5% of girls of 15-year-old students, school is their only source of physical activity each week (OECD, 2017) (Figure 3.3). Thus, PE curriculum can ensure an optimal development of physical outcomes while ensuring student safety through the supervision of a qualified professional.

In the majority of countries and economies participating in the Programme for International Student Assessment (PISA) 2015, most 15-year-olds participate in at least one PE class per week (OECD, 2017) (Figure 3.2). On average across OECD countries, students who participate in at least two PE classes at school exercise moderately about 0.5 days per week more than students who do not take PE classes. In some countries, the difference between these two groups was equal to or greater than one day per week.

PISA 2015 also found that students who take physical education classes at school are significantly more active outside of school (OECD, 2017) (Figure 3.4). This confirms previous research evidence indicating that participating in physical activities at school is associated with valuing sports more (Cook and Kohl, 2013), and being engaged in physical activities outside school, both during childhood and later in life (Okely, Booth and Patterson, 2001). Thus, the role of schools in promoting physical activity is further justified by a growing body of evidence indicating that participation in physical activities – and therefore the fitness and health benefits associated with physical activity – declines during adolescence (Duncan et al., 2007; OECD, 2017). The impacts of physical education might extend beyond school age.

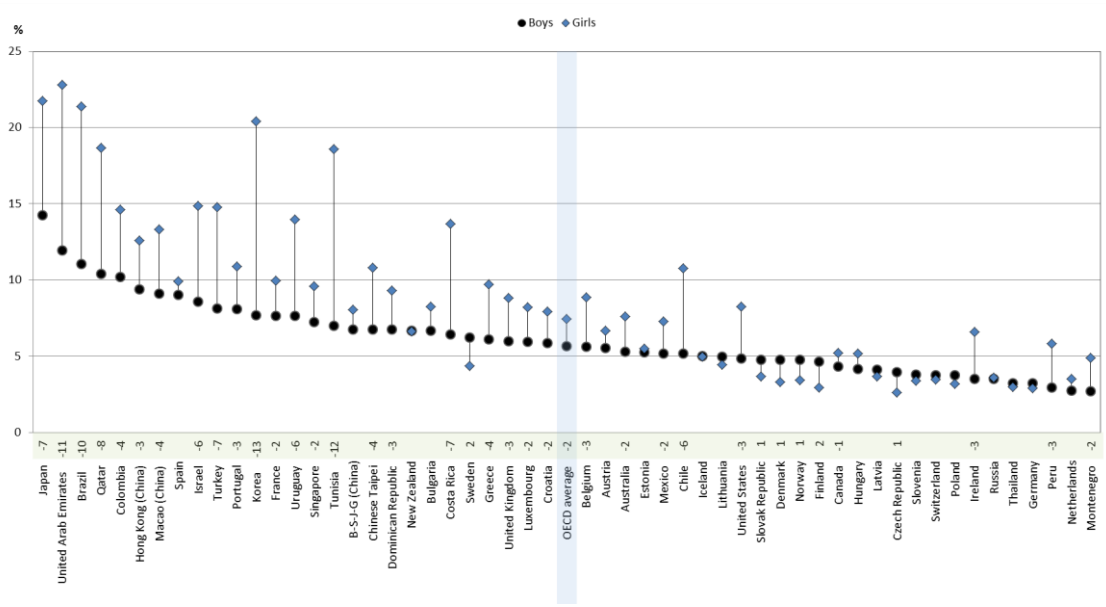
Figure 3.2. Physical education at school (PISA 2015)

Number of days per week students reported that they attend physical education classes



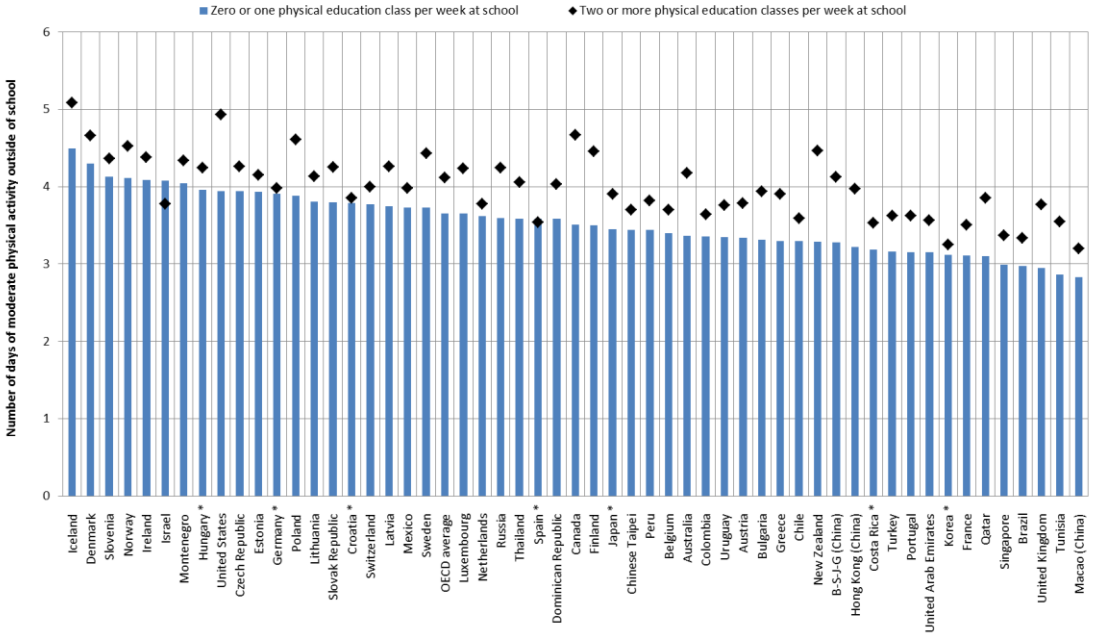
Note: Countries and economies are ranked in descending order of the percentage of students who reported that they attend physical education classes at least three days a week.
Source: OECD, *PISA 2015 Database*, Table III.11.1.

Figure 3.3. Percentage of students who reported that they do not practice any vigorous or moderate physical activity outside of school



Note: Statistically significant differences between boys and girls are shown next to the country/economy name.
Source: OECD, *PISA 2015 Database*, Table III.11.10.

Figure 3.4. Physical activities, in and outside of school (PISA 2015)



Note: Differences in the number of days of moderate physical activities that are not statistically significant are marked with an asterisk next to the country/economy name.
Source: OECD, *PISA 2015 Database*, Table III.11.17.

Reduced non-communicable diseases

The physical benefits of physical activity for children and young people are well established in the research literature. Regular engagement in physical activities underpins overall metabolic and physical health and well-being and can provide the foundations for higher levels of fitness (Dietz, 1998; Roblin, 2007; WHO, 2016) .

Robust evidence exists that supports the positive effects of physical activity on cardiovascular, metabolic and musculoskeletal health outcomes (Felez-Nobrega et al., 2017; WHO, 2008). Harmful effects of not engaging in physical activity have been shown. Inadequate physical activity is found to be one of the four main risk factors associated with non-communicable diseases in children, young people and adults, including cardiovascular diseases, chronic respiratory diseases, cancer and diabetes (Granger, 2017).

Better equity for disadvantaged students and girls

The share of disadvantaged students who reported not engaging in moderate or vigorous physical activity outside of school is 4.5 percentage points higher than the share of advantaged students who reported doing so (OECD, 2017). For many of these students, physical education presents the only opportunity to engage in supervised, structured physical activity.

Though physical education can help reduce inequalities in engagement with physical activity, we cannot assume, however, that the benefits will automatically reach everyone. Observational studies have repeatedly found, for instance, differences between girls' and boys' engagement in moderate to vigorous physical activity during PE classes. Boys are more frequently recorded being involved in moderate to vigorous physical activity, and of having more physical activities than girls (Froberg et al., 2017; McKenzie et al., 2006; Smith, Lounsbery and McKenzie, 2014; Viciana et al., 2017; Webber et al., 2008).

With this in mind, research shows that the choice of activities that make up PE curricula is vital for driving inclusiveness. For example, the most significant divergence in participation between male and female students is reported in instances in which PE lesson content focuses on ball games. This observation presents a challenge for gender equality and inclusiveness in physical education because ball games have been reported to be the most prevalent content in many physical education curricula (Froberg et al., 2017; Viciana et al., 2017).

Do countries and jurisdictions target these outcomes as the main goals in their curriculum?

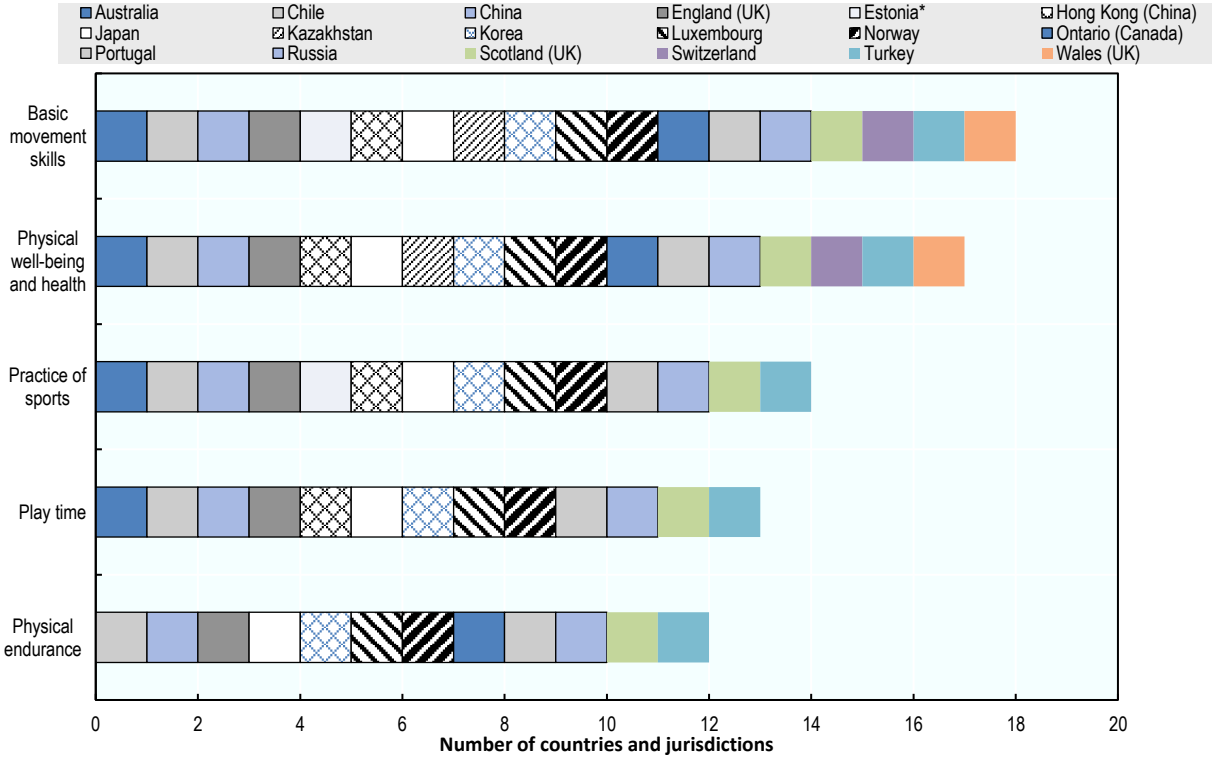
The types of and the scope of "physical outcomes" covered in the curriculum may vary. The most common approach is to promote basic movement skills (100%), followed by physical well-being and health (94%), practice of sports (78%) play time (72%), and physical endurance[3] (67%) (Figure 3.5).

Physical outcomes are widely covered by countries relative to other types of outcomes. It is worth noting that "play time" is included within country responses together with other physical outcomes, suggesting the recognition among policymakers of the importance of securing a certain amount of '(physical) play time' within PE/HE classes. Yet, this is not

[3] The ability to remain physically active for an extended period of time, despite fatigue or exhaustion

necessarily true outside of the time allocated to PE/HE, with reports of lunch time or recess time being shortened at the school level in many places, a trend reported by OECD Education 2030 project's student representatives' group.

Figure 3.5. Types of physical outcomes physical education explicitly promotes in participating countries and jurisdictions



Note: Australia reports basic movement skills and play time for ISCED 1 only, and practice of sports from Grade 3 onwards, including ISCED 2. In Estonia, basic movement skills will be the focus of the revised physical education curriculum.
Source: Education 2030 International Comparative Review of Physical Education questionnaire (2018), Curr1.4a. A.

Psychological and affective outcomes and mental health

Psychological well-being refers to students' overall sense of purpose and satisfaction in lives, their self-awareness, affective states, and broader emotional strength and resilience in the face of adversity. Self-esteem, motivation, resilience, self-efficacy, hope and optimism are some of the key outcomes that affect psychological well-being. On the other hand, adverse factors like stress, depression, and distorted views of self are normally seen as adverse factors for psychological well-being.

Mental illness is increasingly being recognised as "the most significant health concern for children and adolescents in developed countries" (Suhrcke, Pillas and Selai, 2008). It is estimated that between 10% to 20% of children and adolescents worldwide over recent decades suffer from mental health issues, while an increasing number also reports experiencing anxiety or difficulties sleeping (Patalay et al., 2016; Pez et al., 2013; OECD, 2017). In this context, understanding how physical education can shape psychological outcomes seems key.

What the research says about the kinds of psychological and affective outcomes that can be enhanced through physical education

Enhanced self-esteem, self-efficacy, and resilience as mediating factors for the negative impact of stress

Looking at physical activity in particular, where most research on physical education has traditionally focused, positive links have been shown with self-esteem, self-efficacy and resilience (Haugen, Safvenbom and Ommundsen , 2011; McPhie and Rawana, 2015). These outcomes play a vital role in youth well-being by mediating the relations between stress and psychological adjustment (Haine et al., 2003). Young people with higher self-esteem, for instance, have greater behavioural resilience (Dumont and Provost, 1999), as well as increased capacity to manage behavioural problems and interpersonal relationships; they are also at lower risk for depression (Harper and Marshall, 1991; Baumeister et al., 2003; Rieger et al., 2016).

Higher life satisfaction with moderate physical activity

PISA 2015 found a positive association between physical activity and overall life satisfaction. Students who exercised three or more days a week reported higher life satisfaction than those who did not exercise outside of school (OECD, 2017) (Figure 3.6).

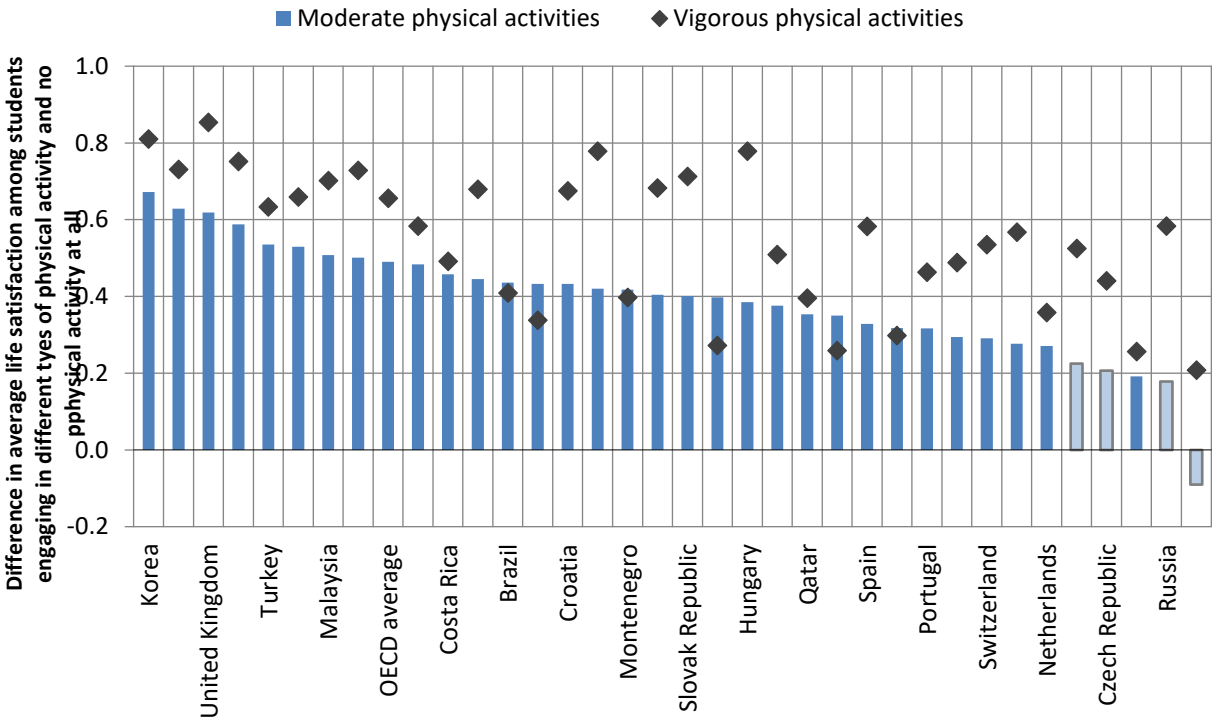
Reduced incidence of mild to moderate depressive symptoms and anxiety

Evidence on the effects of physical education on more severe conditions of psychological health is also strong. Most evidence in this area focuses on physical activity, however; greater evidence is needed on other pathways. Multiple studies report an association between physical activity and reduced incidence of mild to moderate depressive symptoms and anxiety (Birkeland, Torsheim and Wold 2009; Doré et al., 2016; Jang, So and Choi, 2017; McPhie and Rawana, 2015; Moljord et al., 2014; Raudsepp and Neissaar, 2012; Stavrakakis et al., 2012; Taliaferro et al., 2008).

Depression is an umbrella term for a cluster of conditions. Stavrakakis et al. (2012) distinguish between affective symptoms (such as depressed mood, loss of pleasure and low self-worth) and somatic symptoms (sleep disturbances, eating problems and lack of energy). They found a statistically significant relationship between affective symptoms and physical activity, but not between somatic symptoms and physical activity. It is not clear why this is the case.

Figure 3.6. Physical activity and student life satisfaction (PISA 2015)

Difference in average life satisfaction between students who engage in three or more days of moderate to vigorous physical activity per week and those who engage in no physical activity



Note: All differences in life satisfaction relative to engaging in vigorous physical activities are statistically significant. Statistically significant values for moderate physical activities are marked in a darker tone.
Source: OECD, *PISA 2015 Database*, Table III.11.16.

Team sports for better mental health, reduced sense of hopelessness, and suicide ideation

Physically active young people involved in team sports report better mental health than those engaged in individual activities (Farren et al., 2017). Being part of a sports team is associated with lower depressive symptoms, lower perceived stress, and better self-reported mental health in young people (Jewett et al., 2014), and is protective against feelings of hopelessness and risk of death by suicide in adolescents (Taliaferro et al., 2008). Physical activity in general also seems to reduce the sense of hopelessness and suicide ideation in adolescents (Jang, So and Choi, 2017; Taliaferro et al., 2008).

Do countries and jurisdictions target these outcomes as main goals in their curriculum?

Countries and jurisdictions promote diverse psychological and affective outcomes through physical education (Figure 3.7). Specifically speaking, results show that:

- Psychological well-being, broadly defined, is the most widely reported psychological and affective outcome of the physical education curriculum of participating systems, explicitly promoted by 13 countries and jurisdictions (77%).

