



# YOUNG PEOPLE PRACTISING HEALTH

EDUCATIONAL TOOLS  
FOR WELLBEING  
THROUGH SPORT  
AND NUTRITION



EDITED BY  
MARIO CAMPANINO



With the support of the  
Erasmus+ Programme  
of the European Union



# Young People Practising Health

## Educational Tools for Wellbeing through Sport and Nutrition

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*by Mario Campanino*

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## Introduction

# The SEARCH project: characteristics and relevance

BY MARIO CAMPANINO

### ► OBJECTIVES

The project SEARCH - Sport Education for Active and Responsible Citizenship through Health caring is aimed at training young European citizens and at concretely proposing an intervention to organise different realities related to the dissemination of culture and sport. The project aims at increasing young people's awareness of the importance of sports-related issues, potentially resulting in behaviour focused on well-being, inclusion and full citizenship. On the 5<sup>th</sup> December 2016, the European Commission adopted its first progress report on the implementation of the Council Recommendations on health-enhancing physical activity. Through this document, the Commission aims at strengthening policies for physical activity by improving cross-cutting monitoring and cooperation as part of the process. Unfortunately, most people in Europe still do not reach the minimum levels of physical activity recommended by the World Health Organisation (WHO), particularly people from low socio-economic backgrounds, minority ethnic groups and people with disabilities. Our goal is to provide an overview of all policies which act as a plentiful source of data for further analysis through the exchange of good practices, cooperation and the development of projects involving EU countries. Enhancing sports education has to be a key objective for every administration: it is enough to consider the highly negative impact of sedentary life in modern society. Besides the human drama linked to the emergence of diseases related to bad habits and little movement, a poor propensity for motor education entails high social costs as people who get sick need care and support from the national health system. We are not simply talking about increasing the space for motor activity, but about intervening systemically in spreading a culture which embraces sport and all its values in order to have a long-term economic response in saving public spending.

### ▶▶ *Objective 1): Enhance the educational activity of sport*

Sport plays a decisive role in the education of children, it is an opportunity to train body and mind, it helps developing the ability to learn (know - know how to do - know how to be) and giving rise to a sort of guide allowing to reach maturity with lightness and pleasure. Physical activity creates a high level of satisfaction and wellbeing, based also on human values obtained by the participants/trainees.

### ▶▶ *Objective 2): Encourage sports practice to control national health and social costs*

Investing in sport allows savings in health care reducing sedentary lifestyle. Socio-health cost savings are a cross-cutting result obtained at different levels as is well known and proven in all research worldwide. First and foremost, prevention, but also therapy, reconditioning, reduction of relapses and all this is even clearer if we speak about gender medicine.

### ▶▶ *Objective 3): Making sport a force for social inclusion*

Sport is a fundamental element on an emotional and social level, it is a multidimensional, dynamic, playful environment, able to enhance the self and body awareness. It is also a good way to be brought out of isolation and to socialise. The European Parliament in its “White Paper on Sport” resolution included and broadened these issues by defining sport as a factor of social inclusion and reaffirming the importance of sport at school. Inclusion processes are linked, on one side, to the construction of the link between young people and local community, while on the other, they examine the expression of subjectivity as the result of representations and interpersonal relationships involved in sport and motor activity.

### ▶▶ *Objective 4): Increase the economic activities related to sport*

The first definition, which is more limited, restricts the scope of the survey to people working in the sector and to the economic effects of major professional sport and large-scale events. The second includes also indirect effects such as the purchase of clothing and sports equipment, sports tourism, the purchase of sports newspapers and publications.

### ▶▶ *Objective 5): Turning cities into “smart-sport city”*

The challenge concerns opening and permanence of the egalitarian public space. The aim is to bring citizens to live parks and communal

areas that are perceived as public sports facilities available to entire communities.

## ▶ EU PARTNERS

### ▶▶ *P1) The Università Telematica degli Studi IUL - Italian University Line - Florence - Italy*

IUL is a private distance University, founded by Ministerial decree on the 2<sup>nd</sup> of December 2005, published in the Official Journal on the 5<sup>th</sup> of January 2006. It issues academic qualifications recognised by law in accordance with art. 3 Ministerial Decree n. 509 of the 3<sup>rd</sup> of November 1999 and subsequent amendments. The University is sponsored by the IUL Consortium, consisting of the Italian National Institute for Documentation, Innovation and Educational Research (INDIRE) and the University of Florence. The University also proposes I and II level master degree courses, postgraduate and professional update courses as well as several activities in synergy with the Ministry of education, University and Research. These projects included School & Sport project (The project proposes training activities for teachers of students-athletes taking into consideration the psychological aspects daily faced by children).

### ▶▶ *P2) E-C-C Verein fuer interdisziplinäre Bildung und Beratung - Würnitz - Austria*

E-C-C Association for Interdisciplinary Consulting and Education is a non-profit association for interdisciplinary research, consulting and education. E-C-C works with some 20 experts, lecturers and trainers who cover our working fields, especially managing and coordinating scientific cooperation and educational projects in European research and education programmes. E-C-C is registered member of various European research organisations, e.g. at the European Training Village (CEDEFOP), Euroscience and the European Association of Vocational Training Providers, and also of the Mediterranean Migration Network.

### ▶▶ *P3) INTEGRA INSTITUT, Institut za razvoj clovekovih potencialov - Velenje - Slovenia*

The Institute's mission and vision are based on the development of human potentials whereby the accent is on the provision of services in the field of humanistic sciences for different target and age groups. As public officers for the Ministry of Labour, Family and Social Affairs, our

professionals working at the Institute perform special counselling and experts' work in the field of occupational rehabilitation in close cooperation with the Employment Service of Slovenia and the Pension and Disability Insurance Institute of the Republic of Slovenia. Furthermore, the central activities of the Institute are based on educational and advisory services and the development and the implementation of social innovations, as well as on the research in the field of human resources. To this end, the Institute works both with professionals in Slovenia and abroad. However, it also participates in a range of projects relating to lifelong learning and education of adults in the area of European Union and in the states of South-Western Balkans.

#### ▶▶ P4) *National University of Ireland Galway - Ireland*

The National University of Ireland (NUI), Galway is the largest and oldest university based in the west of Ireland, employing in excess NUI Galway is a research-led University and has an overall ranking of 284<sup>th</sup> in the QS world university rankings for 2013, and 314<sup>th</sup> in the Times Higher Education world rankings for 2013/2014. Its research and teaching infrastructure is well established, of world calibre and strongly supported. In the past ten years alone, the University invested in excess of € 400 million. In October 2013 NUI Galway was awarded the HR Excellence in Research Logo by the European Commission in recognition of its commitment in implementing the principles of European Charter and Code for Researchers.

#### ▶▶ P5) *IES Mayorazgo - Malaga - Spain*

IES Mayorazgo is a public high school located in Malaga. It's a small school just one line in secondary education and two post compulsory lines: science and technology; social sciences and humanities. The school also offer different options of vocational training: higher grade of technician of Administration and finance (2000hours); higher grade of technician of management assistance (2000hours); higher grade of infantile education (2000hours). There are about 40 teachers and 450 students. We have a football and badminton team.

#### ▶▶ P6) *OZEL KUMLUCA Sinav Egitim Kurumu - Antalya Kumluca - Turkey*

Özel Kumluca Sinav College is a private college having students from kindergarten to high school. It is a member of a chain school in Turkey with 20 other campuses and is founded in 2015. In the school there are 85 teachers and 605 students from kindergarten to high school.

### ▶▶ P7) AKADIMAIKO DIADIKTYO - “Greek Academic Network” (GUnet) - Panepistimioupoli Athina - Greece

The non-profit civil company called “Greek Academic Network” (GUnet) was founded in September 12th 2000. GUnet has its central office in Athens and its members are all the Universities and Higher Technological Education Institutes (TEI) in Greece (20 Universities and 16 TEI). The mission of the company is to promote, facilitate and coordinate the use of information and communication technologies (ICT), services and applications in the Greek academic community for supporting the Greek higher education institutes in their mission and in general, research and education in Greece.