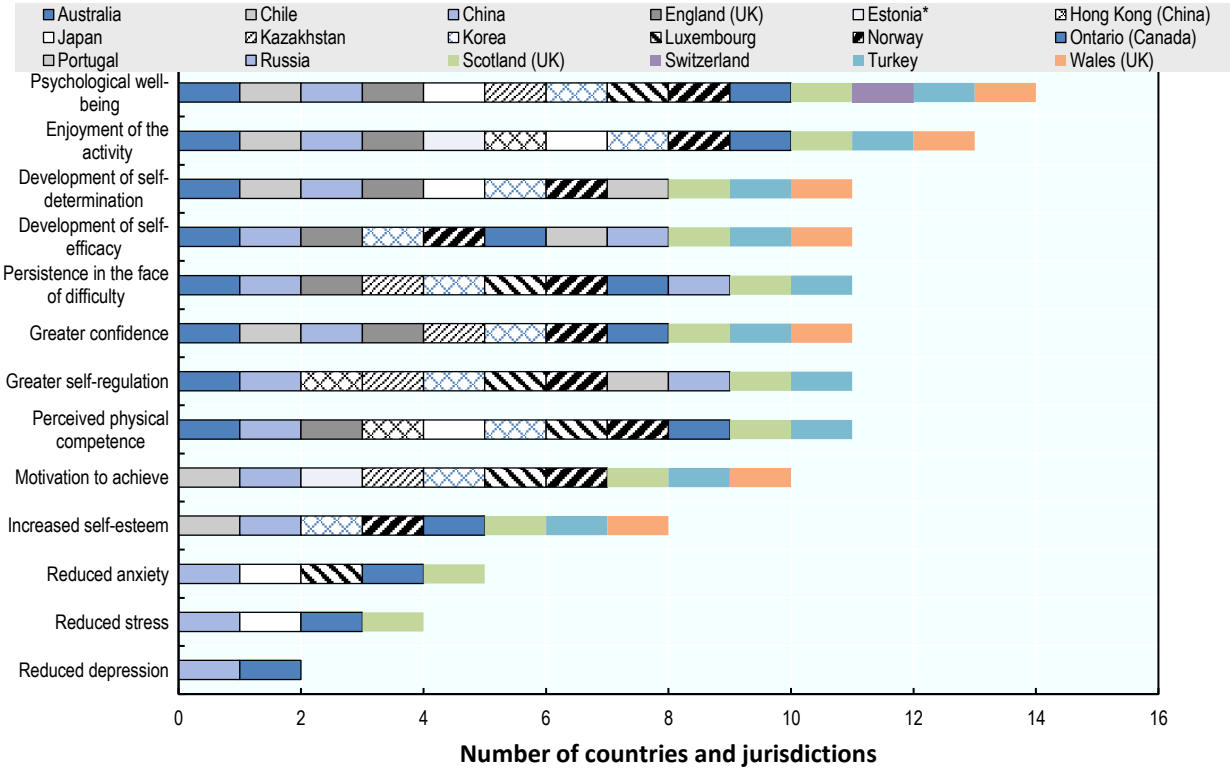
- Most countries also target more specific psychological outcomes, but the selection is not systematic across countries. For example, 13 countries and jurisdictions (72%) explicitly promote student enjoyment of the activity, which is the second most widely promoted psychological and affective outcome of health and physical education. Development of self-determination and self-efficacy, persistence in the face of difficulty, greater confidence and self-regulation, and perceived physical competence are each reported by 11 countries and jurisdictions respectively (61%).
- A smaller sub-set of countries and jurisdictions explicitly target mental health conditions with outcomes like promoting reduced anxiety, reduced stress and/or reduced depression (**China**, **Japan**, **Luxembourg**, **Ontario [Canada], Scotland [United Kingdom]**).

Social outcomes

Social skills encompass a broad set of behaviours "that are essential for effective face-to-face communication between individuals" (McGuire and Priestley, 1981). This includes, for instance, co-operation, relationships with others, showing respect for teachers and neighbours, reduced social anxiety, social functioning, social interaction and integration, fair play, social connectedness and teamwork.

These social skills are central for children and young people to successfully operate in a community setting, including at schools, clubs and societies, as well as within families and among friends. Nurturing them is crucial for promoting students' social well-being, which encompasses the quality of relationships both inside and outside of school, including with teachers, friends and family, as well as students' feelings about their social life both inside and outside of school (Pollard and Lee, 2003). Social skills are usually measured through a number of different outcomes, including trust, empathy, a sense of community and co-operation (Dyson and Casey, 2012).

Figure 3.7. Types of psychological and affective outcomes physical education explicitly promotes in participating countries and jurisdictions



Source: Education 2030 International Comparative Review of Physical Education questionnaire (2018), Curr1.4c.

What the research says about the kinds of social outcomes that can be enhanced through physical education

Socially-oriented activities for developing social skills

Research suggests that socially-oriented physical activities, such as team sports, are suitable for teaching social skills. Co-operative, rather than competitive, and student-focused teaching methods, rather than teacher-directed approaches, are almost support the development of social skills (Haugen, Safvenbom and Ommundsen, 2013; Macdonald-Wallis et al., 2011). The social and interactive nature of physical activity lends itself to the promotion of pro-social skills (Drewe, 2000).

These effects also seem to last over time. Some longitudinal evidence suggests that participation in team sports – specifically school teams – is associated with lower levels of social isolation later on in life, compared to other "pro-social" school-based activities such as the arts. The effects of team membership in this sense appear as important (Barber, Eccles and Stone, 2001).

Developing positive attitudes towards school, connectedness with peers and teachers, team building, responsibility, trust and empathy

Research suggests physical education helps students learn to:

- develop positive attitudes towards school, greater connectedness with other students and teachers and team building (Byrd and Ross, 1991; De la Haye et al., 2011; Macdonald-Wallis et al., 2011)
- build trust, a sense of teamwork and responsibility and instils appropriate sporting behaviours such as honesty (Gutiérrez and Vivó, 2005)
- enhance empathy and assertiveness in children, but only when taught in appropriate teaching settings (García-López and Gutiérrez, 2015).

Effects are also observed with extra-curricular physical activities. Schumacher Dimech and Seiler (2011) measured the effects of extra-curricular participation in sports on social anxiety. Comparing team sports, individual sports, and no sports, they found a relationship between sports and time: team sport participants experienced reduced social anxiety over time, while anxiety scores in the no sports and individual sports groups increased. In this sense, participation in a team appears as a protective factor against social anxiety.

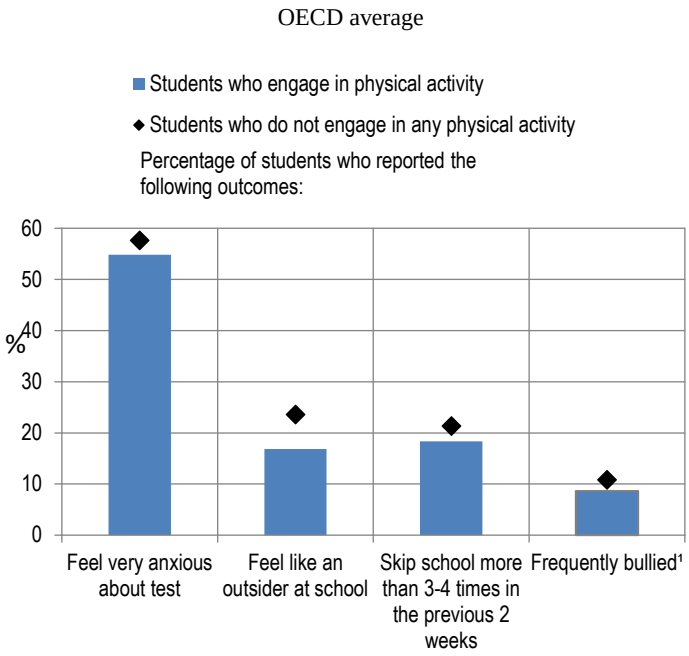
Better sense of belonging, empowerment, and greater autonomy for the vulnerable or the marginalised

Research also suggests physical education is likely to help students to develop a sense of belonging and acceptance, promote friendships and empower vulnerable groups, as well as to change the locus of control so that marginalised groups develop greater autonomy and control (Laker, 2000; Bailey, 2006). A 2006 review recommended that a well-planned PE programme can fulfil a number of markers of social inclusion, including bridging social and economic gaps between students (Bailey, 2006).

Being less likely to skip school, feel like an outsider, feel anxious about school work, or frequently bullied

Data from PISA 2015 also shows that engagement in physical activity is associated with key social outcomes. Students differ greatly, both within and between countries, in how anxious they feel about school work, the quality of their social relationships with peers and other students and their motivations to achieve. The study found that students who are physically active fare better in many social outcomes compared to those who do not engage in any extra-curricular physical activity: for instance they are less likely to skip school, feel like an outsider, feel very anxious about schoolwork or to be frequently bullied (OECD, 2017) (Figure 3.8).

Figure 3.8. Physical activity and social outcomes (PISA 2015)



Note: A student is frequently bullied if he or she is in the top 10% of the index of exposure to bullying among all countries/economies.
Source: OECD, *PISA 2015 Database*, Table III.11.18.

Do countries and jurisdictions target these outcomes as main goals in their curriculum?

Participating countries and jurisdictions explicitly promote a greater range of social outcomes than any other outcomes area in health and physical education curricula (Figure 3.9).Specifically speaking, results show the following attitudes and values in three categories as social outcomes:

- **Interpersonal attitudes and values** are the most widely promoted type of social outcomes among participating countries and jurisdictions. Respect for shared rules, and collaboration and team spirit are the most widely reported social outcomes in written physical education curricula, explicitly promoted by 16 and 15 countries and jurisdictions respectively (88% and 83%). Respect for others was reported by 14 countries and jurisdictions (77%), followed by care for others, and social well-being, which were reported by 12 countries and jurisdictions respectively (66%). Development of pro-social behaviour was reported by 11 countries and jurisdictions (61%). Integration and inclusion of groups of students was reported by 10 countries and jurisdictions (55%).
- **Intrapersonal attitudes and values** required to work with others are also widely promoted, but less so than interpersonal outcomes. Development of moral reasoning and increased sense of responsibility were each promoted by 11 countries and jurisdictions (61%). Trust was explicitly promoted by nine countries and jurisdictions (50%).

- **General improvements in behaviour and/or school attendance** were on average less promoted than other types of social outcomes, but countries like **Chile** or **China** consistently sought to promote these types of outcomes. Compliance with school rules was promoted by five (27%) countries (**Chile**, **China**, **Norway Turkey** and **Scotland [United Kingdom]**); reduced disciplinary problems was promoted by six (33%) countries (**Chile**, **China**, **Korea**, **Russia** ,**Turkey** and **Scotland [United Kingdom]**); reduced incidences of anti-social behaviour was promoted by six (33%) countries (**Chile**, **China**, **Korea**, **Luxembourg, Turkey** and **Scotland [United Kingdom]**); positive attitude towards school by four countries (**Chile**, **China**, **Turkey** and **Scotland [United Kingdom]**); and improved school attendance also by three countries (**Chile**, **China**, **Scotland [United Kingdom]**).

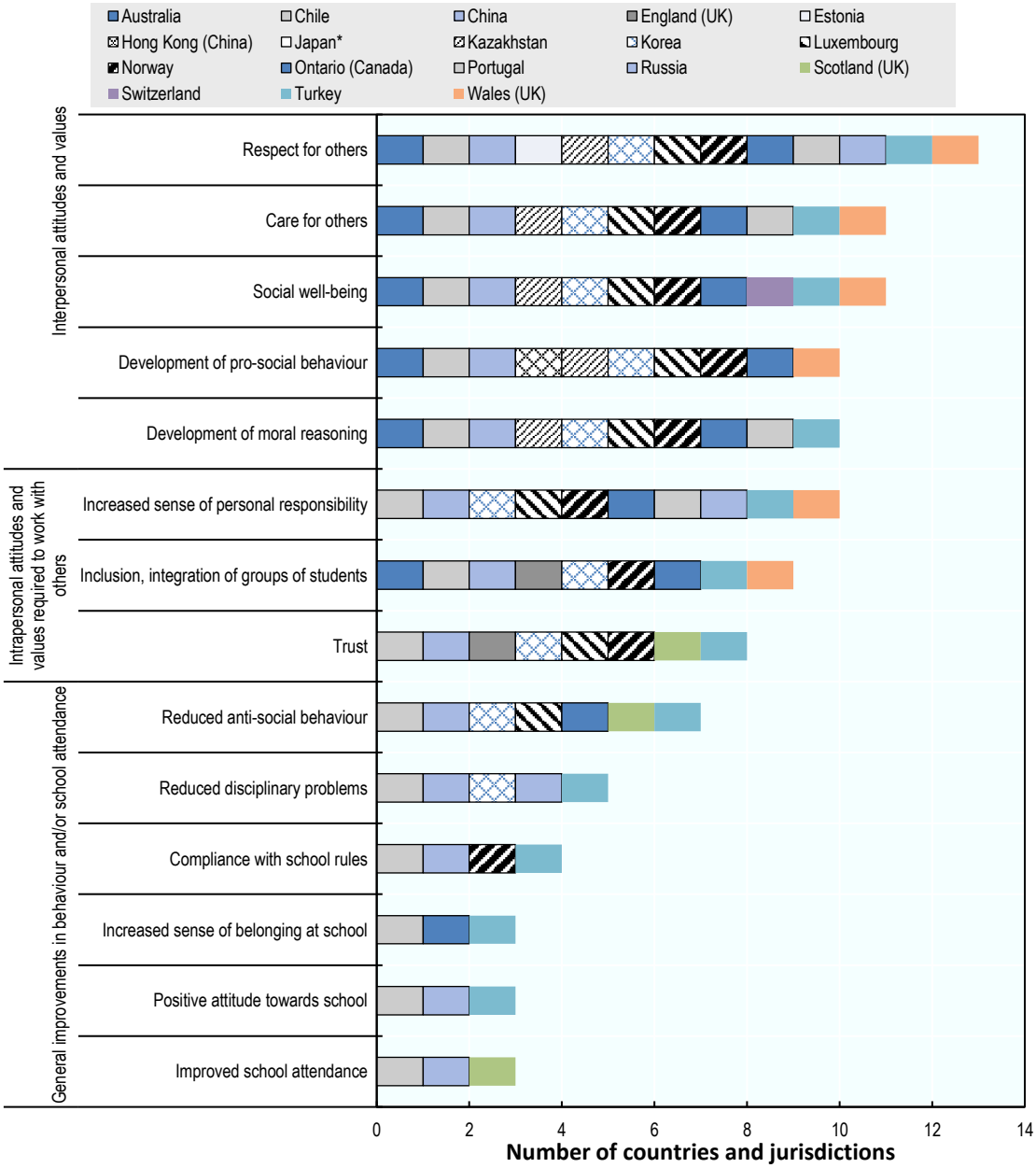
In order to foster social outcomes, countries and jurisdictions usually make use of games and sports, but the emphasis is not always the same, e.g. sports to promote healthy competition (**England [United Kingdom]**), or sports to promote collaboration and team work (**Korea**).

As emerging trends, many participating OECD countries and jurisdictions indicate a general shift towards a more inclusive curriculum that balances competition and sports with other less competitive dimensions in physical education. Alongside games and sports, national physical and health education curricula are increasingly including a diverse range of non-competitive activities such general movement skills and concepts, dance and rhythmic movement, and recreation activities like hiking and ice skating. In a similar fashion, sports and competition are separated from physical education in schools in **Norway**. This trend is in line with recent literature in physical education which recommends revising PE/HE models to remove overly competitive or militaristic influences on sport and physical education at school (Kirk, 2009).

A notable exception to this trend is **England (United Kingdom)**, where competitive sports are becoming an increasingly central component in the national physical education curriculum. In 2011, the Department of Culture, Media and Sport established School Games, an ongoing national programme aimed at encouraging all primary and secondary students, including those with disabilities, to participate in competitive sports, including inter-school and intra-school sports, as well as festivals and the School Games competition.

Following the devolution of educational authority to the Welsh government, **Wales (United Kingdom)** enacted an explicit and official move away from the sports-dominated English curriculum towards a more balanced physical education curriculum that complements competitive activities with three other domains: namely, health and well-being, outdoor activities, and creative activities like circus activities.

Figure 3.9. Types of social outcomes physical education explicitly promotes in participating countries and jurisdictions



Source: Education 2030 International Comparative Review of Physical Education questionnaire (2018), Curr1.4.e.

Cognitive outcomes

Improving students' performance is a leitmotif across most educational systems. Under pressure to do so, educational systems may be tempted to shift instruction time from physical education to academic subjects that are included in the national student assessments like reading, science and mathematics. Pellegrini and Bohn (2005) found that some children are being withheld from physical activities – including classes and recess –

to participate in remedial or enriched learning experiences designed to improve academic achievement. However, there is little evidence to support suggestions that time spent in physical education detracts from student learning in the classroom.

What the research says about the kinds of cognitive outcomes that can be enhanced through physical education

No guarantee of imporved student performance by replacing time on physical activities with extra time on acdemic subjects

A review of 50 studies found that spending more time in school-based PE classes, and relatively less time on other school subjects, does not adversely affect academic performance and can in some contexts enhance it (Centers for Disease Control and Prevention, 2010). Indeed, a reduction in time devoted to physical education may have adverse academic implications. Other research also suggests that low-performing students might perform worse if they replace the time spent on physical activities with extra homework or study (Zhang et al., 2015). Both findings suggest that the quality of instruction – not the quantity – matters for improved student learning outcomes; physical activity does not obstruct, but rather enhances cognitive development in children and adolescents (Alvarez-Bueno et al., 2017a; Fedewa and Ahn, 2011; Jackson et al., 2016; Sibley and Etnier, 2003; Vazou et al., 2016; Watson et al., 2017).

Enhanced cognitive outcomes (e.g. problem solving, creativity, self-awareness, self-regulation, goal setting and planning, working memory)

There is rigorous evidence supporting the links between physical activity and several cognitive outcomes. This includes working memory, which is required for remembering short-term information, and inhibition, the ability to control stimuli that are irrelevant to the tasks or process at hand (Alvarez-Bueno et al., 2017a).

Some of these are key outcomes that students will need to nurture for navigating the world of tomorrow, including: problem solving, self-awareness, goal setting, memory, self-regulation, planning and creativity (Alvarez-Bueno et al., 2017a; Singh et al., 2012; Biddle and Asare, 2011). Such cognitive dimensions of student well-being refers to the cognitive foundations and functioning that students need to participate fully in the world and society today – as lifelong learners, competent colleagues and engaged citizens (OECD, 2017; also see Annex B).

Cognitive engagement (e.g. motivation and learning skills), along with emotional engagement (e.g. enjoyment of learning) and behavioural engagement (e.g. time on-task)

Physical activity has also been found to be positively linked to school engagement. School engagement can encompass three dimensions: cognitive engagement, which reflects students' commitment to learning, e.g. motivation and learning skills; emotional engagement, which refers to students' positive affective reactions to school, e.g. enjoyment of learning; and behavioural engagement, which refers to students' actions that reflect their involvement in learning activities, e.g. time on-task (Owen et al., 2016). A meta-analysis using data from 38 studies covering 71 433 children and adolescents by Owen and colleagues (2016) found that physical activity had a statistically significant positive effect on all three dimensions of school engagement.

It is interesting to note that acute and chronic physical activities could both enhance school engagement, but not always in the same way; bursts of physical activity could improve students' engagement with learning in the classes immediately following that physical activity; whereas regular physical activities can also contribute to stable, long-term, enhanced student behavioural engagement with school (Alvarez-Bueno et al., 2017a, 2017b; Watson et al., 2017).

Possible improvement of math skills through curricular physical education

Focusing on physical activity, a metadata analysis conducted by Alvarez-Bueno et al. (2017a) found strong evidence supporting positive links among physical activity, reading and mathematics-related skills. However, no effects were found in relation to language competencies like vocabulary (idem).

When looking at how physical activity (PA) interventions are incorporated into the curriculum, only math achievement benefits from both curricular physical education (PE) programmes and integrated PA programmes; while reading only benefited from curricular PE programmes (Alvarez-Bueno et al., 2017a). While the integrated or extra-curricular PA interventions might fit better with math problem solving, research suggests that curricular PE classes are more effective at enhancing cognitive outcomes than the integrated PA into other subjects or active recess (Alvarez-Bueno et al., 2017a, 2017b).