### ▶ INNOVATIVE ASPECTS

Creating a perspective for changing future behavioural patterns by teaching to live a healthy life and constantly practise sport means changing the approach to sport of children and their parents. Sport is at the same time both forerunner and innovator, unlike other disciplines that need a long time to develop skills. Sports education can help increasing precociously skills and by expanding them. In other words, skills that young people can then imitate and enlarge to other areas of reality: an orderly, systematic effort that leads to certain results and no matter at what level, the degree of satisfaction is so elevated that it always coincides with well-being. This is the innovative theme because practicing physical activity means leaving an existential dimension often corresponding to conditions of boredom, suffering and discomfort. Recharging your physical batteries allows facing several situations in real life, with much more strength by guaranteeing physical and mental wellbeing. A study carried out by researchers at the World Health Organisation (WHO 2016-2018) and published on the Lancet Global Health journal showed how this issue must start to give rise to serious concern. It is well known that physical inactivity implies a higher risk of cardiovascular disease, stroke, colon cancer, breast cancer, type II diabetes. The alarm has been raised by the author of the study, Regina Guthold: “unlike other important global health risks, sedentary lifestyle is not decreasing and over a quarter of all adults are not reaching the recommended levels of physical activity for good health”.

Speaking on these points means completely changing the approach to sport, well-being and to proper nutrition of children and parents. We want to create an innovative perspective that, through different methodological approaches, means changing the general approach to sport, by teaching to live a healthy life, constantly practising sport.

The project SEARCH - Sport Education for Active and Responsible Citizenship through Health caring copes with the issue of education to sport for a psycho-physical well-being of the individuals in their present but also in their future lives.

The other three innovative plans are:

- **From a technological point of view**

Teachers and sports tutors can follow the e-learning lessons with a maximum degree of flexibility. They will always be available online and each of the attendants will have in any time the possibility to access and consult this resource. The platform will contain not only the modules, but also experiences, good practices and all the information which can be shared at national and international level with the European partners.

Young people may download the APP directly on their smart-phones in order to receive constant “alerts”, being updated on their activities and food consumption.

- **From an educational point of view**

E-learning training for adults and via the APP for young people, aims at representing a new approach to teaching technologically advanced, with the awareness that the tool that is increasingly embracing every aspect of this era is the “becoming”.

The materials will always be freely accessible and available in order to make the understanding of the topics even easier.

- **From a Transnational point of view**

Thinking in European terms and not only in national terms means strengthening cooperation between EU member states in order to promote the well-being of every citizen through smart, sustainable and inclusive growth.

## ► **EU ADDED VALUE**

The SEARCH - Sport Education for Active and Responsible Citizenship through Health caring project aims at enhancing awareness in teachers and young people on the importance of the educational dimension of sport as a fully educational moment. Strengthening sports education is a central objective for every European country: it is enough to consider the high level of sedentary life in modern society. The latest research reveals how sedentary life is increasing, along with new diseases and high social costs. It is essential to adopt a European approach in order to fight these critical issues, as all countries share same challenges and common solutions.

Since 2000, “united in diversity” has been the European Union motto, meaning that the multiplicity of different cultures, traditions and languages is respected by continuing to be an example to be followed by many regions of the world. One of the most important values is precisely the possibility of arriving where it would not be possible to arrive alone. It is in the DNA of the European Union. Even in this project the responsibility has been shared among all the partners because instead of complaining we have all undertaken to fix a problem together, to improve a situation. Basically, this project could only be carried out at European level, because working in an integrated way and collaborating with Member States means sharing common objectives, operating in several areas, exchanging information and good practices, building long-term relationships with other players and making activities to achieve the objectives more effective.

The main outputs of the project (IO1-open portal, IO2-mobile app, IO3-e-learning and IO4-handbook) will be the result of the cooperation of all partners. The networks that are about to be developed will communicate and cooperate with each other (through appropriate online tools) thus ensuring the highest level of transfer of knowledge and skills. Strengthening the exchange and dissemination of information and experiences gathered will develop a methodology of identification which is more aware than in the past of potentialities and benefits of sport. All this is characterised by a strong attention to understand the phenomenon within Europe so as to make the tools developed replicable in other contexts. Such an approach represents the added value expected from the project SEARCH - Sport Education for Active and Responsible Citizenship through Health caring: a good practice that can be replied on other territories to improve health and well-being of all citizens.

Furthermore, the expertise will support a broader transnational initiative on this issue, with the prospect of creating a constant and continuous monitoring network on international education / sport activities with a European scope.

## ► METHODOLOGY

We have chosen multilevel methodologies: individual, group, outdoor, remote, creative, but above all aimed at responding to different learning styles both of different age groups and of different starting levels. The objective is to involve learners by encouraging the participation and motivation of the youngest through educational paths, adapted to different needs with laboratory and operational activities, computerisation and gamification.

This interactive methodology will allow:

- creating a significant, authentic and motivating context;
- involving skills and abilities (cognitive, sentimental, linguistic-communicative and sensorial skills contributing to a long-term learning process);
- encouraging the interaction and socialisation process.

The activities proposed in the project will be a place of refuge, inclusion and interactive learning.

We refer to a communication and situational approach favouring the gradual transition from a first context cognitively dedicated to teacher-trainers, to a second cognitively concrete context and, finally, to a third “learning scenario” being the most cognitively demanding one, linked to the use of the APP and the Handbook. We will favour laboratory activities by directly involving, learning by doing, problem solving, group planning, cooperative learning, the use of computer techniques and methodologies, educational games and tutoring activities. Each information and laboratory activity proposed is designed for an overall number of at least 150 students or athletes (per Partner) using the following methodologies:

**Learning by doing** - each activity involves the students in concrete situations, where the educational contents are lived, tested, implemented and knowledge and theoretical skills are made operational.

**Cooperative learning** - for each activity there are one or more situations requiring group work, as we are firmly convinced that such an approach is fundamental both for creating greater cohesion between students/athletes and teachers/workers, and because of the development of dynamics leading the individual to emerge in a critical and conscious manner within the group.

**Gamification** - using an informal and intellectually stimulating methodological approach based on problem solving, students have the possibility to effectively use the technological and scientific knowledge they have learned.

**Action learning** - learners learn to act effectively by analysing and interpreting their experiences with the aim of identifying the process that generated the learning; the action takes place in real contexts rather than in simulation contexts, students have to work on defined projects and the activity has to be carried out in order to involve all the participants in the group.

The specificity of the topic, the character of the target groups and their contexts required a completely innovating approach to training methods. The transversal approach of this project aims not only at re-

specting the needs of individuals but also of the single structures, administrations and organisational contexts. This was achieved by providing an overall view, integrating objectives, methodologies, activities and budgets, and identifying references respecting each aspect. We have made choices in this direction to constantly monitor the organisation based on the project management and its budget, the profile of the recipients, the training set, the events, the monitoring and its dissemination. And all this is not only because of the individual user, but also and above all as this project has to improve living conditions rapidly.

First step in the planning phase was to clarify positions and responsibilities:

- definition of the project, objectives, partners, output, monitoring and impact;
- definition of timing and organisational scheme;
- agreement between partners and sharing of the project guide lines;
- output implementation planning;
- defining the internal plan of the project communication to ensure that the team members have the right information at the right time, especially as regards the progress of the project, in order to make the most appropriate decisions.

## ► COOPERATION ARRANGEMENTS

The European system is a complex phenomenon, a mosaic of experiences, cultures, needs and expectations. This complexity requires informal cooperation between Member States to ensure the continued exchange of good practices and the widespread of data concerning the results achieved. The SEARCH - Sport Education for Active and Responsible Citizenship through Health caring project is a small step for integrating national policies, to help the achievement of common goals, facing all challenges to protect and improve citizens' health. Each project partner strongly influences the achievement of the objectives because of the "operational" skills deployed, and in creating a network taking into account some values related to the world of sport that must be shared. This aspect is a key element of the project. The cultural approach to physical activity and well-being must be a good practice not just for all partners. Slovenia, Europe's 2017 basketball champion, has approximately 2 million inhabitants, far fewer than those of a city like Rome. Traditions, culture, values and history of a community must represent an added value for this project to go on growing constantly. Every single project partner is both a producer and an added value. IUL, the adult institute E-C-C in Wurnitz, the National University of Ireland in Galway

and the Akadimaiko Diadikto Company in Athens will deal respectively with the 4 outputs: E-Learning Course, Search Open Portal, Handbook and Mobile Application. The following institutes: Integra of Velenje, Ies Mayorazgo of Malaga and Ozel Kumluca Sinav Egitim Kurumu of Antalya Kumluca will be active subjects in terms of experimentation, sport meetings, spreading and valorisation of the project. Italy, Slovenia, Austria, Spain, Turkey, Ireland and Greece, seven states which cooperates for realistic and achievable goals, using skills and good practices of each person involved. From the time it was created, the European Union has been a force of positive change based on the principle of continuous improvement. SEARCH - Sport Education for Active and Responsible Citizenship through Health caring therefore aims at coping with the challenges that our continent has to face with a long-term approach, based on cooperation between States and on the enhancement of local excellences.