Greater effects from adapting frequency, class size, and class composition

The frequency in which students engage in physical activity is important in impacting cognitive outcomes. Fedewa and Ahn (2011) found greater effects in cognitive outcomes and academic performance when children and adolescents engage in physical activity three times a week, followed by twice a week, followed by once a week.

Class size and class diversity also seem relevant. The effect size is the largest when there are fewer than 10 students in the intervention group, followed by 10-30 students per group, followed by more than 30 students per group. Differences in the effects of physical activity interventions are bigger when they are administered in a co-ed environment than when administered to male or female students separately (Fedewa and Ahn, 2011).

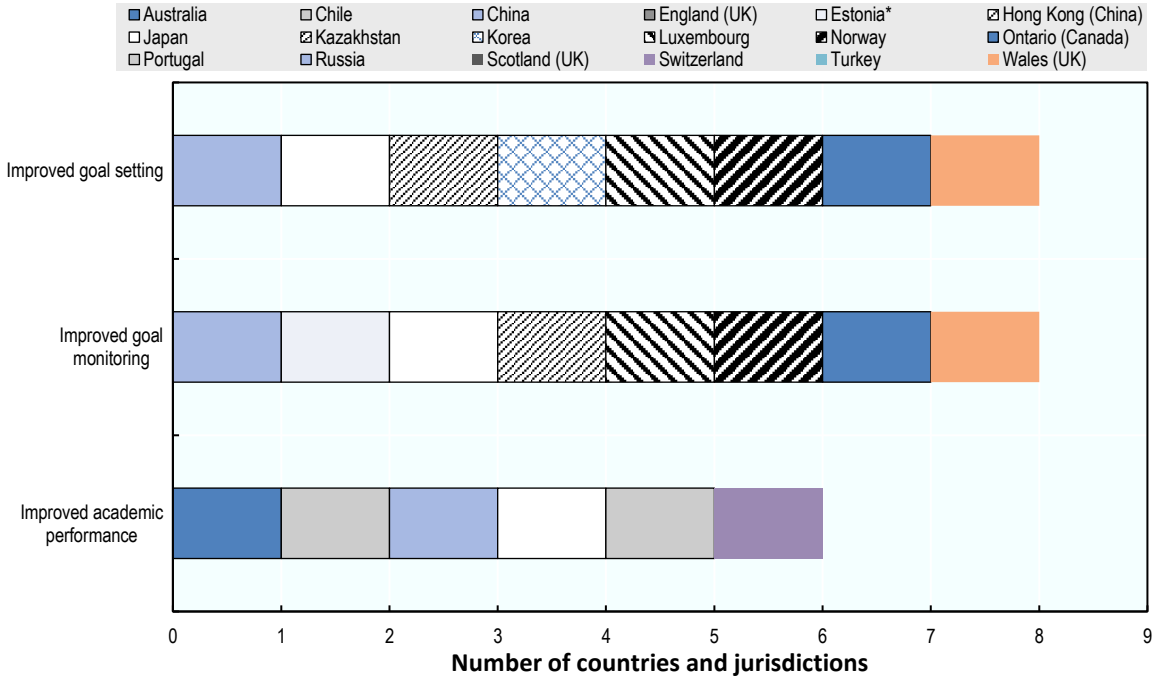
Do countries and jurisdictions target these outcomes as main goals in their curriculum?

Participating countries and jurisdictions reported three types of cognitive outcomes as goals set in the PE/HE curricula: goal setting, goal monitoring and academic performance. All countries and jurisdictions, with the exception of **Russia** and **Turkey**, promote at least one explicit cognitive outcome in their physical education curricula (Figure 3.10):

- Eight countries and jurisdictions (44%) explicitly promote goal setting as a cognitive outcome of physical education (**China**, **Japan**, **Kazakhstan**, **Korea**, **Luxembourg**, **Norway**, **Ontario [Canada]** and **Wales [United Kingdom]**).
- With the exception of **Korea**, and the addition of **Estonia**, this same set of countries and jurisdictions also promotes goal monitoring.
- Six countries and jurisdiction (33%) promote improved academic performance as an explicit outcome of physical education (**Australia**, **Chile**, **China**, **Japan** [ISCED 2 only], **Portugal** and **Switzerland**).

In **Australia**, improved academic performance is registered through students developing knowledge and understanding in health and physical education. In **Scotland [United Kingdom]**, focus and concentration, cue recognition, decision making, prioritising, multi-processing, creativity, and problem solving are associated cognitive outcomes in the health and physical education and curriculum (these are not registered as cognitive outcomes in Figure 3.10).

Figure 3.10. Types of cognitive outcomes physical education explicitly promotes in participating countries and jurisdictions



Source: Education 2030 International Comparative Review of Physical Education questionnaire (2018), Curr1.4d.

Lifestyle and health outcomes

Research over the last 30 years indicates worrying trends: a student today is likely to have worse nutritional outcomes and a higher uptake of some key risk factors associated with non-communicable diseases than a student 30 years ago (Aston, 2018; Roblin, 2007):

- Children and young people are engaging in risk factors associated with non-communicable diseases, with an increasing prevalence of poor dietary habits, and poor sleep duration and quality (OECD, 2017).
- The last three decades have also seen an increase in the over-consumption of soft drinks, sweets, salty snacks and fast foods in children and young people, a trend which is contributing to the doubling and trebling of the number of overweight and obese children respectively (Roblin, 2007).

It is important to acknowledge that these lifestyle choices are influenced by a wide range of external factors. Socio-economic status, traditions, cultural norms, quality of family relationships and role modelling are especially crucial in this regard (Kelder et al., 1994; Videon and Manning, 2003). However, research shows that PE/HE can also play its role in this context by fostering the awareness needed to live a healthy lifestyle.

What the research says about the kinds of physical outcomes that can be enhanced through physical education

Enhanced self-efficacy as a trigger for behavioural changes in some domains

A growing body of evidence shows that health and physical and health education can play a role in shaping dietary habits through balancing behaviour interventions (Van Stralen et al., 2011). Research shows that the main channels through which PE/HE can promote behavioural changes are enhancing self-efficacy, which is a student's belief that he/she will be able to achieve his/her goals and improving student knowledge and attitudes (idem).

Greater evidence is required to assess the long-term impacts of PE/HE-based interventions on other key factors that shape healthy eating habits. Beyond a student's determination, socio-economic, family and cultural background, eating habits are shaped by peers, self-image (Videon and Manning, 2003).

This is particularly pertinent given that young people can experience a drastic change in eating habits as they experience puberty and transition to adolescence. Teenagers may become more conscious of their bodies and how others perceive them. They may consequently alter their diet to meet social pressure and group expectations (Neumark-Sztainer et al., 1999).

More research is also needed on pathways through which PE/HE could impact uptake of risky behaviours like consumption of illegal drugs. In this sense, isolated knowledge-based interventions to reduce the uptake of risky behaviour, have been shown to have no effect on changing behaviours and behavioural intentions (Carney et al., 2016; Faggiano et al., 2014). Broader community factors that affect lifestyle choices suggest that combining school-based programmes with interventions targeting communities and families could be more effective in triggering long-term behavioural changes (idem).

Future adult engagement in physical activity habits

Research on the relationships between physical education and students' health and lifestyle outcomes suggests that children's engagement in physical activity in school may shape their physical activity habits as adults (Cook et al., 2013; Hallal et al., 2012). Children's physical education experiences at school inform their adult health and lifestyle outcomes. Indeed, an expanding body of research evidence is demonstrating that on top of immediate health effects, physical activity habits established during childhood and adolescence have long-term effects on adult morbidity and mortality (Hallal et al., 2006). While the effects of chronic disease manifest in adulthood, many of these conditions start in childhood and adolescence (Cook, Auinger and Huang, 2009; Halfon, Verhoef and Kuo, 2012; Hallal et al., 2006).

Longitudinal studies of students in Finland and Sweden support that physical education may be related to adult engagement in physical activity (Glenmark, 1994; Telama et al., 1997). Looking, thus, beyond the immediate effects of physical education on improving physical outcomes appears particularly relevant. Beyond promoting physical activity, physical education can be a useful tool to promote an active and healthy lifestyle that can span into adulthood, especially when combined with interventions at the community level.

Addressing inequalities in healthy attitudes and practices

PE/HE can also be seen as a potential tool to address inequalities in the attitudes and practices highlighted in the research. PISA (2015) found that 26% of girls and 18% of boys reported skipping breakfast before school (OECD, 2017). Additionally, research shows that girls are more likely than boys to do so due to social pressure and a self-image of being overweight (Florin, Shults and Stettler, 2011). In this sense, PE/HE could contribute to breaking gender stereotypes and promoting body-positive narratives to curb this phenomenon.

PISA (2015) also sheds light on other inequalities in terms of lifestyle choices. Students from socio-economically advantaged backgrounds tend to be more aware of the importance of eating breakfast than disadvantaged students (PISA 2015). Generating evidence on how PE/HE can reduce inequalities in knowledge around eating and lifestyle habits is important.

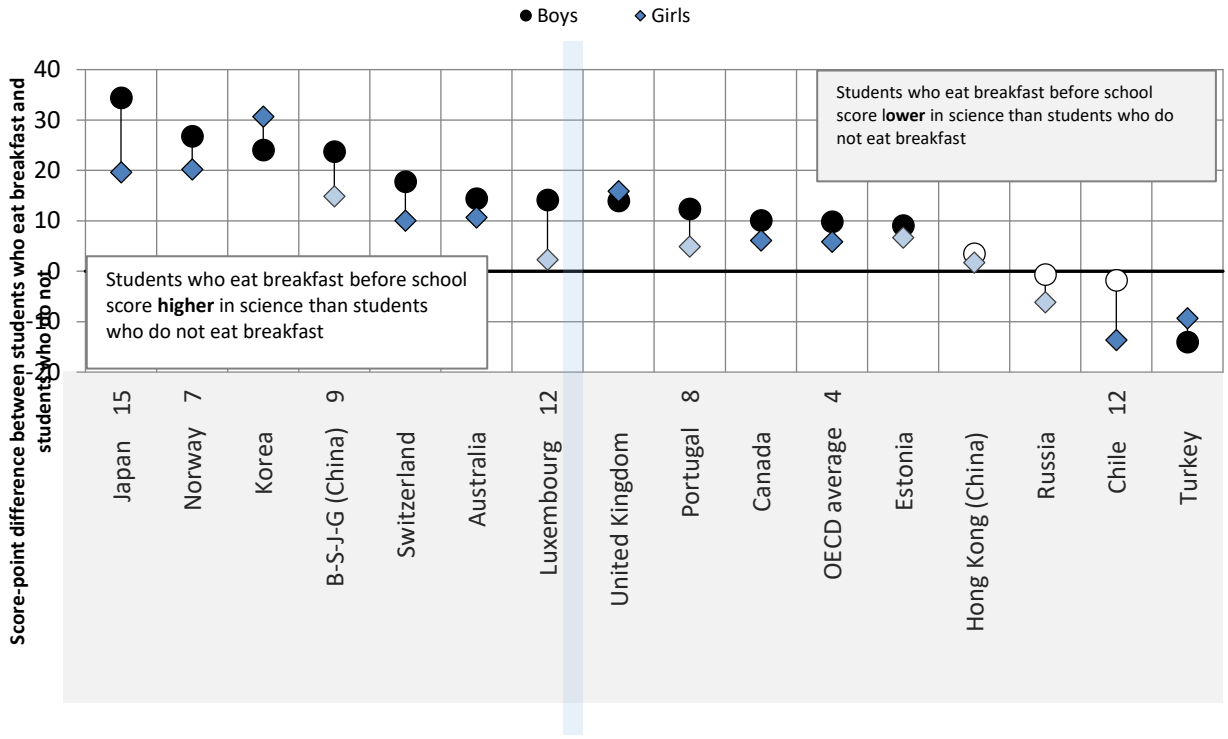
Healthy diet as a possible contributor to enhanced cognitive outcomes

Research also shows that the benefits of promoting a healthy diet could expand beyond improved nutritional outcomes in effective interventions. Eating breakfast, for instance, has been associated with enhanced cognitive outcomes. Students who eat breakfast might perform better in school because they are better able to concentrate and pay attention than students who skip breakfast (Adolphus, Lawton and Dye, 2013). While efforts to promote healthy eating are not enough to counter all factors that shape students' dietary habits, awareness is a crucial tool that physical education can provide.

Looking at OECD data, eating breakfast is positively associated with students' science performance on average across OECD countries, even after accounting for socio-economic status (Figure 3.11). This association is, however not always consistent, as in a number of countries eating breakfast and performance are negatively associated. On average across OECD countries, boys who reported that they had eaten breakfast before school score ten points higher in science than boys who had skipped breakfast. Girls who reported that they had eaten breakfast score six points higher than those who reported not eating breakfast. After accounting for socio-economic status, eating breakfast is positively associated with science performance among boys in 27 countries and girls in 19 countries.

Figure 3.11. Eating breakfast and science performance (PISA 2015)

Score-point difference in science performance, after accounting for student socio-economic status



Note: Only countries and economies with valid values for both genders are shown. Statistically significant differences between students who eat breakfast and those who do not are marked in a darker tone. Statistically significant differences between boys and girls are shown next to the country/economy name.
Source: OECD, *PISA 2015 Database*, Table III.11.25.

Do countries and jurisdictions target these outcomes as the main goals in their curriculum?

Countries and jurisdictions usually put the emphasis on lifestyle habits by helping children develop and sustain physically active lifestyles, a universally promoted health outcome of physical education among participating countries and jurisdictions. Beyond this, ten countries and jurisdictions (55%) explicitly promote healthy eating among children at both ISCED 1 and ISCED 2 (Table 3.1), which is understandable, considering that these countries and jurisdictions, with the exception of **Estonia** and **Wales [United Kingdom]**, include health and physical education as combined subjects (see Chapter 2).

There is considerable variation across the other explicit lifestyle and health outcomes identified by countries and jurisdictions. This variation may also reflect different curriculum models for incorporating health education within the curriculum, i.e health-related content may register elsewhere in the national curriculum, as well as or instead of within the physical education curriculum.

While a glowing body of research, in particular, from neuroscience, suggests the importance of duration and quality of sleep (OECD, 2017a), sleeping habits are less likely to be articulated in the written curriculum.

Table 3.1. Types of lifestyle and outcomes physical education explicitly promotes in participating countries and jurisdictions

		Physically active lifestyle	Healthy eating	Other
OECD country/jurisdiction	Australia	Yes	Yes	No
	Chile	Yes	Yes	No
	England (United Kingdom)	Yes	No	No
	Estonia	Yes	No	No
	Japan	Yes	Yes	Health behaviour and lifestyle (including alcohol and drugs education) Human growth and development, sexual health and adolescence health Safety, first aid and injury prevention Disease prevention
	Korea	Yes	Yes	No
	Luxembourg	Yes	Yes	No
	Norway	Yes	No	No
	Ontario (Canada)	Yes	Yes	Health behaviour and lifestyle (including alcohol and drugs education) Human growth and development, sexual health and adolescence health Safety, first aid and injury prevention
	Portugal	Yes	No	No
	Scotland (United Kingdom)	Yes	No	No
	Switzerland	Yes	No	No
	Turkey	Yes	Yes	No
	Wales (United Kingdom)	Yes	No	No
Partner country/jurisdiction	China	Yes	Yes	Health behaviour and lifestyle (including alcohol and drugs education) Human growth and development, sexual health and adolescence health Safety, first aid and injury prevention Disease prevention
	Hong Kong (China)	Yes	No	
	Kazakhstan	Yes	Yes	Health behaviour and lifestyle (including alcohol and drugs education)
	Russian Federation	Yes	No	No

Source: Education 2030 International Comparative Review of Physical Education questionnaire (2018).

Notes

1. Physical activity may be considered moderate if it raises the participant's heart rate and if the participant breaks into a sweat. Physical activity may be considered vigorous if the participant's breathing becomes difficult and fast, and if his or her heart rate increases rapidly (Centers for Disease Control and Prevention, 2017).
2. A definition of "physical literacy" was adapted in a curriculum-specific comparative analysis, "Curriculum Content Mapping" as "physically literate students have the knowledge, skills and attitudes (including motivation) to integrate physical, psychological, cognitive and social competencies for healthy and active living. This involves the acquisition of fitness and movement skills; positive attitudes towards movement; and understanding how and why they engage in movement activities."

References

Adolphus, K., C.L. Lawton and L. Dye (2013), "The effects of breakfast on behavior and academic performance in children and adolescents", *Frontiers in Human Neuroscience*, Vol. 7, http://dx.doi.org/10.3389/fnhum.2013.00425.

Alvarez-Bueno, C. et al. (2017a), "The effect of physical activity interventions on children's cognition and meta-cognition: A systematic review and meta-analysis", *Journal of the American Academy of Child and Adolescent Psychiatry*, Vol. 56/9, Elsevier, New York, pp. 729-738, https://doi.org/10.1016/j.jaac.2017.06.012.

Alvarez-Bueno, C. et al. (2017b), "Academic achievement and physical activity: A meta-analysis", *Pediatrics*, Vol. 140/6, Elsevier, New York, pp. 1-14, https://doi.org/10.1542/peds.2017-1498.

Aston, R. (2018), "Physical health and well-being in children and youth: Review of the literature", *OECD Education Working Papers*, No. 170, OECD Publishing, Paris, https://doi.org/10.1787/102456c7-en.

Bailey, R. (2006), "Physical education and sport in schools: A review of benefits and outcomes", *Journal of School Health*, https://doi.org/10.1111/j.1746-1561.2006.00132.x.

Barber, B. et al. (2001), "Whatever Happened to the Jock, the Brain, and the Princess?: Young Adult Pathways Linked to Adolescent Activity Involvement and Social Identity", *Journal of Adolescent Research*, https://doi.org/10.1177/0743558401165002

Bassett, D. R. et al. (2015), "Trends in physical activity and sedentary behaviors of United States youth", *Journal of Physical Activity and Health*, http://doi.org/10.1123/jpah.2014-0050.

Bauman, A.E. et al. (2012), "Correlates of physical activity: why are some people physically active and others not?", *The Lancet*, Vol. 380/9838, pp. 258-71, http://dx.doi.org/10.1016/S0140-6736(12)60735-1.

Baumeister, R. F. et al. (2003), "Does high self-esteem cause better performance, interpersonal success, happiness, or healthier lifestyles?", *Psychological Science in the Public Interest*, 4(1), 1-44.

Biddle, S. J. H. and M. Asare (2011), "Physical activity and mental health in children and adolescents: A review of reviews", *British Journal of Sports Medicine*, https://doi.org/10.1136/bjsports-2011-090185.

Birkeland, M. S., T. Torsheim and B. Wold (2009), "A longitudinal study of the relationship between leisure-time physical activity and depressed mood among adolescents", *Psychology of Sport and Exercise*, 10(1), 25-34.

Booth, V. M., A. V. Rowlands and J. Dollman (2015), "Physical activity temporal trends among children and adolescents", *Journal of Science and Medicine in Sport*, https://doi.org/10.1016/j.jsams.2014.06.002.

Byrd, C.E. and S.M. Ross (1991), "The influence of participation in junior high athletics on students' attitudes and grades", *The Physical Educator*, Vol. 48/4, pp.170.

Camiré, M., P. Trudel and T. Forneris (2012), "Coaching and transferring life skills: Philosophies and strategies used by model high school coaches", *The Sport Psychologist*, 26(2), 243-260.

Carney, T. et al. (2016), "Brief school-based interventions and behavioural outcomes for substance-using adolescents", *Cochrane Database of Systematic Reviews*, https://doi.org/10.1002/14651858.CD008969.pub3.

Centers for Disease Control and Prevention (2017), "How much physical activity do adults need?", https://www.cdc.gov/physicalactivity/basics/adults/index.htm.