The partnership, comprising 7 members, has been built selecting those partners that better can serve the project objectives. In general terms, we can classify them in the following categories:

### ▶▶ *Academic Partners*

They are in charge of conceiving, developing and delivering the Intellectual Outputs (SEARCH Sport Open Portal, SEARCH E-Learning Course, SEARCH Mobile Application, SEARCH Handbook), to the group of teachers and students involved. Each project partner will appoint a professor and support staff to conduct the training e-learning sessions. They will integrate the Academic Board of the project, which is the advisory board dealing with the academic part of the project.

SEARCH Academic Partners are:

- IUL (Italy)
- E-C-C (Austria)
- National University of Ireland Galway (Ireland)
- GUnet (Greece)

### ▶▶ *School Partners*

These partners are the link with the project's target group, and will be in charge of promoting the SEARCH among its students and teachers in order to select those persons that better fit the training programme.

Along with the rest of partners, they will agree the profile requested and from there they will identify and select them. They will also be fully in charge of participation the target groups to the different activity, and multiplayer event where SEARCH will take place.

SEARCH School Partners are:

- IES Mayorazgo (Spain)
- INTEGRA (Slovenian)
- Özel Kumluca Sınav College (Turkey)

### ▶▶ *Technical Partners*

IUL will be responsible for coordination of activity's implementation, smooth and effective communication among the partners, budget transfers and preparation of tenders. Together with the other technical partners, it oversees the technological development of the products, in particular the web infrastructure of the SEARCH Open Portal, the e-learning course and the mobile app.

SEARCH Technical Partners are:

- IUL (Italy)
- E-C-C-(Austria)
- GUnet (Greece)



## About the authors

**Sonja Bercko Eisenreich** is the founder and managing director of INTEGRA Institute for Development of Human Potentials with the following experiences: Managing NGO, specialised for HRM, employment, vocational education and training, rehabilitation, social services, development and research; Developing and implementing programmes for social and working integration, especially for people with disabilities; Daily centre-developing and implementing psycho-social programmes to integrate unemployed individuals with psychiatric diagnosis into the labour market; Developing and implementing programmes of public works at regional level. She is also an educational and training expert for the National Employment Service of Montenegro and Bosnia.

**Mario Campanino** is a schoolteachers and project manager at European level. He has been researcher at the Italian National Institute for Educational Research (INDIRE) and, previously, responsible of the Project Area at the science centre of Fondazione Idis-Città della Scienza in Naples (Italy). He got the degree in Disciplines of Music at the University of Bologna in 2003 and the PhD in Sciences of Communication at the University of Salerno in 2008. He has been member of various national committees on school and adult education, such as: Commission for the Development of Science and Technology, Italian Ministry of Education; EdaForum-Forum nazionale per l'educazione degli adulti (European Association for the Education of Adults-EAEA) and others. He has been involved in several projects funded by the European Union on school, adult education, art, and Science and Society.

**Andres Del Jesus Cañete** studied Physical Education at the University of Granada and has four Masters (two Masters in High Performance in Sport, Master in Education and Master in Physical Activity and Health). He is National Swimming Coach, National Triathlon Coach and National Bodybuilding Coach. He has worked in Virgin Active Health Club as a fitness and pool staff in Granada. He is currently working as a Physical Education teacher in an Andalusian High School (IES Mayorazgo).

**Wolfgang Eisenreich** has studied biology and biochemistry at the University of Vienna. He is the founding member of Science Initiative Lower Austria (WIN) and has more than 25 years' experience in transnational project coordination, especially on adult education projects. He is the author of several Guidelines and Handbooks of Leonardo da Vinci and Erasmus+ projects, mainly in the health and nutrition sector.

**Valerio Giangrande** is a Project Manager specialised in Project Development and Digital Learning Management. After graduated (2004) in Communication Sciences, he worked as a Human Resources consultant in a small company in Rome (P&B Value), before attending the Master of the University La Sapienza in Methodologies-Communications-Business Relationships and then being hired for a stage in Accenture Outsourcing in Milan, specializing in Outsourcing Operation. In 2011, he moved to London for a Chamber of Commerce Master's degree in Hospitality Management, where immediately afterwards he started to work at the Grange Hotel as Assistant Operation Manager. In 2014 he started work for INDIRE (National Institute for Documentation, Innovation and Educational Research) and IUL University. His duties were planning and scheduling of national and community projects, verification and evaluation of regulatory documents, coordinating resources, management of the relationship with stakeholders, supported national and international projects.

**Carmen Guerra Retamosa** studied Chemistry at the University of Cordoba and has a Master in Interactive Museography by the University of Barcelona. She has spent most of her professional career as a Chemistry teacher in Andalusian High Schools. She also spent two years as in-service teacher trainer in CEP Perez de la Frontera and has worked for more than 10 years in the Educational Departments of Science Museums such as Parque de las Ciencias de Granada and Principia in Málaga. She is the scientific advisor of CLICKMICA A science communication web related to Chemistry and has written different articles on the relation of literature and cinema and sciences.

**Ananya Gupta** is Assistant Professor in the Discipline of Physiology and the Director of the MSc program in Exercise Physiology. She is also the founder and director of the Exercise Physiology Testing Facility (EPTF) located in the Human Biology Building which is an integral part of the Discipline of Physiology, School of Medicine, NUI Galway. Dr Gupta's research focuses on the application of exercise interventions in improving health and fitness in sports and in rehabilitation in a clinical setting. Ananya has developed and implemented a personalised, patient-centred cancer exercise programme [Can-React]. This programme was launched in 2019 and the participants reported significant improvements in physical function and reduction in fatigue. In 2020 due to the restrictions imposed during the COVID19 pandemic Dr Gupta's team of researchers adopted the can-react programme into an "at-home" personalised exercise programme for improving physical function and quality of life in cancer survivors.

**Conor Hussey** is a research assistant with Dr Ananya Gupta in the University of Galway. He has studied to become a teacher and enhanced his appreciation of the role of education in a young person's development. He taught physical education (and mathematics) in a post-primary level setting for 3 years before completing an MSc. in exercise physiology in the University of Galway. His motivation to return to further study was to enhance his knowledge of the benefits of exercise for people living with illnesses.

**İdil Meray** is a chemistry teacher in secondary schools. She works as chemistry teacher in Kumluca Sınay College, also responsible for Erasmus+ projects. She is highly experienced in teaching, Erasmus+ projects, blended learning, remote

teaching, ICT usage in classroom and scientific project running. She has been teaching chemistry for 24 years in different private schools and coordinating or participating in Erasmus+ projects for the last 12 years. When it comes to the improvement of young people both mentally and psychologically, it is her passion that helps the students.

**María José López Montiel** was graduated in Economics and Business Administration at The University of Málaga (1990). She has two Masters, in Education and in Tax Management. Her first job was as administration responsible at a private company. For the past 26 years she has been working as a vocational training teacher at High School in Andalusia.

**Constantinos Tsibanis** is a Researcher in the field of E-learning Strategies and Technologies, holds a BSc in Applied Mathematics, an MSc in Informatics and an MSc in Management and Economics of Telecommunication Networks. He works as an IT Manager at the University of Athens (Network Operations Centre) and at the Greek Academic Network (GUnet), responsible for the design and development of e-learning services. He is highly experienced in designing e-learning services and successfully manages all phases of e-learning projects from needs analysis and requirements definition to technology selection, implementation, and training. He has also experience in technical project management and participation in several projects which involves collaboration with other Universities and research Institutes. He is the founder and development group leader of the Open eClass Platform (<http://www.openeclass.org>), an open-source learning management system, supported by the Greek Academic Network (GUnet).