Centers for Disease Control and Prevention (2010), "The association between school based physical activity, including physical education, and academic performance", US Department of Health and Human Services, https://www.cdc.gov/healthyschools/pecat/pa-pe_paper.pdf.

Collingwood, T. R. et al. (2000), "Physical training as a substance abuse prevention intervention for youth", *Journal of Drug Education*, 30(4), 435-451.

Cook, H. D. and H. W. Kohl (2013), *Educating the Student Body : Taking Physical Activity and Physical Education to School*, National Academies Press, https://doi.org/10.17226/18314.

Cook, S., P. Auinger and T. T.-K. Huang (2009), "Growth curves for cardio-metabolic risk factors in children and adolescents", *The Journal of Pediatrics*, https://doi.org/10.1016/j.jpeds.2009.04.051.

De la Haye, K. et al. (2011), "How physical activity shapes, and is shaped by, adolescent friendships", *Social Science and Medicine*, https://doi.org/10.1016/j.socscimed.2011.06.023.

Dietz, W. H. (1998), "Health consequences of obesity in youth: Childhood predictors of adult disease", *Pediatrics*, https://doi.org/10.1007/s12098-011-0489-7.

Doré, I. et al. (2016), "Volume and social context of physical activity in association with mental health, anxiety and depression among youth", *Preventive Medicine*, 91, 344-350.

Drewe, S. B. (2000), "The logical connection between moral education and physical education", *Journal of Curriculum Studies*, 32(4), 561-573.

Dumont, M. and M. A. Provost (1999), "Resilience in adolescents: Protective role of social support, coping strategies, self-esteem, and social activities on experience of stress and depression", *Journal of Youth and Adolescence*, 28(3), 343-363.

Duncan S. C. et al. (2007), "A cohort-sequential latent growth model of physical activity from ages 12 to 17 years", *Annals of Behavioral Medicine*. https://doi.org/10.1207/s15324796abm3301_9.

Dyson, B. and A. Casey (eds.) (2012), *Cooperative Learning in Physical Education: A Research-Based Approach*, Routledge, London.

Faggiano, F. et al. (2014), "Universal school-based prevention for illicit drug use", *Cochrane Database of Systematic Reviews*, https://doi.org/10.1002/14651858.CD003020.pub3.

Farren, G. L., Zhang, T., Gu, X., & Thomas, K. T. (2017). "Sedentary behavior and physical activity predicting depressive symptoms in adolescents beyond attributes of health-related physical fitness". *Journal of Sport and Health Science*. Early Print

Fedewa, A. L. and Soyeon Ahn (2011), "The effects of physical activity and physical fitness on children's achievement and cognitive outcomes: A meta-analysis", *Research Quarterly for Exercise and Sport*, Taylor and Francis, New York, Vol. 82/3, pp. 521-535, https://doi.org/10.5641/027013611X13275191444107.

Felez-Nobrega, M. et al. (2017), "The association of context-specific sitting time and physical activity intensity to working memory capacity and academic achievement in young adults", *European Journal of Public Health*, https://doi.org/10.1093/eurpub/ckx021.

Florin, T.A., J. Shults and N. Stettler (2011), "Perception of overweight is associated with poor academic performance in US adolescents", *Journal of School Health*, Vol. 81/11, pp. 663-70, http://dx.doi.org/10.1111/j.1746-1561.2011.00642.x.

Froberg, A. et al. (2017), "Levels of physical activity during physical education lessons in Sweden", Acta Paediatrica (Oslo, Norway : 1992), https://doi.org/10.1111/apa.13551.

García-López, L. M., & Gutiérrez, D. (2015). "The effects of a sport education season on empathy and assertiveness." Physical Education and Sport Pedagogy, 20(1), 1-16.

Glenmark (1994), Prediction of physical activity level in adulthood by physical characteristics, physical performance and physical activity in adolescence: an 11-year follow-up study, https://doi.org/10.1007/BF00239871.

Goudas, M. and G. Giannoudis (2010), "A qualitative evaluation of a life-skills program in a physical education context", *Hellenic Journal of Psychology*, 7(3), 315-334.

Goudas, M. and G. Giannoudis (2008), "A team-sports-based life-skills program in a physical education context", *Learning and Instruction*, 18(6), 528-536.

Granger, E. (2017), "A systematic review of the relationship between physical activity and health status in adolescents", *The European Journal of Public Health*, 27(2), 1–7.

Gutiérrez, M. and P. Vivó (2005), "Enseñando razonamiento moral en las clases de educación física escolar", *Motricidad*, 14, 1-22.

Haine, R. A. et al. (2003), "Locus of control and self-esteem as stress-moderators or stress-mediators in parentally bereaved children", *Death Studies*, 27(7), 619-640.

Halfon, N., P. A. Verhoef and A. A. Kuo (2012), "Childhood antecedents to adult cardiovascular disease", *Pediatrics in Review*, https://doi.org/10.1542/pir.33-2-51.

Hallal, P. C. et al. (2006), "Adolescent physical activity and health", *Sports Medicine*, https://doi.org/10.2165/00007256-200636120-00003.

Hallal, P. C., Andersen, L. B., Bull, F. C., Guthold, R., Haskell, W., & Ekelund, U. (2012). "Global physical activity levels: surveillance progress, pitfalls, & prospects." The Lancet, 380(9838), 247–257.

Harper, J. F. and E. Marshall (1991), "Adolescents' problems and their relationship to self-esteem", *Adolescence*, 26(104), 799.

Haugen, T., R. Safvenbom and Y. Ommundsen (2013), "Sport participation and loneliness in adolescents: The mediating role of perceived social competence", *Current Psychology*, https://doi.org/10.1007/s12144-013-9174-5.

Haugen, T., R. Safvenbom and Y. Ommundsen (2011), "Physical activity and global self-worth: The role of physical self-esteem indices and gender", *Mental Health and Physical Activity*,

Jackson, W. M. et al. (2016), "Physical activity and cognitive development: A meta-analysis", *Journal of Neurosurgical Anesthesiology*, Vol. 28/4, Wolters Kluwer Health, Alphen aan den Rijn, pp. 373-380, https://doi.org/10.1097/ANA.0000000000000349.

Jang, S., W. Y. So and E. J. Choi (2017), "Physical activity and suicidal behaviors in gay, lesbian, and bisexual Korean adolescents", *Journal of Mens Health*, 13(1), 1-8.

Jewett, R. et al. (2014), "School sport participation during adolescence and mental health in early adulthood", *Journal of Adolescent Health*, 55(5), 640-644.

Kelder, S. H. et al. (1994), "Longitudinal tracking of adolescent smoking, physical activity, and food choice behaviors", *American Journal of Public Health*, https://doi.org/10.2105/AJPH.84.7.1121.

Kirk, D. (2009), *Physical Education Futures*, Routledge, London, https://doi.org/10.4324/9780203874622.

Laker, A. (2002), *Beyond the Boundaries of Physical Education: Educating Young People for Citizenship and Social Responsibility*, Routledge, London.

Lobstein, T. et al. (2015) "Child and adolescent obesity: part of a bigger picture", *The Lancet*, Vol. 385/9986, pp. 2510-2520, http://dx.doi.org/10.1016/S0140-6736(14)61746-3.

Macdonald-Wallis, K. et al. (2011), "School-based friendship networks and children's physical activity: A spatial analytical approach", *Social Science and Medicine*, https://doi.org/10.1016/j.socscimed.2011.04.018.

Mandigo, J., J. Corlett and P. Ticas (2016), "Examining the role of life skills developed through Salvadoran physical education programs on the prevention of youth violence", *Journal of Sport for Development*, 4(7), 25-38.

McConnell, E. (2018), Multiple Minority Stress and LGBT Community Resilience among Sexual Minority Men, *NBCI*,.

McGuire, J. and P. Priestley (1981), *Life After School: A Social Skills Curriculum*, Pergamon Press, Oxford.

McKenzie, T. L. et al. (2006), "Girls' activity levels and lesson contexts in middle school PE: TAAG baseline", *Medicine and Science in Sports and Exercise*, https://doi.org/10.1249/01.mss.0000227307.34149.f3

McPhie, M. L. and J. S. Rawana (2015), "The effect of physical activity on depression in adolescence and emerging adulthood: A growth-curve analysis", *Journal of Adolescence*, 40, 83-92.

Meyer, U. et al. (2013), "Contribution of physical education to overall physical activity", *Scandinavian Journal of Medicine and Science in Sports*, https://doi.org/10.1111/j.1600-0838.2011.01425.x.

Moljord, I. E. et al. (2014), "Physical activity, resilience, and depressive symptoms in adolescence", *Mental Health and Physical Activity*, 7(2), 79-85.

Neumark-Sztainer, D. et al. (1999) "Factors influencing food choices of adolescents: Findings from focus-group discussions with adolescents", *Journal of the American Dietetic Association*, Vol. 99/8, pp. 929-937. http://dx.doi.org/10.1016/S0002-8223(99)00222-9.

OECD (2017), *PISA 2015 Results (Volume III): Students' Well-Being*, OECD Publishing, Paris, https://doi.org/10.1787/9789264273856-en.

OECD (2017a), *Looking to 2030: Opportunities and risks for Well-Being*, OECD Publishing, Paris,

Okely, A. D., M. L. Booth and J. W. Patterson (2001), "Relationship of physical activity to fundamental movement skills among adolescents", *Medicine and Science in Sports and Exercise*, https://doi.org/10.1097/00005768-200111000-00015.

Owen, K. B. et al. (2016), "Physical activity and school engagement in youth: A systematic review and meta-analysis", *Educational Psychologist*, Vol. 51/2, Taylor and Francis, New York, pp. 129-145, https://doi.org/ 10.1080/00461520.2016.1151793.

Patalay, P. et al. (2016), "Mental health provision in schools", *Child and Adolescent Mental Health*, 21(3), 139–147.

Pellegrini, D. and Bohn, C. (2005),"The Role of Recess in Children's Cognitive Performance and School Adjustment", *Sage Journals*, https://doi.org/10.3102/0013189X034001013

Pez, O. et al. (2013), *The School Children Mental Health Project: Phase 2: The School Survey*, SCMHE Group, Paris.

Pollard, E.L., and P.D. Lee (2003), "Child well-being: A systematic review of the literature", *Social Indicators Research*, Vol. 61/1, pp. 59-78, http://dx.doi.org/10.1023/A:1021284215801.

Raudsepp, L. and I. Neissaar (2012), "Brief report: relationships between physical activity and depressive symptoms in adolescent girls", *Journal of Adolescence*, 35(5), 1399-1402.

Rieger, S. et al. (2016), "Low self-esteem prospectively predicts depression in the transition to young adulthood: A replication of Orth, Robins, and Roberts (2008)", *Journal of Personality and Social Psychology*, 110(1), 16-22.

Roblin, L. (2007), "Childhood obesity: Food, nutrient, and eating-habit trends and influences", *Applied Physiology, Nutrition, and Metabolism*. https://doi.org/10.1139/H07-046.

Schumacher Dimech, A. and R. Seiler (2011), "Extra-curricular sport participation: A potential buffer against social anxiety symptoms in primary school children", *Psychology of Sport and Exercise*, https://doi.org/10.1016/j.psychsport.2011.03.007.

Sibley, B. A. and J. L. Etnier (2003), "The relationship between physical activity and cognition in children: A meta-analysis", *Pediatric Exercise Science*, Vol.15/3, North American Society of Pediatric Exercise Medicine, Human Kinetics, Champaign, pp. 243-256, https://doi.org/10.1123/pes.15.3.243.

Singh, A. et al. (2012), "Physical activity and performance at school: A systematic review of the literature including a methodological quality assessment", *Archives of Pediatrics and Adolescent Medicine*, Vol. 166/1, pp. 49-55, http://dx.doi.org/10.1001/archpediatrics.2011.716.

Smith, N. J., M. A. F. Lounsbery and T. L. McKenzie, (2014), "Physical activity in high school physical education: Impact of lesson context and class gender composition", *Journal of Physical Activity and Health*, https://doi.org/10.1123/jpah.2011-0334.

Stavrakakis, N. et al. (2012), "Bidirectional prospective associations between physical activity and depressive symptoms: The TRAILS Study", *Journal of Adolescent Health*, 50(5), 503-508.

Story, M., K. M. Kaphingst and S. French (2006), "The role of schools in obesity prevention", *The Future of Children*, https://doi.org/10.1353/foc.2006.0007.

Suhrcke, M., D. Pillas and C. Selai (2008), "Economic Aspects of Mental Health in Children and Adolescents: Social Cohesion for Mental Well-Being among Adolescents", WHO Regional Office for Europe, Copenhagen.

Taliaferro, L. A. et al. (2008), "High school youth and suicide risk: Exploring protection afforded through physical activity and sport participation", *Journal of School Health*, 78(10), 545-553.

Telama, R. et al. (1997) "Physical activity in childhood and adolescence as predictor of physical activity in young adulthood",NBCI, 1997 Jul-Aug;13(4):317-23.

US Department of Health and Human Services (2012), *Physical Activity Guidelines for Americans Midcourse Report: Strategies to Increase Physical Activity among Youth*, US Department of Health and Human Services, https://health.gov/paguidelines/midcourse/.

Van Buren, D. J. and T. L. Tibbs (2014), "Lifestyle interventions to reduce diabetes and cardiovascular disease risk among children", *Current Diabetes Reports*, https://doi.org/10.1007/s11892-014-0557-2.

Van Stralen, M. M. et al. (2011), "What works in school-based energy balance behaviour interventions and what does not: A systematic review of mediating mechanisms", *International Journal of Obesity*, https://doi.org/10.1038/ijo.2011.68.

Vazou, S. et al. (2016), "More than one road leads to Rome: A narrative review and meta-analysis of physical activity intervention effects on cognition in youth", *International Journal of Sport and Exercise Psychology*, Taylor and Francis, New York, Vol. 14, https://doi.org/10.1080/1612197X.2016.1223423.

Viciana, J. et al. (2017), "Effect of two alternated teaching units of invasion team sports on the tactical learning in primary schoolchildren", *International Journal of Performance Analysis in Sport*, https://doi.org/10.1080/24748668.2017.1331575.

Videon, T. M and C. K. Manning (2003), "Influences on adolescent eating patterns: The importance of family meals", *Journal of Adolescent Health*, Vol. 32/5, pp. 365-373, http://dx.doi.org/10.1016/S1054-139X(02)00711-5.

Watson, A. et al. (2017), "Effect of classroom-based physical activity interventions on academic and physical activity outcomes: A systematic review and meta-analysis", *International Journal of Behavioural Nutrition and Physical Activity*, Vol. 14/1, BioMed Central, London, pp. 114 (24 pages), https://doi.org/ 10.1186/s12966-017-0569-9.

Webber, L. S. et al. (2008), "Promoting physical activity in middle school girls: Trial of activity for adolescent girls", *American Journal of Preventive Medicine*, https://doi.org/10.1016/j.amepre.2007.11.018.

WHO (World Health Organization) (2016), *Child and Adolescent Mental Health*, WHO.

WHO (2015), "Prevalence of insufficient physical activity among school-going adolescents: Data by country", http://apps.who.int/gho/data/node.main.A893ADO?lang+en.

WHO (2008), *The Global Burden of Disease: 2004 Update*, WHO, https://doi.org/10.1038/npp.2011.85

Zhang, Y. et al. (2015), "Association between physical activity and teacher-reported academic performance among fifth-graders in Shanghai: A quantile regression", *PLoS ONE*, Vol. 10/3,http://dx.doi.org/10.1371/journal.pone.0115483.

Chapter 4. Fit for purpose in the 21st century: Past, present, and future avenues in physical and health education

This chapter examines the history of reforms in physical and health education curricula, the main drivers and today's challenges and future directions for physical education in the 21st century.

Introduction

The scope, content and focus of physical and health education curricula are evolving. Countries and jurisdictions that took part in this case study have all recently completed, or are currently undertaking reforms in their physical and health education curricula to improve teaching in schools and to answer new questions for the future of physical and health education.

The evolution of physical and health education

Unique historical contexts influence the reform pathways open to countries and jurisdictions as they reform their national physical and health education curricula.

Making PE as a mandatory subject since mid-19th century

Some countries, such as **Luxembourg, Japan** and **Norway** introduced physical education as a mandatory subject in schools in the mid to late 19th century. In other countries and jurisdictions, physical education entered the national curriculum from the mid to late 1900s, such as **China** (Figure 4.1).

Figure 4.1. Country examples of PE/HE and HE integrations in curricula

Reform types	1850-1890s	1900-1940s	1950-1990s
Introducing mandatory PE	• Luxembourg introduces mandatory PE for preparatory classes (1860) • Japan and Norway introduce mandatory PE (mid-80s)	• Luxembourg introduces mandatory PE for all grades.	• England introduces mandatory PE (1988) • Portugal introduces mandatory PE (early 1990s) • China (mid-90s)
Producing guidelines, books, etc.	• Estonia publishing the first book about PE (mid-80s)		• International council for health, physical education, recreation, sport, and dance (ICHPER)recommends integrating PE and HE in schools (1971)
Combining PE and HE		• Japan introduces PE/HE as a mandatory learning area (1949)	• Australia combined as a school subject (mid-90s)

Note: Only countries and jurisdictions that included historical dates in the national case studies are included in this figure.
Source: National case studies.

Shift from militaristic physical training in the 19th century to democratic approach and integration with health in the 20th century

It was during this later period, particularly from the 1970s onwards, that international calls to recognise the interrelated nature of health education and physical education through an integrated curriculum model saw widespread changes in the curriculum design and model around the world (ICHPER, 1971; Lynch and Soukup, 2016). **Australia**, for instance, integrated the previously distinct subjects of physical and health education into one curriculum learning area in the mid-1990s, as with similarly integrated curricular models seen today, regardless of whether or not this is registered in the official subject/learning area title, in **Japan, Korea** and **Norway**.

Throughout the 20th century, the content and structure of health education and physical education curricula absorbed influences from shifting academic, social and political trends and currents. The militaristic or drill-style training that had typified physical education in the late 19th century gave way, in the 20th century, to the democratisation and pluralisation of education. Advances in both educational and medical understandings of the role and importance of healthy diet and adequate physical activities in children's and youth's overall social, physical, psychological, cognitive and emotional development and well-being influenced this evolution (ICHPER, 1971; Lynch and Soukup, 2016).

Stakeholders as drivers for change

These historical changes saw an increasing number of educational and non-education stakeholders – including public health and sports agencies – come to bear upon school-based physical and health education. These sectors remain key drivers of physical and health education reform today.

Physical education and health curricula today continue to adapt to external influences. Across participating countries and jurisdictions, the subject/learning area is increasingly student-oriented and interdisciplinary. As a result, a multiplicity of stakeholders are increasingly involved in PE/HE curriculum reform.

While there is still little evidence to support systemic and evidence-based policy making, consensus-oriented reforms predominate across participating countries and jurisdictions. For this, it is important to consider the multiple stakeholders that shape the policy development and revision process. Who are the key stakeholders and actors, both internal and external to education systems, driving reform processes and aims? What characterises their interactions? Stakeholders can be categorised into those in the education sector, those in the non-educational sector, and those from the international community. It is important to recognise the ecological nature of each of the interactions within and across the spheres of these three groups.

Education sectors

Key education sector drivers as reported in country and jurisdiction reform case studies are listed in Table 4.1.

Table 4.1. Key education sector drivers for PE/HE curriculum change

Who	Responsibility
Central education departments/ ministries and local education authorities	The central government or ministry responsible for each country or jurisdiction is the primary education driver for recent and scheduled curriculum reforms in physical and health education. However, the relative powers of these central education authorities, and the governance structures distributing powers between these central authorities and local or regional education authorities varies between countries and jurisdictions. Countries and jurisdictions usually report mixed governance structures, with shifting centres of balance between centralised and decentralised authorities within the school system. There are two main typologies: **Centralised school system:** The central ministry holds considerable authority over school policy and development and implementation across regions/ prefectures and schools. Countries like **Japan, Korea** and **Russia** report a comparatively centralised school system. **Decentralised policy development and implementation model**: Provincial/ state departments are endowed with autonomy over physical and health education curriculum development and/or implementation across the public system. Countries and jurisdictions including **Australia, China, Norway, Ontario (Canada) and Scotland (United Kingdom) and Wales (United Kingdom)** report a more decentralised model of policy development and implementation.
Curriculum authorities	National and subnational curriculum authorities are responsible for research and development of curriculum and assessment policies and resources. Authorities may be housed within a central government (i.e. branch or agency of the ministry or department), or may be independent advisory bodies. Curriculum bodies that influenced curriculum development and reforms include, for instance, the **Australian** Curriculum, Assessment and Reporting Authority, and the **Korean** Institute for Curriculum and Evaluation. In **Ontario (Canada)**, the Curriculum, Assessment and Student Success policy branch of the Ontario Ministry of Education is the provincial authorising curriculum body.
Educational research councils and partners	Countries and jurisdictions cite the influence of national and subnational research councils and centres, such as the Australian Council for Educational Research (**Australia**), the National Education Science Institute (**China**) and the National Institute for Educational Research and Central Council for Education (**Japan**).
School networks and communities	Some countries report the influence of student organisations, school networks (i.e. **Ontario** Health Schools Coalition), and parents associations (i.e. the National Confederation of Parents' Associations in **Portugal**) on public debate and policy in the province's physical and health education curriculum reforms.
Professional associations	Professional associations — such as principals' and/ or teachers' councils or representative bodies at the national or subnational level — have a stake in physical and health education reform, for instance the National Council of Professional Association of Physical Education Teachers and the Portuguese Society of Physical Education (**Portugal**); Scottish Association of Teachers of Physical Education (SATPE) **(Scotland [United Kingdom])**; and the Association for Physical Education (**Wales [United Kingdom]**).

Non-education sectors

Physical education and health engages broad public and professional interest beyond the educational domain. Key non-education drivers as reported in country and jurisdiction reform case studies are listed in Table 4.2.

Table 4.2. Key non-education sector drivers for PE/HE curriculum change

Who	Responsibility
Other government departments/ministries	The organisation of departments/ministries and their respective portfolios varies considerably between countries and jurisdictions. All countries and jurisdictions however note the influence of a department or ministry other than education in the development and revision of the physical and health education curriculum. Usually ministries and departments referred to as key influences on PE/HE curriculum reform in national case studies include: health and/ or science; sports; culture; media; tourism; transport or the Office of the Deputy Prime Minister.
Families and the community	Social and community concerns about children and young people's well-being, health and learning are a powerful driver for education reform in school systems across the board. Some of the key social topics that can elicit social interest when addressed in PE/HE curriculum reform include: drugs education; growth, development and sexuality; water safety and swimming; violence against women and children; extremism; bullying; or healthy online behaviours and relationships. In this sense, extensive public consultation, and engaging with social concerns about children and youth physical and mental health, informed current and ongoing curriculum revisions in **Australia, Korea, Norway, Ontario (Canada), Scotland (United Kingdom)** and **Wales (United Kingdom)**. For instance, the Australian Curriculum, Assessment and Reporting Authority responded to social interest in mental health awareness when developing the PE/HE curriculum, by adopting a strengths-based approach that promotes optimistic thinking habits, positive self-talk, resilience skills, and general mental health literacy in all students.
National public health associations and research institutes	National public health organisations and research institutes play an important role shaping health and physical discourse and curriculum reforms in countries and jurisdictions, i.e. the Australian Council for Health, Physical Education and Recreation (**Australia**); the Ontario Public Health Association (**Ontario [Canada]**), and the Institute of Child and Adolescent Health at Peking University (**China**). National case studies from **Australia, Japan, Luxembourg** and **Norway** also cite national public health data, reports or commissions on health and well-being trends in children and young people that influenced public debates and informed PE/HE curriculum reforms.
Sports sector	National and subnational sporting organisations, both as independent bodies and as agencies of the central government, have a stake in PE/HE curriculum reform and policies (**Australia, Japan**). In their national case studies, **England (United Kingdom)** and **Japan** also report momentum injected into physical and health education as a result of these countries hosting the Olympics and Paralympics.

International influences on curriculum reform and design

The growing availability of robust comparative data is increasingly allowing peer learning in curriculum reform around the world. For instance, **Australia, China, Korea, Ontario (Canada), Scotland (United Kingdom)** and **Wales (United Kingdom)** report the influence of other national and subnational curricula and policy initiatives in physical and health education in their own national and jurisdictional reforms. As an example, **Wales (United Kingdom)** reports that the development of the Foundation Phase of curriculum reform was heavily comparative, with ministers drawing on Reggio Emilia in Northern Italy, Te Whāriki in New Zealand, High Scope in the United States and Forest Schools in Scandinavia.

A number of international organisations, agencies and authorities support the ongoing review of PE/HE curriculum. Organisations that have informed physical and health education policy development and curriculum are listed in Table 4.3.

Table 4.3. International organisations that have informed PE/HE policy development and curriculum

Who	Responsibility
OECD	The OECD puts an emphasis on international comparative educational research to inform education policies. Broad initiatives in this line include the Programme for International Student Assessment (PISA), the Definition and Selection of Competencies Framework, and the Well-being Framework. Targeted initiatives for PE/HE also exist: the OECD Future of Education and Skills 2030 is channelling efforts from countries like Korea to conduct subject-specific analysis of pathways for forward-looking reforms, including PE/HE.
World Health Organization (WHO)	Reporting global public health trends and information on children and youth health outcomes, the WHO informs country and jurisdiction reform processes and both public and political discourse on the issue.
United Nations Educational, Scientific and Cultural Organization (UNESCO)	UNESCO provides guidance for policies in PE/HE, via, for instance the *Quality Physical Education* (UNESCO, 2015); sexuality education guidelines (UNESCO, 2009); and the *International Charter of Physical Education, Physical Activity and Sport* (UNESCO, 1978).
International Olympic Committee (IOC)	The International Olympic Committee provides impetus for PE/HE when Olympic Games are celebrated in a given country. Both **England (United Kingdom)** and **Japan** report increased interest in the subject as a result of the Olympic Games.
European Union	Provides evidence and policy for the effective inclusion of PE/HE in school curricula within Europe. A key contribution in this line includes the *Physical Education and Sport at School in Europe* report (European Union, 2013).
European Physical Education Association (EPEA); Europeactive	EPEA provides research on the impacts of physical activity as well as advocacy for the inclusion of physical activity and PE/HE within education policy circles at the European level.

Today's challenges and future directions for physical education in the 21st century

There are no easy answers or single solutions to the question of how to reform PE/HE curriculum so that it is fit for purpose in the 21st century. Alongside the global trends that are rapidly changing the world, countries and jurisdictions must adapt and respond to nuanced local circumstances, priorities and expectations rooted in social, cultural and historical contexts.

Recent and ongoing reforms from countries and jurisdictions participating in this study provide useful insights into policy-making decision processes, priorities, and strategies. Future pointers are suggested to develop and deliver dynamic and inclusive physical and health education curriculum for children and adolescents today, and to ensure an effective implementation entrusted with agency models. These pointers are supported by the design principles accumulated in the knowledge base on curriculum design and implementation of the OECD Future of Education and Skills 2030 project.

Designing a dynamic and inclusive PE/HE curriculum

Redefine PE/HE goals: Place student well-being at the centre, with a wider and long-term perspective

PE/HE content has traditionally been narrowly defined and attached to physical fitness rather than learning or developing competencies (Annerstedt and Larsson, 2010; Kirk, 2009; Larsson and Nyberg, 2016; Redelius, Quennerstedt and Øhman, 2015).

However, recent reforms in physical and health education are widely motivated by concerns over student well-being. Concerns include:

- lack of moderate to vigorous daily physical activity among students, as recommended by the World Health Organization (WHO, 2015), which is contributing to a rise in non-communicable diseases (Bauman et al., 2012)
- changing dietary and lifestyle habits associated with a range of negative health outcomes, including sedentarism, poor dietary habits and insufficient sleep duration (Aston, 2018; Roblin, 2007)
- rise in risk factors for social and psychological well-being, including anxiety and other mental health issues (Suhrcke, Pillas and Selai, 2008; Patalay et al., 2016; Pez et al., 2013; OECD, 2017a)
- reduction in time devoted to curricular physical education, with possible adverse academic implications, in particular, for low-performing students (Centers for Disease Control and Prevention, 2010; Zhang et al., 2015; Alvarez-Bueno et al., 2017a; Fedewa and Ahn, 2011; Jackson et al., 2016; Sibley and Etnier, 2003; Vazou et al., 2016; Watson et al., 2017).

Reflecting increasing interest in not just students' academic performance, but their overall health and well-being, these curriculum reforms emphasise students' social and emotional skills and experiences, alongside cognitive development and academic outcomes. Such reforms often recognise the complex pathways for these outcomes to be developed in inter-dependent and ecological contexts.

However, well-being is not a singular or static concept. It encompasses a broad range of psychological, cognitive, social and physical qualities that underpin the overall development of the whole person. Countries and jurisdictions participating in this curriculum analysis exercise refer to student well-being from diverse perspectives, while sharing a commitment to well-being as both a motivator, and desired outcome, of reforms in PE/HE curriculum reform. For instance:

- A key driver for public policy in **Wales (United Kingdom)** is the Well-being of Future Generations Act (2015). This act articulates seven well-being goals that educational bodies and local authorities are obliged to promote. Illustrating how the scope of well-being varies by country and context, these goals are: "A healthier Wales"; "A resilient Wales"; "A prosperous Wales"; "A globally responsible Wales"; "A Wales of vibrant culture and thriving Welsh language"; "A Wales of cohesive communities"; and "A more equal Wales".
- **Australia**, for instance, reports that physical and health education content links to all 11 indicators on the OECD Well-being Framework, with the strongest links between health, life satisfaction, safety, and work/life balance (Box 4.1). The framework embraces a concept of well-being that is holistic and recognises the complexity of the social, emotional, environmental and economic ecosystem of which humans are one part.
- **China** reports that with the increasing prominence of child and adolescent health and well-being as policy priority in recent years, physical and health education is one avenue through which the government is promoting student well-being.

Despite differences in approaches to well-being, topics like health (both physical and mental) remain central to the concept of well-being in most countries. However, statistics are not reassuring: trends show a general decline in participation in structured physical activities and a decline in participation in physical education in secondary school from 1993 to 2013 (Bassett et al., 2015; Booth, Rowlands and Dollman, 2015).

Education policies may, therefore, aim to promote regular physical activity to reduce the negative effects on well-being of not engaging in any kind of moderate to vigorous physical activity, especially during early adolescence, to counter this trend and its consequences for student well-being as well as possible lifelong implications.

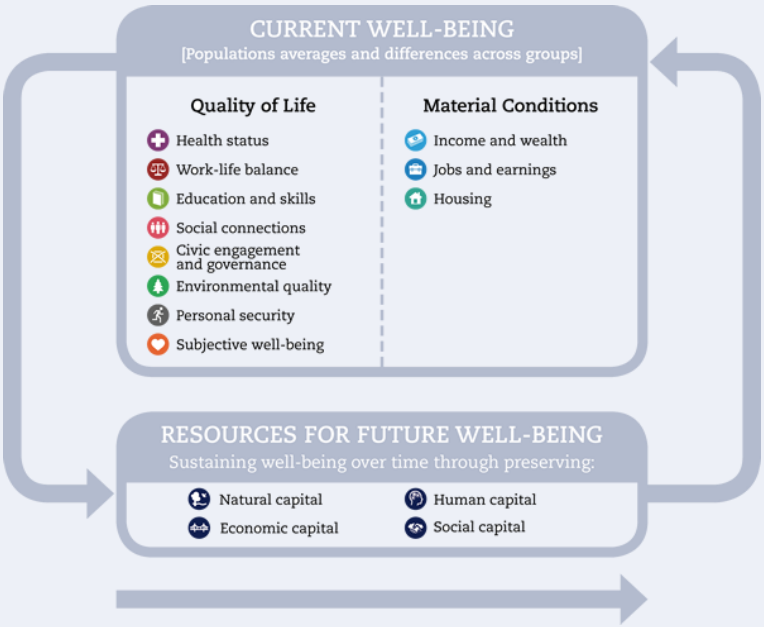
Box 4.1. The OECD Framework for Measuring Well-being and Progress

Several countries and jurisdictions participating in this study report that physical and health education is already and explicitly linked to one or more of the indicators in the OECD's Framework for Measuring Well-being and Progress.

This framework comprises 11 dimensions of individual well-being, including 8 quality of life indicators (health status, work/life balance, education and skills, social connections, civic engagement and governance, environmental quality, personal security and subjective well-being) and 3 material conditions (income/wealth, jobs/earnings and housing).

These indicators are underpinned by the idea of sustainability: those resources for future well-being, including natural capital, human capital, economic capital, and social capital.

Figure 4.2. The OECD Well-being Framework



Source: OECD (2017b), *How's Life? 2017: Measuring Well-being*, OECD Publishing, Paris, https://doi.org/10.1787/how_life-2017-en.

Make PE/HE education work for all: Highlight "inclusiveness" as an explicit design principle for physical education curriculum

PISA has shown that the share of disadvantaged students who report not engaging in moderate or vigorous physical activity outside of school is 4.5 percentage points higher than the share of advantaged students who reported doing so (OECD, 2017). PISA has also shown that disadvantaged students are likely to be less aware of the importance of healthy dietary habits. Indeed, socio-economic background is often an important determinant of what activities students can access or how much time they have for doing so.

For many disadvantaged students, curricular physical education is likely to be the only opportunity to engage in supervised, structured physical activity (OECD, 2017a). Well-designed physical education curricula, that include access to extra-curricular activities, can help to reduce inequalities in engagement with physical activity as well as inequalities in knowledge around eating and lifestyle habits. Beyond this, PE/HE curricula could also include activities that foster autonomy and self-control, important domains for the empowerment of disadvantaged students that PE/HE can impact (Laker, 2000; Bailey, 2006).

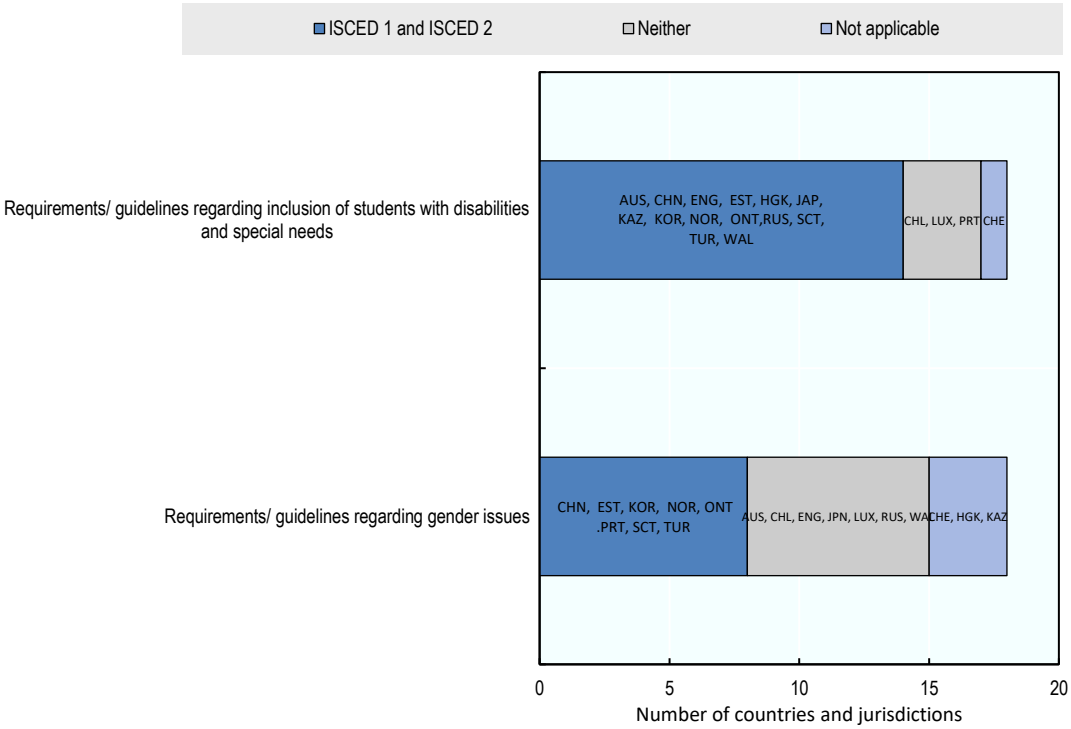
Yet, it is important to acknowledge that PE/HE curricula alone cannot support those students who are at risk with regard to their health, social or psychological well-being. In this sense, holistic approaches that provide counselling in co-operation with community services, could be beneficial for these students (Laker, 2000; Bailey, 2006).

Challenges in gender equity within PE/HE are particularly relevant. Female students tend to participate less than male students in moderate to vigorous physical activity (Froberg et al., 2017; McKenzie et al., 2006; Smith, Lounsbery and McKenzie, 2014; Viciana et al., 2017; Webber et al., 2008), a challenge that was reported by several countries (**Australia, England [United Kingdom], Japan** and **Korea**).

Lower participation rates could be explained by PE/HE having historically been a "gendered" subject in some countries and jurisdictions, particularly those with roots in the more militaristic or drills-based approach to physical education (Kirk, 2009). For instance, in countries like **England (United Kingdom)**, where sports play an important role in the curriculum, it is not uncommon to split students by gender during ISCED 2. According to Penney (2002), girls and boys gain experiences in PE/HE lessons that reinforce stereotypical images, attitudes and behaviours related to "how they should feel about their own and others' bodies, who can legitimately participate in what physical activities, when and why". Yet, only eight countries and jurisdictions (44%), issue requirements or guidelines regarding gender issues in physical education (**China, Estonia, Korea, Norway, Ontario [Canada], Portugal, Scotland [United Kingdom]** and **Turkey**). In **Switzerland**, policies and regulations differ by canton (Figure 4.3).

Figure 4.3. Policies and regulations for standards, inclusion and gender in physical education

Are there any requirements or guidelines regarding the inclusion of students with disabilities or special needs? Are there any requirements or guidelines regarding gender issues in physical education?



Notes: Hong Kong (China), Kazakhstan, Norway and Switzerland indicate that one or more of these items are not applicable. In Kazakhstan, guidelines on gender are outlined in subject plans. In Switzerland, policies and practices vary at the level of the canton.
Source: Education 2030 International Comparative Review of Physical Education questionnaire (2018), Curr. 1.6, 1.7, and 1.8.

Where policies and guidelines for gender and/or inclusion are in place, they apply to both ISCED 1 and ISCED 2.

- In **England (United Kingdom)**, there are recent initiatives like the media campaign #ThisGirlCan, which used social media channels to highlight support and encourage young women to be active and to celebrate the enjoyment that can occur within physical activity, sports and physical education.
- **Korea** reports a range of studies that have been undertaken to explore pathways to increase the engagement of female students in PE/HE. For example, a policy initiative, "Activating female student engagement in PE/HE", allocated budget to each local educational departments in 2016. The policy gave autonomy to schools to implement policies for improving the engagement of female students in PE/HE. This flexibility to use the available budget as needed and appropriate was reported to allow schools and PE/HE teachers to develop a range of programmes specifically

Challenges in gender equity also extend to the workforce. In many countries included in this curriculum analysis exercise, there are more female teachers than male in primary and lower secondary schools. However, more men are PE/HE teachers. With few female teachers and role models, girls might integrate an understanding of PE/HE as a

male-dominated subject area. To be able to change unwanted gender gaps requires systematic knowledge. A first step in this line could be developing reporting systems that can provide information about practices, and provide a basis for change.