**PART A**

**SPORT AND NUTRITION  
FOR YOUTH HEALTH  
AND WELLBEING**



## Chapter 1

# Importance of physical activity and its impact on growth, development and health

BY CONOR HUSSEY AND ANANYA GUPTA

Physical activity (PA) as defined by the world Health Organisation<sup>1</sup> refers to *any bodily movement that requires contraction of skeletal muscles and raises energy expenditure above the resting levels* (Sommer, Nussbaumer-Streit, & Gartlehner, 2021). Physical activity can be classified into four different types, such as, leisure-time physical activity (e.g. sports and dancing), occupational physical activity (e.g. weight lifting, carrying a load) physical activity at-home including activities of daily living and physical activity for mobility or transport (Silva, Goldberg, Teixeira, & Dalmas, 2011). Participation in physical activity can be influenced by multitude of factors including personal and environmental factors and can be physical (e.g. built environment, land use), social and economic (Mansfield, Ducharme, & Koski, 2012).

Participation in regular physical activity has a close relationship with health and quality of life (Paffenbarger, Hyde, Wing, & Hsieh, 1986) (Lee, Paffenbarger, & Hennekens, 1997). The human body has evolved to support movement and therefore needs to engage in regular physical activity in order to function optimally. Lack of physical activity can therefore lead to poor functionality and long term illness. Evidence obtained from research has established that a sedentary lifestyle is a risk factor for increased all-cause mortality due to the increased risk of developing chronic illnesses, such as cardiovascular diseases (CVD), obesity and diabetes. In the western world CVD is the main cause of mortality (D. E. Warburton, Nicol, & Bredin, 2006; D. E. Warburton, Nicol, Gatto, & Bredin, 2007). In contrast, an active lifestyle not only results in good health but is also associated with many social and psychological benefits. Extent of physical activity has a direct correlation with life expectancy, such that physically active populations tend to live longer than inactive ones (Haegele, Famelia, & Lee, 2017; Healy & Owen, 2010). Sedentary

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<sup>1</sup> WHO, <https://www.who.int/news-room/fact-sheets/detail/physical-activity>.

people who become more physically active report feeling better from both physically and mentally, reduced disease symptoms, reduce anxiety, improve sleep and enjoy a much better quality of life (Gomez-Redondo et al., 2022; Gopinath, Hardy, Baur, Burlutsky, & Mitchell, 2012).

Participation in regular physical activity, leads to many favourable changes in morphology, physiology and functional parameters, which can prevent or delay the onset of chronic illnesses and improve functional capacity and performance (Burnham, 1998) (Janssen & Leblanc, 2010). It is currently evident that individuals who participate in regular physical activity and have a physically active lifestyle experience a number of health benefits, including the following (D. E. R. Warburton & Bredin, 2017):

1. Decreased risk of cardiovascular disease. If already diagnosed with CVD physical activity can reduce symptoms and slow progression of disease. Prevention and/or delay the onset of hypertension. Improved control of high blood pressure. Improved cardio-respiratory function and cardio-respiratory capacity.
2. Maintain metabolic functions and lower risk of type 2 diabetes.
3. Reduce risk of obesity and improve fat utilisation and help in weight management
4. Reduced risk of developing cancers, such as breast, prostate and colon cancer.
5. Strengthen bones through improved mineralisation in young ages, improved bone density and bone strength, contributing to the prevention of osteoporosis and reduce risk of fractures in older ages.
6. Improved digestion and regulation of the intestinal rhythm.
7. Maintenance of muscle mass and improvement in muscular strength and endurance, resulting in an increase in functional capacity to carry out all activities of daily living.
8. Improve motor functions including flexibility and balance.
9. Improved cognitive functions. Reduced risk of depression and dementia. Lowered stress levels and improved sleep quality.
10. Improved self-image and self-esteem and increased enthusiasm, motivation and optimism.
11. Improved immunity and reduced susceptibility to infections
12. Improved productivity and decreased absenteeism from school.
13. In older adults, physical activity helps to maintain flexibility and balance thus reducing the risk of falling and prevention or delaying of chronic illnesses associated with ageing.

Physical inactivity or sedentary behaviour is a key determinant of poor health outcomes across the life span (Bai et al., 2021; Bailey, 2017). A lack of activity or movement increases the risk of developing many chron-

ic illnesses such as: heart disease, cancer, diabetes, obesity, hypertension, osteoporosis, sleep disorders, anxiety and depression (Bai et al., 2021; Bailey, 2017; Falk et al., 2022). The global health burden of physical inactivity in terms of mortality has been found to be equivalent to that of cigarette smoking and obesity. Indeed, the prevalence of physical inactivity, along with this substantial associated disease risk, has been described as a modern day “pandemic” (Bailey, 2017; Mossavar-Rahmani et al., 2020).

Despite the strong correlation between regular physical activity and a healthier, longer life majority of adults and young people globally are not meeting the minimum physical activity needed for securing health benefits (Donnelly et al., 2009; Oja, Bull, Fogelholm, & Martin, 2010; Riebe et al., 2015). A large body of research evidence highlights an alarming decline in the levels of physical activity and physical fitness within all age brackets worldwide (Guthold, Stevens, Riley, & Bull, 2018). This can be attributed to a greater reliance on technology and desk based work. Physical inactivity is ranked between the second and sixth most important risk factor in contributing to the population burden of disease in the western society [3-5]. Its prevalence is higher than that of all other modifiable risk factors [5]. Physical inactivity during the early years of life is currently indicated as a major contributor to the increasing levels of obesity, and other serious medical conditions, in children and adolescents in Europe [6, 7]. The increased political, media and scientific interest in obesity has placed the need for regular physical activity as high priority among current public health issues. This has led to the development of international guidelines recommending the minimum levels of PA needed for health benefit. EU member states have adopted these guidelines at the national policy level. These guidelines and the current status of PA in some of the EU member states are discussed in Chapter 2.

In children and adolescents, physical activity confers benefits for the following health outcomes: improved physical fitness (cardiorespiratory and muscular fitness), cardiometabolic health (blood pressure, dyslipidaemia, glucose, and insulin resistance), bone health, cognitive outcomes (academic performance, executive function), mental health (reduced symptoms of depression); and reduced adiposity.

**It is recommended that:**

- **Children and adolescents should do at least an average of 60 minutes per day of moderate- to vigorous-intensity, mostly aerobic, physical activity, across the week.**  
*Strong recommendation, moderate certainty evidence*
- **Vigorous-intensity aerobic activities, as well as those that strengthen muscle and bone, should be incorporated at least 3 days a week.**  
*Strong recommendation, moderate certainty evidence*

**FIGURE 1:** PA benefits and recommendations for children. Taken from WHO guidelines on physical activity and sedentary behaviour 2020. (Source: WHO report ISBN 978-92-4-001512-8).

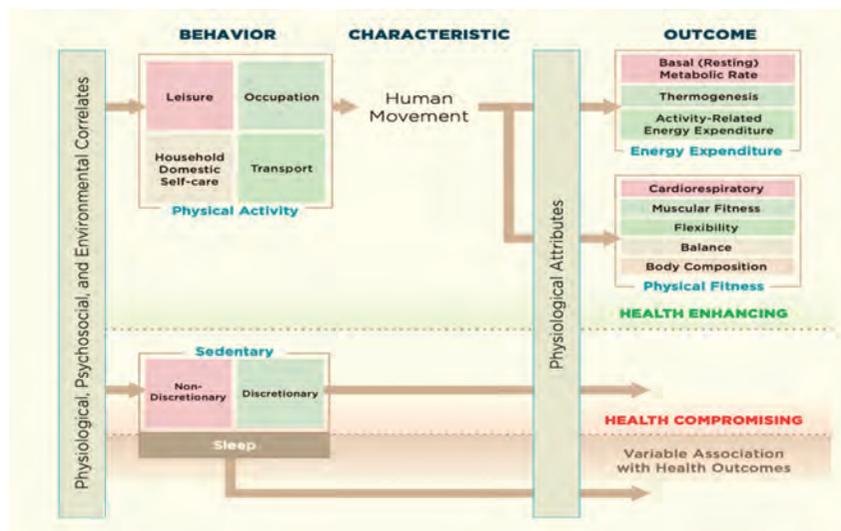
According to the recent global estimate less than 50% of children and adolescents meet the required minimum PA levels recommended by WHO evidence-based guideline (Aubert et al., 2021) (Figure 1) of “minimum 60 minutes of moderate-intensity physical activity daily”. Moreover, the proportion of youth who meet this guideline declines with increasing age, so that younger children are more likely to be physically active than adolescents and young adults. Further, daily opportunities for incidental physical activity have declined significantly for children and adolescents, as they have for adults, as a result of such factors as increased reliance on nonactive transportation, automation of activities of daily living, and greater opportunities for sedentary behaviour and choice of sedentary leisure-time activities. Finally, substantial disparities in opportunities for physical activity exist across racial, ethnic, and socio-economic groups further increasing the barriers towards being active (Aubert et al., 2021).