Beyond gender, countries have focused on driving inclusiveness within PE/HE for children with disabilities or special learning needs. Fourteen (of the eighteen) participating countries and jurisdictions (78%) provide requirements or guidelines regarding the inclusion of students with disabilities or special needs (**Chile, Luxembourg** and **Portugal** do not report any, while in **Switzerland** these are established at the canton level) (**Figure 2.7**).

Other areas where efforts need to continue include ensuring that low-performing students are engaged in PE/HE, an issue reported by **Australia**, **England (United Kingdom)**, **Japan** and **Korea,** and including education on sexual and LGBT (lesbian, gay, bisexual, and transgender) issues.

If PE/HE wants to be a driver of inclusivity, it is important that the implementation of the PE/HE curricula ensures participation opportunities and access for the diverse range of students (e.g. appropriate content and focus on types of activity, adequate forms of deliveries, diverse teacher profiles for PE/HE, etc.). This way, PE/HE could become a more attractive learning area for those students who are currently less engaged in the subject. Similarly, it is important that PE/HE includes gender and disability guidelines together with a relevant choice of activities that facilitates student participation and avoids the reinforcement of gender stereotypes and gender biases.

Move towards knowledge-rich, competency-based curricula: *Incorporate cross-curricular themes and competencies into key concepts of physical and health education*

Countries and jurisdictions provide different descriptions of their curriculum design choices depending on the emphasis they place in content and competency development. Box 4.2 provides a general description about content- and competency-based curriculum models. While they are not categorical alternatives, countries and jurisdictions broadly described their latest curriculum as following (Table 4.4):

1. a content-based approach,
2. a competency-/ skills-/ outcomes-/ experienced-based, or
3. a mixed approach.

For example:

- **Wales (United Kingdom)** (2018), **Japan** (2017), **Korea** (2015), **Norway** (Knowledge Promotion Reform, 2006) and **Luxembourg** (2009) reported a redesign of content-based to competency-based or outcomes-based curricula through physical and health education curriculum reforms.
- **Australia** (2015), **England (United Kingdom)** (2014), and **Russia** (2017) reported a more content-oriented curriculum redesign. **Russia** further indicated a movement towards greater personalisation in physical and health education, including greater student agency and flexibility to choose between PE/HE at school and extra-curricular physical activities outside of school.

Box 4.2. Competency-based and content-based curriculum choices

A **competency-oriented curriculum** may be loosely defined as "a curriculum that emphasises the complex outcomes of a learning process (i.e. knowledge, skills and attitudes to be applied by learners), rather than mainly focused on what learners are expected to learn about in terms of traditionally defined content" (International Bureau of Education, n.d.). Competency-based curricula are criteria-based and goals oriented, flexible and adaptive to students' and school contexts.

A **content- or subject-oriented curriculum** is a model of curriculum in which content is divided into separate and distinct subjects or disciplines, such as languages, mathematics and social studies. The term "content-based" or "subject-based" covers the full range of distinct subjects and fields of study, including more traditional subjects such as mathematics or history, and newer subjects such as media education and information and communication technology (ICT).

It is of critical importance to highlight that the OECD Education 2030 working group has identified that countries usually perceive a false dichotomy between "content-based curriculum" and "competency-based curriculum". The effective development of competencies requires nurturing knowledge (i.e. content, concepts), skills, attitudes and values. And, thus, an integrated model of a "concept-driven, competency-based curriculum" is starting to emerge as a response, as was reported by British Columbia, Canada, at the OECD Education 2030 project's meeting, May 2019.

One of the most common challenges faced by countries in today's curriculum reforms is how to incorporate emerging key competencies or new themes in curricula that are already overloaded.

Table 4.4. Curriculum reform schedules and design choices

Among the countries and jurisdictions that contributed national case studies, what are the latest and future curriculum reforms, and how is the curriculum design described?

		Year of most recent PE/HE curriculum reform	Design concepts the curriculum emphasises, i.e. content-based, competency-based, both, or other	Next PE/HE curriculum reform/ revision scheduled for? Are reforms ongoing?
OECD country/jurisdiction	Australia	2015	Content	Ongoing monitoring and revision, formal review in 2021
	Chile	2015*	Skills	n.a
	England (United Kingdom)	n.a	Content	n.a
	Estonia	2014	Content	Ongoing
	Japan	2016	Competency/outcomes	Ongoing, to be concluded in 2019/20
	Korea	2017	Competency	n.a
	Luxembourg	2015	Competency	n.a
	Norway	2009	Outcomes	n.a
	Ontario (Canada)	2015	Competency/outcomes	Ongoing Subject Renewal Reform to be concluded in 2020
	Portugal	2001	Skills	n.a
	Scotland (United Kingdom)	2010	Experiences/outcomes	Next reform/revision ongoing
	Switzerland	n.a	Varies by canton	n.a
	Turkey	n.a	Competency	Ongoing (to be concluded in 2023)
	Wales (United Kingdom)	2008	Competency	Ongoing, prosed curriculum to be implemented from September 2018
Partner country/jurisdiction	China		Content	n.a
	Hong Kong (China)	2017	Mixed	n.a
	Kazakhstan			
	Russian Federation	2017	Content	n.a

Notes: Only countries and jurisdictions that contributed national case studies are included in this table. References to the 2015 elementary Health and Physical Education curriculum in Ontario (Canada) are not current since an updated version of Ontario's elementary Health and Physical Education was issued in 2019, after data for this report was collected.
Source: National case studies.

Strategies to incorporate cross-curricular competencies

As seen in Figure 4.4 a number of countries and jurisdictions are starting to use PE/HE as a platform to include the development of cross-curricular competences and skills:

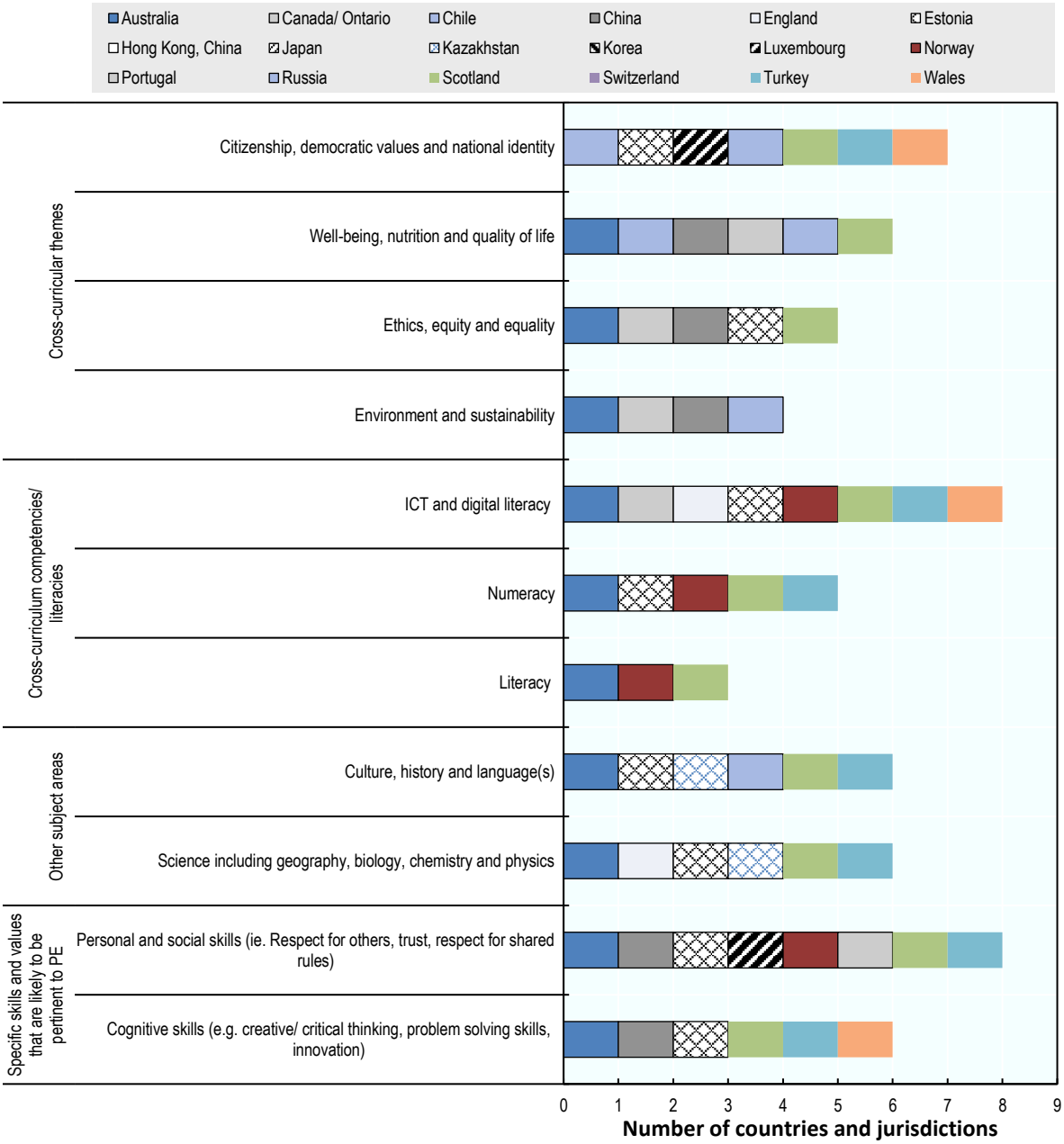
- With regard to cross-curricular competencies/literacies, eight participating countries and jurisdictions expect PE/HE to incorporate information and communication technology (ICT) and digital competence; four incorporate numeracy; and two incorporate literacy.
- Regarding specific skills and values that are likely to be pertinent to physical education, seven participating countries and jurisdictions expect PE/HE to incorporate personal and social skills, i.e. confidence, respect, motivation and meta-cognition; and four to incorporate ethics, values and equality; six connect cognitive skills e.g. creative/critical thinking, problem solving skills.

Strategies to incorporate cross-curricular themes

In the majority of countries and jurisdictions (72%), the physical education curriculum is expected to connect with other cross-curricular themes (e.g. well-being, technology) and as well as key concepts from subjects like biology, physics or geography, pointing to the interrelation between PE/HE and cross-curricular themes (Figure 4.4). For example:

- In the area of cross-curricular themes,[1] six participating countries and jurisdictions expect PE/HE to incorporate concepts of citizenship, democratic values and national identity; five incorporate well-being, nutrition and quality of life and another five report ethics, equity and equality; and four incorporate environmental sustainability.
- As for other subject areas, five participating countries and jurisdictions expect PE/HE to incorporate culture, history and languages; and five incorporate science, including geography, biology, chemistry and physics.

Figure 4.4. Cross-curricular themes in PE/HE



Note: These are self-reported cross-curricular themes and subjects gathered through the International Comparative Review of Physical Education—data therefore differ from the Education 2030 Learning Framework and Curriculum Content Mapping exercise findings.
Source: E2030 International Comparative Review of Physical Education questionnaire (2018).

Making dynamic physical education a reality in school

Address curriculum gaps: Align goals, pedagogies and assessments, in particular using ICT as an opportunity for enhanced pedagogies and innovative assessments

Reeves (2006) states that "the success of any learning environment is determined by the degree to which there is adequate alignment among eight critical factors: 1) goals; 2) content; 3) instructional design; 4) learner tasks; 5) instructor roles; 6) student roles; 7) technological affordances; and 8) assessment" (Reeves, 2006, p. 294). In educational contexts, the most commonly misaligned factor among these is assessments (idem).

Countries often experience a misalignment between objectives and results, a "curriculum gap". For example, the US Department of Health and Human Services (2012) reported that intended psychological and affective outcomes (as recorded in a written or official curriculum) and the reality experienced in many PE/HE programmes might not always correspond. This "curriculum gap" may be a result of students feeling uncomfortable and anxious in a physical activity setting, through low self-esteem, a perceived lack of co-ordination, or anxiety arising from mandatory participation due to the lack of student-centred approaches (OECD, 2017).

Teachers' pedagogical approaches are crucial in this sense, as they mediate the effects of participation in any school domain (Camiré, Trudel, and Forneris, 2012; Goudas and Giannoudis, 2008, 2010; Mandigo, Corlett and Ticas, 2016). Relationship building, teaching and effective planning seem necessary for consistently positive outcomes. In this sense, it is important to ensure that school leaders and teachers can design PE classes and other forms of physical activity in school, centring on students' psychological well-being (Collingwood et al., 2000).

This is especially important for countries embarking on forward-looking PE/HE curricular reforms, incorporating competency-based design concepts or diverse leaning outcomes in their curricula. Learning outcomes are increasingly defined with a wider scope of target goals as formulated in the curriculum; however, pedagogy and instruction and assessment are still to be redesigned.

Traditionally, military drills and a pathogenic approach to health have influenced the development of PE/HE curricula, leading learning outcomes to be vaguely formulated in the subject (Kirk, 2009; Redelius, Fagrell and Larsson, 2009). As a result, teachers have not always clarified learning goals and objectives, resulting in students not knowing what they are supposed to learn during lessons (Annerstedt and Larsson, 2010; Kirk, 2010; Larsson and Nyberg, 2016; Redelius, Quennerstedt and Øhman, 2015).

In the same fashion, assessment in PE/HE has traditionally focused on what is easy to measure, e.g. sports and physical achievement by tests, rather than on what is expected in terms of student individual, social and affective outcomes (López-Pastor et al., 2013). New approaches to assessments in PE/HE are emerging, however, as with the introduction of forward-looking curricula.

Increasing use of technology and devices is cited as part of the broader social trends that are contributing to risk factors such as sedentary lifestyles and inadequate physical activity among children and young people. However, there are promising signs that technology and ICT can be part of the solution in improving physical and health education in schools: the issue is how and when it is used (Dumont, Istance and Benavides, 2010). Emerging examples from research include:

- promoting a learner-centred approach, particularly with regard to the role of key emotions and competencies, such as motivation (OECD, 2013).
- improving student engagement through innovative approaches like gamification.
- differentiating students' experiences and feedback based on personalised data generated by fitness and tracking devices (OECD, 2013).
- personalised fitness and tracking devices for changing students' habits and behaviours. It is found to be more effective when computer-mediated interventions (including the use of mobile devices) cater to individual feedback data and needs, preferences and stage of behaviour change, so as to promote higher levels of physical activity, improve health nutrition, and reduce risky behaviours such as smoking (Aston, 2018; Civljak et al., 2013; Smedslund, 2017).

In line with this, **England (United Kingdom)**, **Japan**, **Korea**, **Norway** and **Russia** have nominated ICT/digital technology as a potential area for further development and inclusion within physical and health education. Examples include:

- considering how ICT and personal devices may be used within physical and health education to promote student understanding of their physical activity and eating habits, such as wearable devices to observe levels of physical activity, sleep, and nutritional intake (i.e. "fitbits", pedometers, personal mobiles/health and fitness apps and other movement/sleeping tracking devices)
- using time-lapse videos to record and replay practices and techniques; timing sensors
- using virtual reality, augmented reality, and artificial intelligence as part of school facilities or instructional devices for physical and health education.

Value teacher agency and teacher well-being: Support shared responsibilities with communities

Students benefit the most when teachers who know their needs best can use their agency to design ad hoc learning environments. In this sense, it is important that countries and jurisdictions grant teachers autonomy to enable their agency to make decisions. Beyond this, teachers also need support to be able to make informed decisions about the most appropriate content, pedagogical approaches or assessment for their students, given the context in which they operate. In line with this, some countries report an increasing move towards supporting teacher's agency for adapting curriculum implementation to their given educational ecosystem (**Australia**, **Norway**, **Ontario** [**Canada**]).

It is important to note that in many contexts the burden on teachers seems to increase as an unintended consequence of the teacher agency model. For example, countries like **Japan** report that teacher burnout is an increasing concern, with PE/HE teachers responsible for conceptualising the translation of new curriculum designs into class practices, as well as being responsible in many cases for extra-curricular activities.

Articulating the concept of "shared responsibilities" involving not only the whole school but also communities beyond school can be an important lever for ensuring teacher well-being, while enabling teacher agency to interact with the educational ecosystem. In this line, teachers can be granted the opportunity to tap into external resources like community facilities or community members to support curriculum implementation. This approach is especially relevant in rural areas where decreasing rates of fertility make it difficult to hire PE/HE teachers or to provide PE-related facilities at each school, accordingly.

To do this, it is important that teachers, communities and schools are given the resources to support teacher agency, teacher well-being and shared responsibilities with communities. Such resources might include:

- **Resources that can support curriculum implementation**: Achievement criteria adapted at the school level, sample lessons and pedagogical guidelines can help teachers to make the most of their agency.
- **Professional learning**: Countries report that as curricula with broader goals are conceived, greater levels of staff professional development are needed to ensure that teachers have the necessary skills to implement curricula with reduced prescription of subject content. Similarly, opportunities for training of community members in key topics like student safety when these are expected to participate in PE/HE classes or extra-curricular activities is also important.
- **Enabling mechanisms for sharing best practices**: Knowledge-broker mechanisms that facilitate peer learning and best practice sharing can be important levers for translating innovations in curriculum design into practice and for allowing teachers to interact with the educational ecosystem.

Building knowledge base for systemic change towards a new vision

Monitor implementation: Focus in particular on student well-being, and pilot new curriculum contents, pedagogies and assessments

Countries and jurisdictions usually report new curriculum content, pedagogies and assessments are not always effectively aligned when taken to class settings, or they are difficult to scale up. In this sense, piloting and monitoring mechanisms are useful tools for the effective implementation of new curricular reforms:

- Piloting new curriculum contents, pedagogies and assessments facilitates weeding out ineffective approaches in a timely manner, before these are scaled up.
- Monitoring and evaluating mechanisms allow countries to track the effectiveness of approaches for implementing new curriculum content, pedagogies and assessments as these are scaled up.

However, only few countries and jurisdictions reported making use of pilots or of the evaluation and quality assurance processes to oversee how curricula were translated to schools.

- In **Australia**, the Australian Curriculum, Assessment and Reporting Authority (ACARA) monitors curriculum implementation, recording any issues to be raised for consideration during formal curriculum reviews. The next review for physical and health education is scheduled for 2021. Monitoring and reporting on student well-being and engagement have been on the national education agenda since 2004.
- In **Wales (United Kingdom)**, Sport Wales – the national organisation responsible for developing and promoting physical activity and sports, sponsored by the Welsh government – administers the School Sport Survey, a survey of students and teachers responsible for physical education and school sport delivery. The survey explores students' attitudes and participation in school-based and community sports and collects data on the provision of physical education and sports activities in schools across Wales.

Monitoring mechanisms can also lever indicators on key areas for student well-being, like student safety or gender markers. This would allow countries and jurisdictions to obtain granular data on how in-class practices contribute to student well-being to inform future reform through learning.

However, one important consideration when introducing monitoring systems is to assess the bureaucratic burden that many schools already have. Approaches that streamline monitoring systems, as opposed to making them subject-specific, can be helpful in this line.

Close the knowledge gap in PE/HE: Make PE curriculum design more evidence-based

While the evidence base on physical education, physical activity and child/youth outcomes is expanding, it nonetheless remains an under-developed area of research within comparative curriculum studies. The literature review, together with the experiences and expertise provided by countries and jurisdictions participating in this curriculum analysis exercise highlight some key gaps in the evidence, and priority areas for development and further research (Table 4.5). Further research in these areas will contribute to making PE/HE curriculum development process more systematic and evidence-based, valuing student agency and student well-being, rather than focusing on continuous political and ideological debates.