The major cause underpinning the growing trend in physical inactivity can be attributed to changes in children’s leisure time pursuits (Katzmarzyk et al., 2008). In the past, children actively engaged in active outdoor play both during free time in school and after school hours. With the emergence of television, computer games and the internet, children are now spending most of their free time engaged in sedentary pursuits (Katzmarzyk et al., 2008). The role played by PA in the growth and development of physical, mental and social health of youth is evident and well accepted, therefore it is crucial to take effort to “reintroduce” physical activity into the day to day lives of our youth. The growing obesity and related illnesses in children is considered to be the biggest health challenge in the 21st century and can be attributed to insufficient PA (Millard, 2012). The responsibility to improve levels of childhood physical activity and other health related childhood behaviours lies with everyone in society. Schools, homes and the community are excellent locations to assist children in improving health related lifestyle behaviours such as physical activity (Froberg & Andersen, 2005).

### **1.1▶ Important Concepts of Physical Activity and Physical Fitness**

There are many different techniques that can be used to measure and interpret physical activity. Caspersen et al. (Caspersen, Powell, & Christenson, 1985) previously described physical activity as “Any bodily movement produced by skeletal muscles that result in caloric expenditure.” However a more recent conception, created through a roundtable consensus conference of experts on physical activity research (Pettee

Gabriel, Morrow, & Woolsey, 2012) provides a more objective description of PA and facilitates understanding and assessment. The new definition: “behaviour that involves human movement, resulting in physiological attributes including increased heart rate, blood pressure, and blood glucose levels”, describes “PA as a habit” thus providing recognition of PA as a “behaviour”. This effectively conveys that PA or exercise is “voluntary” by nature and is therefore influenced by the different physiologic, psychological, and environmental factors. The “movement” described can include both Structured activities (those that are repetitive, planned, frequently guided by an adult, and carried out in physical education classes) and Unstructured activities (i.e., play, unsupervised, activity performed during recess or school breaks). Additionally, activities can be operationally classified based on their frequency (i.e., number of movements each day), duration (i.e., minutes of real movement recorded), intensity (i.e., effort required to perform the movement), and kind (i.e., activity) (i.e., nature of movement as being, for example, aerobic or bone-strengthening related activities). The term “dose” or “volume” of physical activity, which refers to the overall quantity of movement made during a given time period, is frequently used to describe the mix of frequency, duration, and intensity (Aarnio, Winter, Kujala, & Kaprio, 2002; Gorely, Biddle, Marshall, & Cameron, 2009; Moore et al., 2020; Muzenda, Kamkuemah, Battersby, & Oni, 2022; Pettee Gabriel et al., 2012; Ridley & Dollman, 2019; Tye, Scott, Haszard, & Peddie, 2020; Uijtdewilligen et al., 2011).



**FIGURE 2:** Physical Activity Behaviour and relationship to Health.

## ►► Definitions

**Physical activity:** is defined as “body movement produced by muscle action that increases energy expenditure. *It is a behaviour that involves human movement, resulting in physiological attributes including increased heart rate, blood pressure, and blood glucose levels*”.

**Physical exercise:** includes PA that is “structured”, involves repetitive and purposeful movements, often with the goal of improving or maintaining one’s physical fitness or is required for performance in a sport. For example, cycling and swimming are forms of physical exercise while gardening or walking upstairs in one’s home may not be classed as structured “exercise”, but it is certainly physical activity.

**Physical fitness:** is a physiological state of well-being that defines the capacity of an individual to carry out the various tasks of daily living. It includes the capacity of an individual to perform in sports. It also includes the ability of the individual to resist illnesses and is a measure of their health. Physical fitness therefore consists of a set of physical and physiological parameters that can be measured or quantified and describes how well one can perform in physical activity and exercise. Physical fitness parameters can be used to compare the relative capacity of individuals to perform in a given physical activity.

**Health:** is a reflection of one’s overall physical, mental and social capacity and condition and overall well-being. Good health does not simply mean absence of disease. The health and wellness are conditions of an individual that is not stable and it can vary over time through a continuum (Draper, Tynan, & Christianson, 2008) from optimal physiologic functioning (wellness) to near death (illness) (see Figure 1).



**FIGURE 3:** The Illness to Wellness Continuum.

### ▶▶ *Exercise Prescription - A “Dose-Response” principle for training and fitness*

It has been established that the health benefits of exercise and physical activity can be achieved only when the right amount and type of exercise is undertaken. The “dose” of exercise required to produce a desired “response” constituting favourable changes in health outcomes is strongly correlated. Therefore it is important to be able to define and prescribe the “dose” of exercise required accurately both for obtaining health benefits and as part of training to improve performance.

The correct “dose” of physical activity that should be prescribed to a person depends upon several factors such as frequency, intensity, type of exercise and time/duration of exercise (FITT). The FITT principle (P. D. Thompson, Arena, Riebe, Pescatello, & American College of Sports, 2013) is used to determine the value of each component required for the correct dose of exercise. The FITT principle therefore help exercise professionals to accurately plan and provide an exercise programme that will maximise individuals health benefits. The components of the FITT principle are described below.

**Frequency** (*how often you exercise*): This includes the number of times that one engages in physical activity during a typical week.

**Intensity** (*how hard you exercise*): The intensity of the exercise or how strenuous is the physical activity (described as light, moderate or vigorous) is measured in terms of the effort needed to complete the activity. The effort is measured based on the total number of METs (metabolic equivalents) used to complete the activity, where 1 MET is the amount of energy (oxygen) your body uses at rest (Jette, Sidney, & Blumchen, 1990).

Any activity that burns <3 METs is considered light intensity

Any activity that burns 3-6 METs is considered moderate intensity

Any activity that burns >6 METs is considered vigorous intensity

The use of METs to estimate exercise intensity is discussed in more details in the next section.

**Time** (*how long do you exercise*): the duration for which the physical activity session is undertaken also contributes to the total amount of energy spent and is therefore an important component defining the “dose” of PA. The Frequency, intensity and time taken together constitutes the “Volume” of exercise performed (usually measured per week) and determines the “dose” of exercise undertaken.

**Type:** the specific mode of exercise in which one engages (e.g. running, swimming, etc.). Different types of exercise contributes to the improvement of different physiologic parameters. For example aerobic exercise is required to improve cardiorespiratory capacity while weight bearing exercise improve muscle strength and endurance. Therefore for overall health benefits it is important to ensure that all the different types of exercise are included in an individual’s exercise plan.

	Aerobic	Strength	Flexibility & Balance
Frequency	≥3 days per week, trend to ≥5 days per week *	≥2 days week	2 to 3 days per week
Intensity	Moderate to vigorous **	50% to 80% of 1RM ****	To point of light to mild tension
Time	≥150 - 300 minutes/week (moderate-intensity) ***	5 to 30 repetitions, 3 to 14 seconds/rep, 1 to 3 sets	10 to 40 seconds per stretch or position
Type	Rhythmic, continuous physical activity	Body & external weights; all muscle groups *****	Stretch, balance, yoga, all major muscle groups

**FIGURE 4:** Represents a typical Exercise Prescription based on the FITT principle.

The Frequency Intensity Time Type or the “FITT” factors can be manipulated to vary the “dose” of physical activity as needed for an individual. The dose of exercise is expressed in terms of energy expenditure (calories expended) or METs. What this means is that when participating in physical activity that is more intense, one can spend more calories and at a faster rate which may reduce the amount of time needed to burn a set amount of calories. Burning a specific amount of calories while performing a type of exercise may be seen as a measure or “dose” that is needed to see improvement or “response” in a particular physiologic parameter.