Table 4.5. Gaps in the evidence and areas for further development

Areas for further research	Topics/direction within areas for further research
Evidence-based policy and curriculum in health and physical education	• More research, especially longitudinal studies and more comprehensive meta-analyses, are needed to answer the impacts of PE curriculum to inform the development of evidence-based policies, in particular sub-groups of interest ((Cook and Kohl, 2013 , Alvarez-Bueno et al., 2017b; Fedewa and Ahn, 2011; Sibley and Etnier, 2003). • Research on causal relationships between identified mediators, physical health and developmental outcomes in later childhood and adulthood (Aston, 2018).
Research on the relationships and factor analysis in physical and health education	• Research on the relationship / developmental pathways among physical, lifestyle, social, health, and cognitive outcomes. • Research on the relationships between physical activity, fitness and academic performance, and socio-economic status (Biddle and Asare, 2011, Efrat, 2011) ; and, in particular, in subject areas other than mathematics, reading and other language-related skills (Alvarez-Bueno et al., 2017a). • Research on the impact of physical activity on specific groups of students, e.g. students from minority backgrounds, hard-to-reach families, LGBT children, etc. who face a disproportionate risk of experiencing mental health issues (McConnell, 2018).
Inclusion strategies for physical education and physical activities at school	• Research on inclusive physical education curriculum and instructional strategies, and school level interventions to increase participation of less representative groups in physical education, physical activities and extra-curricular sports, identifying specific barriers and incentives.
Effects of innovative pedagogies and assessments in physical and health education	• Impact of technology on interventions, particularly for increasing levels of physical activity among children and youth, and promoting positive behavioural change (Aston, 2018).

Notes

1. For some countries and jurisdictions, cross-curricular themes are set out in a supplementary document promoting competencies across the whole curriculum (rather than recorded in the written physical and health education curriculum per se).

References

Alvarez-Bueno, C. et al. (2017a), "The effect of physical activity interventions on children's cognition and meta-cognition: A systematic review and meta-analysis", *Journal of the American Academy of Child and Adolescent Psychiatry*, Vol. 56/9, Elsevier, New York, pp. 729-738, https://doi.org/10.1016/j.jaac.2017.06.012.

Alvarez-Bueno, C. et al. (2017b), "Academic achievement and physical activity: A meta-analysis", *Pediatrics*, Vol. 140/6, Elsevier, New York, pp. 1-14, https://doi.org/10.1542/peds.2017-1498.

Annerstedt, C. and H. Larsson (2010), "I have my own picture of what the demands are..." Grading in Swedish PEH – problems of validity, comparability and fairness, *European Physical Education Review* 16(2) 97-115.

Aston, R. (2018), "Physical health and well-being in children and youth: Review of the literature", *OECD Education Working Papers*, No. 170, OECD Publishing, Paris, https://doi.org/10.1787/102456c7-en.

Bailey, R. (2006), "Physical education and sport in schools: A review of benefits and outcomes", *Journal of School Health*, https://doi.org/10.1111/j.1746-1561.2006.00132.x.

Bassett, D. R. et al. (2015), "Trends in physical activity and sedentary behaviors of United States youth", *Journal of Physical Activity and Health*, http://doi.org/10.1123/jpah.2014-0050.

Bauman, A.E. et al. (2012), "Correlates of physical activity: why are some people physically active and others not?", *The Lancet*, Vol. 380/9838, pp. 258-71, http://dx.doi.org/10.1016/S0140-6736(12)60735-1.

Booth, V. M., A. V. Rowlands and J. Dollman (2015), "Physical activity temporal trends among children and adolescents", *Journal of Science and Medicine in Sport*, https://doi.org/10.1016/j.jsams.2014.06.002.

Centers for Disease Control and Prevention (2010), "The association between school based physical activity, including physical education, and academic performance", US Department of Health and Human Services, https://www.cdc.gov/healthyschools/pecat/pa-pe_paper.pdf.

Civljak, M. et al. (2013), "Internet-based interventions for smoking cessation", *Cochrane Database of Systematic Reviews*, https://doi.org/10.1002/14651858.CD007078.pub4.

Dumont, H., D. Istance and F. Benavides (eds.) (2010), *The Nature of Learning: Using Research to Inspire Practice*, Educational Research and Innovation, OECD Publishing, Paris, https://doi.org/10.1787/9789264086487-en.

European Union (2013), *Physical Education and Sport at School in Europe*, Education, Audiovisual and Culture Executive Agency (European Commission) and Eurydice (Education, Audiovisual and Culture Executive Agency), https://doi.org/10.2797/49648.

Fedewa, A. L. and Soyeon Ahn (2011), "The effects of physical activity and physical fitness on children's achievement and cognitive outcomes: A meta-analysis", *Research Quarterly for Exercise*

and Sport, Taylor and Francis, New York, Vol. 82/3, pp. 521-535, https://doi.org/10.5641/027013611X13275191444107.

Froberg, A. et al. (2017), "Levels of physical activity during physical education lessons in Sweden", *Acta Paediatrica (Oslo, Norway : 1992)*, https://doi.org/10.1111/apa.13551.

ICHPER (1971), "Proceedings of the 13th ICHPER Congress", in *13th International Congress of the ICHPER*, International Council for Health, Physical Education, Recreation, Washington DC, pp. 2–189.

International Bureau of Education (n.d.), "Competency-based curriculum", http://www.ibe.unesco.org/en/glossary-curriculum-terminology/c/competency-based-curriculum.

Jackson, W. M. et al. (2016), "Physical activity and cognitive development: A meta-analysis", *Journal of Neurosurgical Anesthesiology*, Vol. 28/4, Wolters Kluwer Health, Alphen aan den Rijn, pp. 373-380, https://doi.org/10.1097/ANA.0000000000000349.

Kirk, D. (2009), *Physical Education Futures*, Routledge, London, https://doi.org/10.4324/9780203874622.

Laker, A. (2002), *Beyond the Boundaries of Physical Education: Educating Young People for Citizenship and Social Responsibility*, Routledge, London.

Larsson, H., and G. Nyberg, G. (2016), "'It Doesn't Matter How They Move Really, as Long as They Move.' Physical Education Teachers on Developing Their Students' Movement Capabilities", *Physical Education and Sport Pedagogy* 22:2, 137-149, https://doi.org/10.1080/17408989.2016.1157573.

López-Pastor, V.M. et al. (2013), "Alternative assessment in physical education: A review of international literature", *Sport, Education and Society*, 18(1), 57-76.

Lynch, T. and G. J. Soukup (2016), "Physical education, 'health and physical education', 'physical literacy' and 'health literacy': Global nomenclature confusion", *Cogent Education*, https://doi.org/10.1080/2331186X.2016.1217820.

McConnell, E. (2018), *Multiple Minority Stress and LGBT Community Resilience among Sexual Minority Men*, NBCI, https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5846479/.

McKenzie, T. L. et al. (2006), "Girls' activity levels and lesson contexts in middle school PE: TAAG baseline", *Medicine and Science in Sports and Exercise*, https://doi.org/10.1249/01.mss.0000227307.34149.f3.

OECD (2017a), *PISA 2015 Results (Volume III): Students' Well-Being*, OECD Publishing, Paris, https://doi.org/10.1787/9789264273856-en.

OECD (2017b), *How's Life? 2017: Measuring Well-being*, OECD Publishing, Paris, https://doi.org/10.1787/how_life-2017-en.

OECD (2013), *Innovative Learning Environments*, Educational Research and Innovation, OECD Publishing, Paris, https://doi.org/10.1787/9789264203488-en.

Patalay, P. et al. (2016), "Mental health provision in schools", *Child and Adolescent Mental Health*, 21(3), 139–147.

Penney, D. (2002), *Gender and Physical Education: Contemporary Issues and Future Directions*, Routledge, London.

Pez, O. et al. (2013), *The School Children Mental Health Project: Phase 2: The School Survey*, SCMHE Group, Paris.

Redelius, K., M. Quennerstedt and M. Øhman (2015), "Communicating aims and learning goals in physical education: Part of a subject for learning?", *Sport, Education and Society*, ISSN 1357-3322, E-ISSN 1470-1243, Vol. 20, no 5, p. 641.

Redelius, K., B. Fagrell and H. Larsson (2009), "Symbolic capital in physical and health education: To be, to do or to know? That is the gendered question", *Sport, Education and Society*, 14:2, 245-260, https://doi.org/10.1080/13573320902809195.

Reeves, T. C. (2006), "How do you know they are learning? The importance of alignment in higher education", *International Journal of Learning Technology*, Vol. 2, Issue 4, pp. 294-309.

Roblin, L. (2007), "Childhood obesity: Food, nutrient, and eating-habit trends and influences", *Applied Physiology, Nutrition, and Metabolism*. https://doi.org/10.1139/H07-046.

Sibley, B. A. and J. L. Etnier (2003), "The relationship between physical activity and cognition in children: A meta-analysis", *Pediatric Exercise Science*, Vol.15/3, North American Society of Pediatric Exercise Medicine, Human Kinetics, Champaign, pp. 243-256, https://doi.org/10.1123/pes.15.3.243.

Smedslund, G. (2017), "Effects of early, computerised brief interventions on risky alcohol use and risky cannabis use among young people", *Campbell Systematic Review*, No. 6, www.campbellcollaboration.org.library/computerised-interventions-youth-alcohol-cannabit-use.html.

Smith, N. J., M. A. F. Lounsbery and T. L. McKenzie, (2014), "Physical activity in high school physical education: Impact of lesson context and class gender composition", *Journal of Physical Activity and Health*, https://doi.org/10.1123/jpah.2011-0334.

Suhrcke, M., D. Pillas and C. Selai (2008), *Economic Aspects of Mental Health in Children and Adolescents: Social Cohesion for Mental Well-Being among Adolescents*", WHO Regional Office for Europe, Copenhagen.

UNESCO (United Nations Educational, Scientific and Cultural Organization) (2015), *Quality Physical Education: Guidelines for Policy Makers*, UNESCO, Paris, http://unesdoc.unesco.org/images/0023/002311/231101E.pdf.

UNESCO (2009), *International Technical Guidance on Sexuality Education: An evidence-informed approach for schools, teachers and health educators*, UNESCO, Paris, https://unesdoc.unesco.org/ark:/48223/pf0000183281.

UNESCO (1978), *International Charter of Physical Education, Physical Activity and Sport*, UNESCO, Paris, http://www.unesco.org/new/en/social-and-human-sciences/themes/physical-education-and-sport/sport-charter/.

US Department of Health and Human Services (2012), *Physical Activity Guidelines for Americans Midcourse Report: Strategies to Increase Physical Activity among Youth*, US Department of Health and Human Services, https://health.gov/paguidelines/midcourse/.

Vazou, S. et al. (2016), "More than one road leads to Rome: A narrative review and meta-analysis of physical activity intervention effects on cognition in youth", *International Journal of Sport and Exercise Psychology*, Taylor and Francis, New York, Vol. 14, https://doi.org/10.1080/1612197X.2016.1223423.

Viciana, J. et al. (2017), "Effect of two alternated teaching units of invasion team sports on the tactical learning in primary schoolchildren", *International Journal of Performance Analysis in Sport*, https://doi.org/10.1080/24748668.2017.1331575.

Watson, A. et al. (2017), "Effect of classroom-based physical activity interventions on academic and physical activity outcomes: A systematic review and meta-analysis", *International Journal of*

Behavioural Nutrition and Physical Activity, Vol. 14/1, BioMed Central, London, pp. 114 (24 pages), https://doi.org/ 10.1186/s12966-017-0569-9.

Webber, L. S. et al. (2008), "Promoting physical activity in middle school girls: Trial of activity for adolescent girls", *American Journal of Preventive Medicine*, https://doi.org/10.1016/j.amepre.2007.11.018.

World Health Organization (2015), *Injuries and violence: The facts 2014*, WHO, Geneva, http://apps.who.int/iris/bitstream/10665/149798/1/9789241508018_eng.pdf?ua=1&ua=1&ua=1.

Zhang, Y. et al. (2015), "Association between physical activity and teacher-reported academic performance among fifth-graders in Shanghai: A quantile regression", *PLoS ONE*, Vol. 10/3,http://dx.doi.org/10.1371/journal.pone.0115483.

Annex A. Methodology

To advance our global understanding of comparative physical and health education curriculum, and in partnership with key and partner countries and jurisdictions, the OECD team, project experts, and partner jurisdictions jointly collaborated on three exercises to supplement available data on physical and health education curriculum with richer detail derived from participating systems. These initiatives include.

1. International comparative analysis of physical education
2. National case studies
3. Examples of innovative and future-oriented practices in physical education

The international comparative analysis of physical education was a fact-finding questionnaire designed to generate information on various aspects of physical education policies, curriculum, practices and perspectives in participating systems.

List of countries and jurisdictions that completed the International Curriculum Comparison of physical and health education questionnaire

OECD country/jurisdiction
Australia, Chile, England (United Kingdom), Estonia, Japan, Korea, Luxembourg, Norway, Ontario (Canada), Portugal, Scotland (United Kingdom), Switzerland, Turkey, Wales (United Kingdom)
Partner country/jurisdiction
China, Hong Kong (China), Kazahkstan, Russian Federation

Nominated experts from these systems were then invited to contribute original case studies to complement facts from the international comparative analysis questionnaire with qualitative insights into the physical education curriculum, policies, and reforms in different systems.

List of countries and jurisdictions that contributed national/ jurisdictional case studies

OECD country/jurisdiction
Australia, England (United Kingdom), Japan, Korea, Luxembourg, Norway, Ontario (Canada), Portugal, Wales (United Kingdom)
Partner country/jurisdiction
China

The third exercise aimed to gather stories and narratives featuring outstanding and innovative practices and policies in the area of physical education from around the world.

Annex B. Metadata analysis on the impacts of physical education on cognitive outcomes

The following annex presents results from an ad hoc metadata analysis that was conducted to inform evidence in this report. The analysis provides a practical synthesis of the existing evidence of the impacts of physical education (PE) on cognitive outcomes, with a focus on the role of physical activity (PA).

Highlights

- Physical activity does not impede cognitive development and academic achievement; it can even improve cognitive and academic outcomes, particularly in math and reading.
- Curricular physical education is more effective at enhancing cognitive outcomes than integrating physical activity into other subjects or active recess.
- Curricular physical education benefits both math and reading achievements, while integrating physical activity into other subjects or active recess enhances only math achievement.
- Increasing the amount of physical activity and increasing the cognitive demand of physical activity tasks benefit different cognitive skills; both are needed to promote comprehensive cognitive development.
- Aerobic exercise is the most effective type of physical activity for enhancing both cognitive and academic outcomes.
- Physical activity interventions better promote cognitive development when compared to academic instruction interventions.
- The optimal benefits on academic achievement are achieved when physical activity opportunities are offered three times a week.
- The positive effect of physical activity on academic achievement is stronger in co-ed groups than single-gender groups.
- The best group size for administering physical activity to promote academic achievement is ten students per group.
- Physical activity can enhance academic achievement through improving students' engagement with school, particularly time on-task.
- Physical activity is an efficient way to use limited educational resources since it promotes development in multiple aspects at the same time.

Overview of meta-analysis

Meta-analysis is a quantitative synthesis of multiple individual studies investigating the same scientific problem about the relationship between various phenomena (Borenstein et al., 2009). The basic assumption is that there is a common true relationship between these phenomena, but individual studies have measured it with certain error. Meta-analysis uses statistical methods to generate a pooled estimate closest to the unknown true relationship. In this case, meta-analyses were employed to combine individual studies that investigate the relationship between physical activity and cognitive outcomes or academic achievement; and a pooled estimate of the effect size of physical activity on cognitive outcome or academic achievement is generated.

The aggregation of information in meta-analysis allows for the quantification of the consistency of findings across individual studies; and sources of inconsistency can be identified (Borenstein et al., 2009).

For instance, the effect of physical activity on cognitive outcomes may differ by the intensity of physical activity; and intensity is considered to be a moderator in this relationship and a source of inconsistency of results from individual studies. Effect size in meta-analysis refers to the standardised mean difference of the outcome variable. In randomised controlled trials or quasi-experimental studies, it refers to the standardised mean difference in the outcome variable between the treatment group who receives the intervention and the control group.

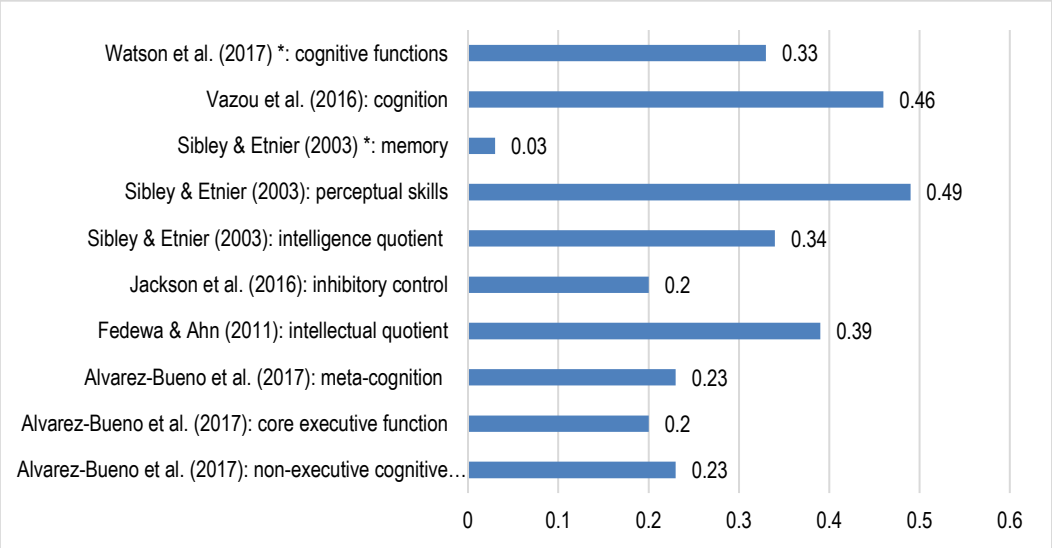
If cross-sectional design studies in which there is no manipulation of participants' behaviour are included in meta-analysis, effect size can refer to the standardised mean difference between participants that can be grouped into two or more groups alongside a certain dimension, such as level of physical activity.

The unit for effect size is standard deviation. There is no reliable rule-of-thumb to determine what effect size is small, medium and large; the substantive significance of an effect size needs to be considered in the specific context of the research problem. Effect size will be shortened as ES in the following sections. Physical activity interventions will be shortened as PA or PA interventions to avoid redundancy.

Effects on cognitive development

Meta-analyses provide evidence that physical activity does not obstruct, but enhances cognitive development in children and adolescents (Alvarez-Bueno et al., 2017a; Fedewa and Ahn, 2011; Jackson et al., 2016; Sibley and Etnier, 2003; Vazou et al., 2016; Watson et al., 2017). Figure B.1 summarises the general pooled effect sizes of physical activity on cognitive outcomes reported by the meta-analyses reviewed for this report.

Figure B.1. Pooled effect size of physical activity interventions on cognitive outcomes by study and outcome type



Note: Effect sizes in rows marked with * are not statistically significant at the $\alpha = 0.05$ level.

Box B.1. Statistical significance

A research finding is considered statistically significant if the probability of obtaining the observed pattern in the data purely by chance is less than the researcher's chosen confidence level when the null hypothesis is true.

In this case, the null hypothesis is that physical activity interventions have no effect on cognitive outcomes; the observed pattern in the data is that PA interventions have positive effects on cognitive outcomes. And the researchers' chosen confidence level in meta-analyses reviewed here are consistently 0.05; it means that the researchers are willing to tolerate the risk of rejecting the null hypothesis when it is true for 5% of the time.

For instance, Alvarez-Bueno et al. (2017a) conducted the most updated meta-analysis of the effect of physical activity interventions on the cognitive outcomes for children and adolescents. Using data from 36 studies that covered 5 527 children and adolescents from 15 countries and economies, they found that PA interventions had statistically significant positive effects on non-executive cognitive functions (ES=0.23), core executive functions (ES=0.2) and meta-cognition (ES=0.23) (Alvarez-Bueno et al., 2017a).