Other important factors that can contribute to exercise prescription are:

**Overload principle:** In order to improve an individual’s fitness it is important for the individual to stretch their current limit or threshold. Overload refers to the load or intensity of each exercise, this should be set at very close to or slightly higher than the individuals current maximum capacity providing a greater stress, or load, on the body than it is normally accustomed to in order to. Placing an overload on the body stimulates a physiologic mechanism of adaptation thus increasing capacity and contributing to increase in fitness.

**Volume and Progression:** is the way in which an individual should increase overload in order to stimulate continuous increases in fitness

(often called progressive overload). It is a gradual increase in either frequency, intensity or time, or a combination of all three components. Progression must be gradual to be safe. Progressing too quickly can lead to injury or unnecessary fatigue, both of which can discourage or prevent an individual from continuing to participate.

## 1.2► Measuring the amount/intensity of physical activity

The intensity of exercise defined as moderate or vigorous activity is a factor dependent on an individual's current capacity and level of fitness. As a result intensity is difficult to measure or quantify. The physical activity guidelines set out for adults and children (detailed in the next chapter) recommends participation in exercise of at least of moderate intensity. In order to achieve this an individual must know or be able to estimate how much effort is needed. This can be better understood or explained by observing certain physiologic responses to exercise. An individual who is performing moderate intensity exercise should exhibit the following:

- Breathing rate is increased, but it is still possible to engage in conversation.
- Heart rate is increased to approximately 60-70% of maximum. The increased heart rate and pulse pressure can be felt easily at the wrist, neck or chest.
- Increased body temperature or feeling of warmth along with sweating.

A healthy individual should be able to continue performing exercise at a moderate intensity for an extended period without feeling exhausted or fatigued. It is important to understand that since “moderate intensity” depends on an individual's current capacity so the actual volume of exercise can differ for different people but the responses described above should still be the same. For example, an individual with a higher level of fitness would need to perform an activity at a higher absolute intensity when compared to an individual with a lower fitness in order to experience the same responses of increased breathing, heart rate and temperature that are characteristic of a “moderate intensity” activity.

Below, various methods for assessing exercise intensity are discussed in further detail.

### ►► Further methods for gauging intensity of physical activity

The absolute measurement of intensity of exercise can be determined by measuring the calorie expenditure which can be estimated

from the oxygen consumed ( $\text{VO}_2$ ) during the activity. Such measurements require complex equipment (metabolic cart), are expensive to perform and require expertise. However there are numerous other indirect methods that can be used easily and reproducibly to estimate the intensity of exercise. These methods can be used during an outdoor activity or sport or while exercising at home. Some of these methods of monitoring the intensity of physical activity are outlined below:

### The talk test

The talk test (Persinger, Foster, Gibson, Fater, & Porcari, 2004) is a simple method of measuring intensity and uses one's ability to speak while exercising.

- **Light intensity:** when exercising at a *light* intensity such as a leisurely walk an individual should be able to sing or carry on a normal conversation without feeling out of breath.
- **Moderate intensity:** during a *moderate* intensity activity the individual should be able to carry on a conversation but with some difficulty or breathlessness but cannot sing. Example being brisk walking, cycling.
- **Vigorous intensity:** during vigorous intensity activity the individual should be out of breath and unable to carry on a normal conversation. Examples of *vigorous* activity would include jogging or running and strenuous sports such as basketball, swimming, handball, etc.

### Heart rate



When exercising the cardiac output or the amount of blood pumped by the heart must be increased to meet the increased oxygen and nutrients needed by the working muscles. As a consequence the heart rate is increased. The increase is directly proportional to the work intensity and to the energy consumed. Therefore percent increase in heart rate can be used easily and reliably as a measure of exercise intensity (Karvonen & Vuorimaa, 1988). Heart rate can be measured easily by counting the pulse at the wrist (the radial pulse) or the neck (the carotid pulse). This can be then converted to the number of beats per minute (bpm) to obtain the heart rate. One can feel the pulse at the wrist and count the total number of beats in one minute. Alternatively one can count for 15 seconds and multiply the number of beats by 4 to obtain the beats per minute or heart rate. The maximum heart rate

that an individual can attend depends on their age. This can be estimated from the following: Maximum Heart rate =  $220 - \text{Age}$ . For example, if a child was 15 years old, their estimated maximal heart rate would be  $220 - 15 = 205$  bpm. Resting heart rate is best measured when an individual has just awakened in the morning and is still lying down or is at rest or after a few minutes of sitting quietly. It is usually 60-70 bpm.



**FIGURE 5:** How to determine your heart rate from your pulse.

The heart rate reserve method (HRR or Karvonen method) is the best method to determine target heart rate ranges for monitoring intensity of physical activity [8]. In this method, resting heart rate (RHR) is first subtracted from the maximal heart rate (MHR) to obtain HRR. For example, let us assume that a 15 year old child had a resting heart rate of 80 bpm. The HRR of this individual is  $MHR (205) - RHR (80) = 125$  bpm.

To calculate a heart rate range for practical purposes, one must first consult Table 1 below to determine the relevant % values of HRR:

Intensity Description	% Heart Rate Reserve (%HRR)	Rate of perceived exertion (RPE*)
Very light	<20	<10
Light	20-39	10-11
Moderate	40-59	12-13
Vigorous	60-84	14-16
Very Vigorous	>85	17-19

(\*See definition of RPE in the section below)

**TABLE 1:** Classification of physical activity intensity using the %HRR and RPE methods. (Adopted from Reference 9, American College of Sports Medicine Position Stand 1998).

We can see that moderate intensity corresponds to 40-59% of heart rate reserve =  $50 (0.40 \times 125) - 74 (0.59 \times 125)$ . We must now add the resting heart rate back onto each number to determine the final target heart rate range. Therefore, the corresponding heart rate range for our child for moderate intensity activity is 130 ( $50 + 80$ ) to 154 ( $74 + 80$ ) bpm.

For vigorous intensity exercise, the heart rate range for this child would be 155 to 185 using exactly the same procedure as above.

### 2.4.3 ▶ Rating of perceived exertion using a Borg-scale

Perceived exertion is an estimate of the effort an individual has to make in order to carry out the physical activity or in other words how hard one feels they need to work. This is a subjective assessment based on the physical sensations experienced by an individual during exercise (Carvalho, Bocchi, & Guimaraes, 2009; Hommerding, Donadio, Paim, & Marostica, 2010; Potteiger & Weber, 1994). An example of a Borg scale is shown below in Figure 6.

The BORG Scale			
Scale for Relative Perceived Exertion		Modified Borg Scale	
6	Extremely Light	At Rest	0
7	Very Very Light	Very Easy	1
8			
9	Very Light	Someht Easy	2
10			
11	Light	Moderate	3
12			
13	Somewhat Hard	Somewhat Hard	5
14			
15	Hard	Hard	6
16			
17	Very Hard	Very Hard	7
18			
19	Extremely Hard	Extremey Hard	9
20	Maximal Exertion	Maximum effort	10

**FIGURE 6:** The Borg scale of Rating of Perceived Exertion (Noble, Borg, Jacobs, Ceci, & Kaiser, 1983).

While exercising, an individual is advised to look at the rating scale, and estimate the level of exertion they are experiencing as best as possible and provide the appropriate number from the scale. This is defined as the “rating of perceived exertion” or RPE. The scale shown in Figure 6 is known as the Borg scale.

A moderate intensity physical activity (Table 1) is represented by a RPE of between 12 to 13 on the Borg scale (described as “some- what hard”). Light and vigorous activities fall into the ranges of 10-11 and 14-16 respectively.

## Metabolic equivalent (MET) level

One metabolic equivalent (1 MET) is the amount of energy required and is equivalent to the amount of oxygen the body uses when at rest (Jette et al., 1990), such as while lying down, or sitting quietly, reading a book or watching television. Any physical activity can be defined by the intensity which is expressed as a multiple of this value depending on the extent of energy required.

The more intense the work out the higher the energy required and the higher the METs.

- Any activity that burns <3 METs is considered light intensity.
- Any activity that burns 3-6 METs is considered moderate intensity.
- Any activity that burns >6 METs is considered vigorous intensity.

Table 2 below list the METs required for some common activities.

ACTIVITY	INTENSITY	METS	ENERGY EXPENDITURE (kcal equivalent for a person of 30kg doing the activity for 30 mins)
Ironing	Light	2.3	35
Cleaning or dusting or sweeping	Light	2.5	37
Leisurely walking or strolling	Light	2.5	37
Painting	Moderate	3	45
Brisk walking (4-6 km/h)	Moderate	3.3	50
Hoovering	Moderate	3.5	53
Golf	Moderate	4.3	65
Badminton	Moderate	4.5	68
Tennis	Moderate	5	75
Walking Fast >6 km/h	Moderate	5	75
Lawn Mowing	Moderate	5.5	83
Cycling 16-19 km/h	Moderate	6	90
Aerobic dancing	Vigorous	6.5	93
Cycling fast 19-22 km/h	Vigorous	8	120
Swimming	Vigorous	8	120
Tennis	Vigorous	8	120
Running 9-10 km/h	Vigorous	10	150
Running 10-12 km/h	Vigorous	11.5	173
Running 12-14 km/h	Vigorous	13.5	203

**TABLE 2:** Intensities and Energy expenditure (METs) associated with common types of physical activity. (Adopted from Ainsworth et al, 2000)(Ainsworth, 2000).

### 1.3► Different Types of physical activity

Based on the main physiologic responses elicited physical activity can be classified into different types which contribute to the development of different aspects of physical fitness. The most important types of physical activity for health in children and adolescents are:

1. Activities for Cardio-respiratory (aerobic) Fitness.
2. Activities for building muscle strength and/or endurance (resistance or strength training).

3. Activities for enhancing flexibility (Stretching).
4. Activities involving coordination (Balance, agility etc.).

### ▶▶ *Cardio-respiratory (aerobic) exercise*



Physical activities that involve an increase in cardio-respiratory function, are also known as “cardio-respiratory” or “aerobic” activities. Such activities usually require complex movements involve large muscle groups. As a result such activities have a high energy requirement imposing an increased demand for oxygen. The cardio-respiratory system is responsible for uptake and transport of oxygen to the working muscles. Cardiovascular endurance is the capacity of our body to perform tasks that require the use of large muscle groups usually for relatively prolonged periods of time (several minutes or more). Such activities are associated with increased heart rate and blood pressure. Training that involves repeated participation in such endurance exercises can enhance the capacity of the cardio-respiratory system through adaptation. The heart and lungs can function more efficiently at providing the working muscles with the oxygenated blood which is needed to perform the task.

Some examples of physical activities that can improve cardio-respiratory endurance are walking, running, swimming, bicycling, paddling, dancing, etc. All of these activities involve complex movements brought about by the coordinated action of multiple large muscle groups.

### ▶▶ *Muscular strength and endurance exercise*



Movement is produced due to the force generated by the contracting muscles. The capacity of the muscle to generate force or tension against an opposing force or resistance is known as muscular strength. The ability of the muscle to remain contracted for a prolonged period or length of time in order to produce the force or tension is defined as muscular endurance. The activities or exercise which involves movement against a resistance helps to build strengthen and endurance of muscles. Weight bearing exercises which apply a load on the bones stimulate bone deposition and this contributes to increased bone density and strength. Muscular strength and endurance is required for activities such as pushing, pulling, lifting or carrying a heavy load.

Some examples of activities that can help to build muscular strength and endurance are:

1. Weight bearing exercises such as skipping, climbing, push ups, hanging on a monkey bar, etc.
2. Load bearing exercises such as lifting weights and dumbbells.
3. Activities such as throwing a ball, paddling, rowing, using resistance machines in a gym which involves muscular contraction against an opposing force or load.

### ▶▶ Flexibility exercise



Flexibility can be described as the capacity of joint(s) when facilitated by the muscles to move through a full range of motion, unrestricted and pain free. Flexibility therefore depends on the specific part of the body or joints involved and is determined by the elasticity of the joint components – muscles, tendons and ligaments. Improved flexibility is necessary for pain free movement and is essential to be able to carry out activities of daily living. Good flexibility has been shown to be correlated to a higher quality of life. Flexibility is required for such activities that require bending, lunging, twisting, reaching out and stretching. Some activities that improve flexibility are: gentle stretching of muscles, sports such as gymnastics and karate, Yoga, Pilates, etc. During resistance training for muscle strength flexibility is required in order to move the joint through a full range of motion. Usually flexibility exercise are built in as part of the warm up and cool down session before and after an exercise session. These involve different types of stretching exercises and helps to prepare the joints and muscles for the bout of exercise.

It is important to note that girls often have greater flexibility when compared to boys and also varies significantly during the major growth phases of life. Flexibility is decreased during a growth spurt as the bones grow faster than muscles and tendons.

### ▶▶ Coordination exercises



Coordination refers to the ability to control the movement. This is a function of the central nervous system. The motor unit regulates the activation or recruitment and contraction of a muscle, or group of muscles, which may be required for a specific task, activity or movement. Motor coordination is the capacity to use the brain and the central nervous system together with the motor unit and locomotor system to develop stable, controlled, smooth and precise movements. Good coordination is re-

quired for many sports in which precision is the key to performance such as tennis and golf. Good coordination is also important for activities such as gymnastics and dancing. Good coordination can be developed through exercises that use such movements repeatedly. Some examples are:

- Balancing exercise involving the body, such as one leg stand or walking on a tight rope.
- Repeated activities that follow a rhythm, such as dancing to music or gymnastics.
- Activities involving kinaesthetic awareness and spatial coordination, such as learning how to perform a somersault or learning a new dance move.
- Activities involving foot-eye coordination, e.g. kicking or dribbling a ball as in football.
- Activities involving hand-eye coordination, e.g. racquet sports, throwing or catching a ball.

#### 1.4► Health-related and skill-related fitness

Physical fitness is defined as a set of attributes that people have or achieve that relates to the ability to perform physical activity. Components of physical fitness are:

- Cardiorespiratory endurance
- Muscle strength, endurance, and power
- Flexibility
- Balance
- Reaction time
- Body composition

Physical fitness is determined by an assessment of an individual's physiologic capacity. Based on the type of physical activity physical fitness can be classified into two types: *health-related physical fitness* and sports or athletic performance or *skill-related physical fitness*. Health-related physical fitness is a sub-component of fitness and refers to those physiologic parameters which determine an individual's health (Asztalos et al., 2009; Kim, Shin, Nam, Choi, & Kim, 2008). These components reflect the individual's risk of developing chronic illness. Components of health-related physical fitness are:

- Cardiorespiratory fitness
- Muscular strength
- Muscular endurance
- Flexibility
- Body composition

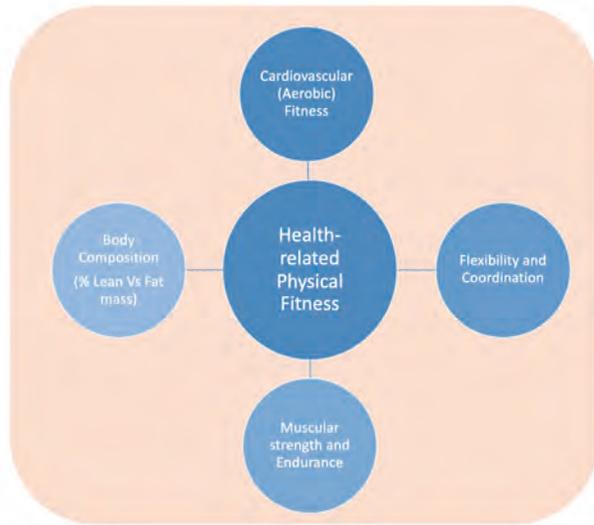
For example, an individual with a good cardiorespiratory capacity is less likely to develop hypertension and heart disease. An individual with a low percent body fat is less likely to suffer from obesity. Thus, good aerobic fitness and low body fat constitute important components of health related physical fitness. High health related fitness reduces the risk of illness, however, the individual may not have a high level of athletic performance.