However, when core executive functions and meta-cognition are further divided into their subdomains, the effect of physical activity is not the same across all subdomains. Among the domains under core executive functions, physical activity intervention had the largest statistically significant effect on inhibition (ES=0.38), followed by working memory (ES=0.14); but the effects on selective attention and cognitive flexibility were not statistically significant (Alvarez-Bueno et al., 2017a). Among the domains under meta-cognition, physical activity interventions were particularly effective at enhancing cognitive life skills (ES=0.30), including problem solving, self-awareness of goal setting and self-regulations, while the effect on higher-level executive functioning including fluid intelligence such as reasoning, planning, and creativity (ES=0.19) was smaller in magnitude but still statistically significant (Alvarez-Bueno et al., 2017a). Earlier meta-analyses have also found positive effects of physical activity interventions on intelligence quotient (Fedewa and Ahn, 2011; Sibley and Etnier, 2003).

Curricular physical education is more effective than integrated physical activity

Curricular physical education interventions refer to the practice of allocating specific time in the curriculum for the subject of physical education, while integrated physical activity interventions refers to incorporating physical activity into the teaching of other subjects (physically active lessons) or providing short bursts of physical activity (active breaks with or without curriculum focus), or physical activity during recess or lunch time (Alvarez-Bueno et al., 2017a). When Alvarez-Bueno et al. (2017a) grouped the studies in their analysis by intervention type, they only found statistically significant effects of physical activity on non-executive functioning, selective attention-inhibition, and higher-level executive functions when using data from studies that included a curricular physical education intervention (Alvarez-Bueno et al., 2017a). No statistically significant effect was found when using studies that employed integrated PA interventions (Alvarez-Bueno et al., 2017a). This conclusion is also supported by another meta-analysis that also examined integrated PA interventions; no statistically significant effect was found even though the direction of the effect was positive (Watson et al., 2017).

In summary, these meta-analyses indicate that curricular physical education interventions are more effective at promoting cognitive development than integrated physical activity interventions for children and adolescents.

Increasing the amount of physical activity and enriching its content benefits different cognitive skills

Simply increasing the amount of physical activity could benefit the development of non-executive functioning (ES=0.21), working memory (ES=0.28), and higher-level executive functioning (ES=0.21) (Alvarez-Bueno et al., 2017a). However, selective attention-inhibition (ES=0.49) is more sensitive to physical activity tasks that have a higher cognitive and co-ordinative demand (enriched PA) (Alvarez-Bueno et al., 2017a). Cognitive life skills also benefited from enriched PA programmes, although no studies evaluated the effect of increasing PA amount on cognitive life skills (Alvarez-Bueno et al., 2017a). Therefore, schools need to both increase the amount of physical activity and increase the cognitive and co-ordinative demand of the physical activity tasks in order to promote development in multiple cognitive skills.

Aerobic exercise has the strongest effects on cognitive outcomes

A meta-analysis by Vazou and colleagues (2016) divided the types of physical activities offered in past literature into aerobic exercise, motor skill training and cognitively engaging exercises (such as yoga with meditation) and the combinations thereof. Among these types of physical activities, aerobic exercise showed the strongest effects on promoting cognitive development (Vazou et al., 2016). They drew this conclusion with data from only three studies (Vazou et al., 2016), however. An older meta-analysis by Fedewa and Ahn (2011) also found aerobic exercise to be the most effective type of physical activity at enhancing intelligence quotient and academic achievement combined; they used data from 15 studies.

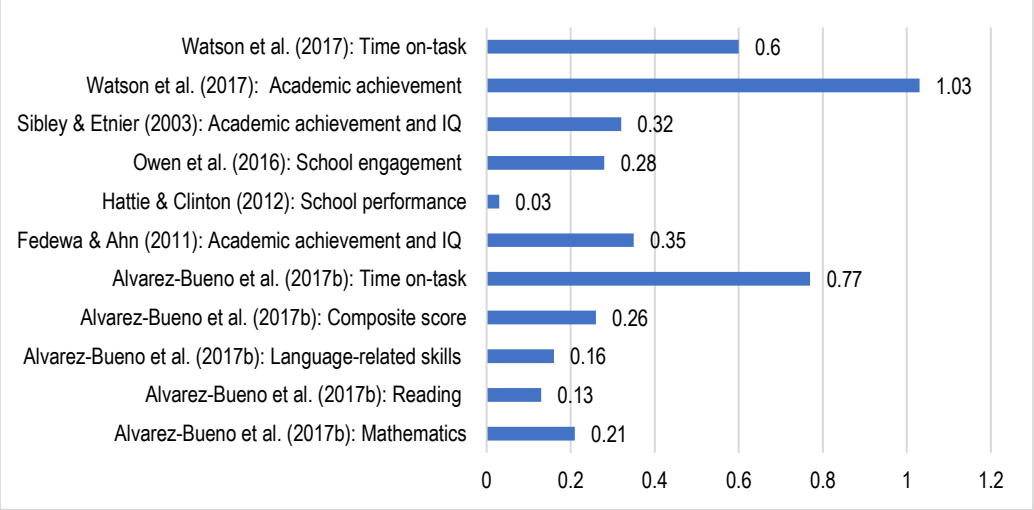
Physical activity better promotes cognitive development than academic instruction

In the meta-analysis conducted by Vazou and colleagues (2016), data from ten studies compared students receiving physical activity interventions to those receiving academic instruction interventions. Children who received PA interventions had better cognitive outcomes than those receiving academic instructions; a medium to large effect (ES=0.57) was found when physical activity interventions were compared to academic instructions (Vazou et al., 2016). It is important to note, however, that these ten studies are not all randomised controlled trials, so differences in cognitive development between control and treatment groups before the PA interventions could have influenced the results in these source studies for Vazou et al. (2016) meta-analysis.

Effects on academic achievement

Results from meta-analyses show that physical activity does not impede, but promotes academic achievement among children and adolescents. Figure B.2 summarises the summary effect sizes from each of the meta-analysis reviewed for this report that examined academic achievement. Except for Hattie and Clinton (2012), which did not report statistical significance, all studies found a statistically significant positive effect of physical activity on academic achievement (Alvarez-Bueno et al., 2017b; Fedewa and Ahn, 2011; Sibley and Etnier, 2003; Watson et al., 2017). One possible explanation for the close to zero effect size in Hattie and Clinton (2012) is that the data reported by four of the articles included in their analysis could lead to underestimation of the effect size. They only included 13 studies in total in this meta-analysis.

Figure B.2. Pooled effect size of physical activity interventions on academic achievement by study and outcome type



One of the most updated meta-analysis on this topic includes 23 studies covering 9 636 children and adolescents in 11 countries (Alvarez-Bueno et al., 2017b). PA interventions had the biggest impact on interdisciplinary composite scores (ES=0.26), followed by math-related skills (ES=0.21), followed by reading (ES=0.13). However, there was no statistically significant effect found for other language-related skills such as vocabulary, speaking and writing (Alvarez-Bueno et al., 2017b). Another meta-analysis that only examined primary school children (Watson et al., 2017) and older meta-analyses (Fedewa and Ahn, 2011; Sibley and Etnier, 2003) also confirmed the positive effects of physical activity intervention on academic achievements, particularly in mathematics, reading and total scores (Fedewa and Ahn, 2011; Sibley and Etnier, 2003). Physical activity also had a positive effect on grade point average, English/language arts, academic readiness, creativity and cross-disciplinary batteries (Fedewa and Ahn, 2011; Sibley and Etnier, 2003).

Although the effect sizes and achievement measures included in each meta-analysis could differ due to technical reasons, the substantive implication is that physical activity interventions could positively impact students' academic achievement, particularly in mathematics and reading. Giving students adequate opportunities for physical activity in school could therefore enhance physical well-being and academic achievement at the same time.

Length, measurement of achievement and frequency of physical activity might matter

Length of intervention alone does not influence the outcomes of physical activity interventions; if the intervention lasts for one week or eight months, it would not affect the effect size of physical activity on academic achievement (Alvarez-Bueno et al., 2017b; Fedewa and Ahn, 2011).

This being said, in the Watson et al. (2017) meta-analysis study, when interventions were less than one year long, no statistically significant effect of physical activity interventions were found when achievement was measured by national standardised tests; however, significant positive improvements measured by national standardised tests are found when the intervention lasted for a full year or more (Watson et al., 2017). Unfortunately, there

were only two studies that examined such long-term interventions, so a summary effect size across studies could not be calculated.

However, the frequency of intervention per week matters such that the best effect was achieved when children and adolescents engaged in physical activity three times a week, followed by twice a week, followed by once a week (Fedewa and Ahn, 2011).

Different physical activities have different effects

Not all types of physical activity have the same effect on academic achievement. When looking at how physical activity interventions are incorporated into the curriculum, only math achievement benefits from both curricular PE programmes (ES=0.16) and integrated PA programmes; reading (ES=0.21) and composite scores (ES=0. 3) only benefited from curricular PE programmes (Alvarez-Bueno et al., 2017a). It is possible that the design of the integrated or extra-curricular PA interventions fit better with math problem solving (Alvarez-Bueno et al., 2017b).

When the interventions are classified by content, aerobic training has the largest positive effect on academic achievement (as seen above with cognitive development), followed by perceptual-motor training and physical education (Fedewa and Ahn, 2011). Note that physical education intervention here refers to the interventions in individual studies that did not clearly describe what activities were included in their interventions; they could have included aerobic training, for instance (Fedewa and Ahn, 2011). But they are not equal to the curricular physical education interventions mentioned in the section on cognitive development. Resistance/circuit training, as well as combined training that included several categories of activities, showed no statistically significant effects (Fedewa and Ahn, 2011).

Other moderators of physical activity interventions' effects on academic achievement

The Fedewa and Ahn (2011) study also examined other moderators that are dimensions along which the effects of PA interventions differ. For example, effects of PA interventions are bigger when it is administered in a co-ed environment than when administered to male or female students separately (Fedewa and Ahn, 2011). The effect size is the largest when there are fewer than 10 students in the intervention group, followed by 10-30 students per group, followed by more than 30 students per group (Fedewa and Ahn, 2011).

Although Alvarez-Bueno et al. (2017a) pointed out that in several individual studies, PA interventions developed by trained specialist teachers resulted in a bigger difference in the academic performance between the group receiving the PA intervention and the control group, they did not use meta-analytic methods to compare the effects of interventions designed by specialist teachers and those designed by untrained teachers. Moreover, an earlier meta-analysis by Fedewa and Ahn (2011) shows that who conducts the intervention does not influence the effect size of PA interventions.

Finally, although Alvarez-Bueno et al. (2017b) found that the effect size of PA interventions on academic achievement does not differ by participants' age, Fedewa and Ahn (2011) found the opposite to be true; primary school children benefited more from PA interventions than secondary school students (Fedewa and Ahn, 2011). This could be caused by the different studies included in these meta-analyses, as Alvarez-Bueno et al. (2017a) included studies published after 2009 and studies in Spanish; and Fedewa and Ahn (2011) included studies with cross-sectional design. More research is needed to ascertain whether age matters for PA interventions' effects on academic achievement.

Box B.2. A moderator case: Exercise intensity matters

The effect of physical activity on cognitive and academic outcomes could differ by exercise intensity. In a study in Spain, three groups of adolescents were randomly assigned to a control group and two treatment groups. Over a four-month period:

- The control group participated in two 55-minute sessions of PE class per week.
- Treatment Group 1 participated in four 55-minute sessions PE class per week and the learning goals, content and pedagogy remained the same as the control group.
- Treatment Group 2 participated in four 55-minute sessions of PE class per week with high intensity – activities that involved a heart rate of 120 bpm or more.

All three groups were taught by a specialist PE teacher. The cognitive skills and academic achievement of all three groups were assessed prior to, and following, the intervention.

Adolescents in Treatment Group 2, the high intensity group, showed a more significant improvement in both cognitive skills and academic achievement as measured by school grades in multiple subjects when compared to both the control group and Treatment Group 1. The advantage of Treatment Group 2 in improvement is statistically significant.

On the contrary, Treatment Group 1 did not experience statistically significantly higher improvement in cognitive skills or academic achievement when compared to the control group, even though they participated in two more sessions of physical education per week.

This study provides evidence suggesting that intensity matters when designing PE classes that aim to promote cognitive and academic development beyond physical health benefits.

Source: Ardoy et al. (2014), "A physical education trial improves adolescents' cognitive performance and academic achievement: The EDUFIT study", https://doi.org/10.1111/sms.12093.

Positive effects of physical activity on school engagement and academic achievement

School engagement can encompass three dimensions: *behavioural engagement*, which refers to students' actions that reflect their involvement in learning activities such as time on-task; *emotional engagement*, which refers to students' positive affective reactions to school, such as enjoying learning; and *cognitive engagement*, which reflects students' commitment to learning, e.g. motivation and learning skills (Owen et al., 2016). A meta-analysis using data from 38 studies covering 71 433 children and adolescents by Owen and colleagues (2016) found that physical activity had a statistically significant positive effect (ES=0.28) on all three dimensions of school engagement combined.

Other meta-analysis that examined physical activity's influence on academic achievement also consistently found a large effect of physical activity on behavioural engagement as measured by students' time on-task; effect size ranged from 0.6 (Watson et al., 2017) to 0.77 (Alvarez-Bueno et al., 2017b). Both acute and chronic physical activities could enhance students' time on-task (Alvarez-Bueno et al., 2017b; Watson et al., 2017). The implication is that short bursts of physical activity could improve students' engagement with learning in the classes immediately following that physical activity; and regular physical activities could facilitate stable, long-term, enhanced student behavioural engagement with school.

Limitations

There are a number of limitations that should be considered in the context of these findings. They may provide fodder for future research:

- A limited number of studies have examined achievement in subjects other than mathematics, reading and other language-related skills. Both Alvarez-Bueno et al. (2017b) and Fedewa and Ahn (2011) were only able to identify one study that examined science achievement that fit their inclusion criteria for meta-analysis.
- The effect of physical education on more diverse cognitive outcomes such as the constructs included in the Education 2030 Learning Framework is also lacking.
- Many meta-analyses only included articles published in English, except for Alvarez-Bueno and colleagues (2017a, 2017b). Evidence from cultures that do not often publish in English is neglected; and results of meta-analysis could vary if those studies were included.
- No meta-analysis so far has tried to calculate effect size by country or economy. Itis possible that culture moderates the effect of physical activity on cognitive and academic outcomes so that the same intervention may have different effects in different cultures.
- Existing meta-analyses do not differentiate data from randomised controlled trials, quasi-experimental design studies and cross-sectional design studies. While randomised controlled trials can provide evidence that supports causation, cross-sectional design studies only provide evidence for association. Evidence from studies with these three types of design should be weighed differently.
- There is limited evidence on the effect of non-school-based PA interventions such as after-school programmes.
- There is limited evidence on the long-term effects of PA interventions after its implementation cessation (Alvarez- Bueno et al., 2017a). For example, it is unclear whether cognitive benefits induced by physical activities in 9th grade can last until the end of high school.
- Limited evidence is available on whether physical activity interventions should be designed and implemented by professionally trained teachers. Information provided by Alvarez-Bueno et al. (2017b) and Fedewa and Ahn (2011) are inconsistent. More research is needed in this regard.
- There are limited studies that allow for the comparison of enhanced PA programmes (increasing the amount of physical activity) with enriched PA

programmes (increasing the cognitive complexity of physical activity tasks). Although Alvarez-Bueno et al. (2017a) was able to compare these two types of interventions; other scholars found there were insufficient studies for them to do the same comparison (Watson et al., 2017).

- Results from existing meta-analysis on which age group can reap the most cognitive and academic benefits from physical activity is mixed (Alvarez-Bueno et al., 2017b; Fedewa and Ahn, 2011; Sibley and Etnier, 2003). More research, especially longitudinal studies and more comprehensive meta-analyses are needed to answer this question.
- Although Watson et al. (2017) indicated that trained research staff can deliver physical activity interventions with higher fidelity to the design than regular school teachers, there is a lack of empirical evidence on how implementation fidelity influences the effect of physical activity interventions.
- There is a lack of studies that objectively measure the intensity of physical activity and meta-analyses that generated effect sizes for physical activity interventions with different intensity (Watson et al., 2017).
- Earlier meta-analyses generally did not differentiate among the various domains of cognitive functioning when examining physical activity interventions' effects on cognition. Newer meta-analyses began to do so (see Alvarez-Bueno et al., 2017a; Jackson et al., 2016). Future meta-analyses should carry on this practice.
- Although meta-analyses have provided evidence that physical activity interventions could enhance school engagement, cognitive outcomes and academic achievement respectively, no study has provided evidence on whether school engagement and cognitive development mediates the effect of physical activity on academic achievement.
- Although several meta-analyses have tried to provide preliminary information on what kind of physical activity is beneficial for cognitive and academic outcomes (Alvarez-Bueno et al., 2017a, 2017b; Fedewa and Ahn, 2011; Vazou et al., 2016), more research is needed to unpack the type of physical activity that is most beneficial for various cognitive and academic outcomes.

References

Alvarez-Bueno, C. et al. (2017a), "The effect of physical activity interventions on children's cognition and meta-cognition: A systematic review and meta-analysis", *Journal of the American Academy of Child and Adolescent Psychiatry*, Vol. 56/9, Elsevier, New York, pp. 729-738, https://doi.org/10.1016/j.jaac.2017.06.012.

Alvarez-Bueno, C. et al. (2017b), "Academic achievement and physical activity: A meta-analysis", *Pediatrics*, Vol. 140/6, Elsevier, New York, pp. 1-14, https://doi.org/10.1542/peds.2017-1498.

Borenstein, M. et al. (2009), *Introduction to Meta-analysis*, John Wiley and Sons, United Kingdom.

Ardoy et al. (2014), "A physical education trial improves adolescents' cognitive performance and academic achievement: The EDUFIT study", https://doi.org/10.1111/sms.12093.

Fedewa, A. L. and Soyeon Ahn (2011), "The effects of physical activity and physical fitness on children's achievement and cognitive outcomes: A meta-analysis", *Research Quarterly for Exercise and Sport*, Taylor and Francis, New York, Vol. 82/3, pp. 521-535, https://doi.org/10.5641/027013611X13275191444107.

Hattie, J. and J. Clinton (2012), "Physical activity is not related to performance at school", *Archives of Pediatrics and Adolescent Medicine*, Vol. 166/7, American Medical Association, Washington, DC, pp. 678-679, https://doi.org/10.1001/archpediatrics.2012.334.

Jackson, W. M. et al. (2016), "Physical activity and cognitive development: A meta-analysis", *Journal of Neurosurgical Anesthesiology*, Vol. 28/4, Wolters Kluwer Health, Alphen aan den Rijn, pp. 373-380, https://doi.org/10.1097/ANA.0000000000000349.

Owen, K. B. et al. (2016), "Physical activity and school engagement in youth: A systematic review and meta-analysis", *Educational Psychologist*, Vol. 51/2, Taylor and Francis, New York, pp. 129-145, https://doi.org/ 10.1080/00461520.2016.1151793.

Sibley, B. A. and J. L. Etnier (2003), "The relationship between physical activity and cognition in children: A meta-analysis", *Pediatric Exercise Science*, Vol.15/3, North American Society of Pediatric Exercise Medicine, Human Kinetics, Champaign, pp. 243-256, https://doi.org/10.1123/pes.15.3.243.

Vazou, S. et al. (2016), "More than one road leads to Rome: A narrative review and meta-analysis of physical activity intervention effects on cognition in youth", *International Journal of Sport and Exercise Psychology*, Taylor and Francis, New York, Vol. 14, https://doi.org/10.1080/1612197X.2016.1223423.

Watson, A. et al. (2017), "Effect of classroom-based physical activity interventions on academic and physical activity outcomes: A systematic review and meta-analysis", *International Journal of Behavioural Nutrition and Physical Activity*, Vol. 14/1, BioMed Central, London, pp. 114 (24 pages), https://doi.org/ 10.1186/s12966-017-0569-9.



BETTER POLICIES FOR BETTER LIVES