Skill related physical fitness is a subcomponent of physical fitness, that determines an individual's performance in a specific sport. As each sport requires a different set of skills for optimal performance, the skills required to excel in them will vary and will be composed of a combination of different facets of fitness. Skill related fitness is also known as performance-related fitness and contributes to more skilled and efficient functioning. Some components of skill related fitness are:

- Agility
- Power
- Balance
- Reaction time
- Coordination
- Speed

For example, athletics requires high levels of flexibility and agility whereas competitive long distance swimming requires high aerobic fitness and endurance. To appropriate skill-related fitness the athlete must undergo training specific to their sport. Skill related fitness will also improve physiologic capacity and therefore it will also contribute to health benefits and health related fitness.

Figure 7, A and B below outlines the key components of health-related physical fitness and skill related physical fitness.



A



B

**FIGURE 7:** Aspects of (A) Health related Fitness (B) Skill or performance related Fitness.

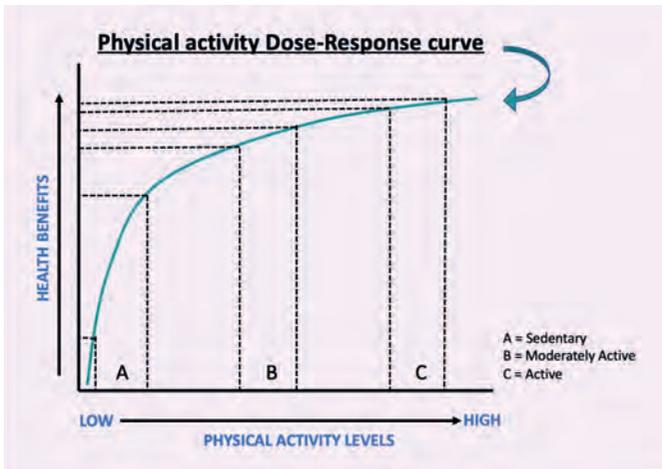
## Chapter 2

# Health Benefits of Physical Activity

BY CONOR HUSSEY AND ANANYA GUPTA

### ► Dose-response issues concerning physical activity and health

According to the FITT principle “dose” of exercise is determined by Frequency, Intensity, Time and Type of exercise. This is crucial to prescribe optimal amount of exercise to obtain health benefits. The figure 1 below shows that there is a parabolic relationship between physical activity and health status. That is with increase in the levels of physical activity and fitness there is a much greater improvement in health status (Hamer, Stamatakis, & Steptoe, 2009; Lee, 2007; Pate, 1995) (see figure 1). Physically active people therefore have a much lower risk of illness. The most significant change in health status is observed when the most sedentary individual becomes physically active (Ekkekakis, Hall, & Petruzzello, 2005) (Figure 1). This relationship has significant public health implications, for both young people and adults.



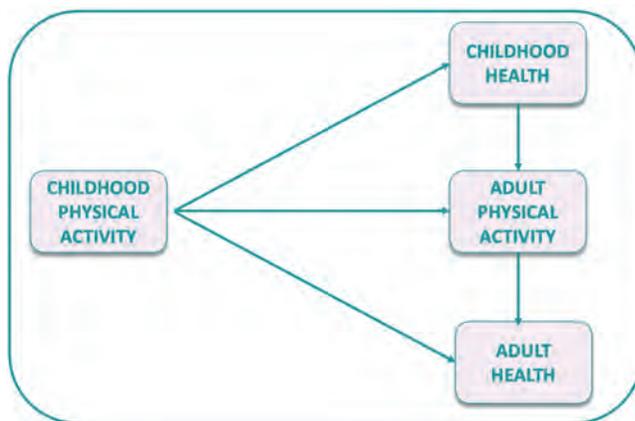
**FIGURE 1:** The Dose-Response relationship between physical activity and health benefits.

It is important to determine the intensity of physical activity in order to prescribe the exercise dosage accurately to ensure maximum health benefit. Evidence suggests that performing exercise at a higher intensity (moderate-to-vigorous) are significantly more beneficial to health and fitness (Lee & Paffenbarger, 2000; Lee et al., 1997; Paffenbarger & Lee, 1996, 1997; Paffenbarger, Lee, & Kampert, 1997). It is also important to determine the plan for the week in order to ensure that the exercise or training is performed regularly (i.e., both Frequency and Time of the FITT principle) to have significant benefit to health. International guidelines (WHO) recommends a minimum of 150 minutes of moderate intensity physical activity spread over 3-5 days in a week. This is discussed in more details in the next chapter.

### ▶▶ *Physical activity and its impact on the health of young people*

Physical activity has several benefits to the growth, development and long term health of children and young people. These benefits fall broadly into three categories (see Figure 2):

1. Childhood Health benefits: Physical, mental and social health benefits during childhood.
2. Adult health benefits – Childhood health benefits which lead to better health in adulthood.
3. Physical activity behavioural and lifestyle benefits on long term health resulting from healthy physical activity habits developed in childhood to be practiced into adulthood.



**FIGURE 2:** Relationship between childhood and adult physical activity and health.

## 2.1▶ Health benefits of childhood physical activity

### ▶▶ *Growth and Development*

Engaging in regular physical activity is crucial to a child's growth and development. Physical activity in childhood has a range of benefits some of which can be seen during childhood including healthy growth and development of the musculoskeletal and cardiorespiratory system, maintenance of energy balance and thus a healthy body weight. It also leads to health benefits in adulthood such as reduced risk of chronic illness such as cardiovascular disease (hypertension, high blood cholesterol, coronary artery disease). Physical activities helps in the development of better motor skills, concentration and cognition. Physical activity also presents opportunities for children to engage in social interactions with peers. This helps to build important social skills, build team spirit and cooperation amongst children.

### ▶▶ *Bone and Muscle*

Physical activities undertaken in childhood, particularly activities which apply large forces quickly convey optimal benefits to bone mass, size, and structure. Evidence is accumulating that benefits persist well beyond activity cessation. Regular physical activity in early is essential for the normal development of the skeleton and is crucial to maintaining a healthy skeleton in adulthood ("American College of Sports Medicine Position Stand. The recommended quantity and quality of exercise for developing and maintaining cardiorespiratory and muscular fitness, and flexibility in healthy adults," 1998; Apkon, 2012; Donnelly et al., 2009). The osteogenic potential of a particular physical activity is conditional upon the magnitude of the applied load, the rate at which the load is applied, the duration of the loading bout, and the novel nature of the load (Paffenbarger & Lee, 1996). Physical activities shown to have the greatest osteogenic effects on the growing skeleton are those characterised by a considerable loading magnitude applied at a rapid rate. Greater forces, delivered quickly, through activities such as jumping, skipping etc appear to convey the greatest benefits to bone mineralisation and structure in children and adolescents. These activities are typically weight-bearing activities since body weight increases the magnitude of loading.

To obtain significant skeletal benefits exercise interventions including high impact exercises (with Ground Reaction Forces > 3.5 times Body Weight) needs to be delivered for a sufficient length of time ("American College of Sports Medicine Position Stand. The recommended quantity and quality of exercise for developing and maintaining cardiorespira-

tory and muscular fitness, and flexibility in healthy adults,” 1998; Donnelly et al., 2009). Research has shown that at least 7 months of impact exercise is essential to stimulate a measurable change in bone mass in children (Ainsworth et al., 2011; Ainsworth et al., 2000; Lee, Sesso, Oguma, & Paffenbarger, 2003). Exercise induced loading is most effective during pre- and early puberty for stimulating optimal bone mass deposition (Bass, 2000). In addition, to high-impact activities lifestyle physical activity during childhood also contribute towards achieving optimal bone mass and density into young adulthood (Bass, 2000; Donnelly et al., 2009).

Weight bearing exercises such as running involving large muscle groups stimulates growth and increase in muscle mass and can help in developing muscle strength in children. Resistance exercises where the muscle has to contract against a load helps to stimulate muscle growth. Using resistance bands, rope ladders, monkey bars or climbing frames can also be helpful. It is important to build in such activities regularly during the week.

### ▶▶ *Body composition*

Physical inactivity and a sedentary lifestyle is thought to be responsible for the growing levels of obesity in children. Exercise and active play helps to burn the excess calorie consumed in an prevents the accumulation of excess fat (Goran & Treuth, 2001). Children spending more time in sedentary leisure time activities such as watching television and playing computer games are more likely to have excess fat. Childhood obesity has been strongly associated with a number of chronic diseases such as diabetes that can develop later in life.

### ▶▶ *Cardiorespiratory function*

Aerobic exercises help to increase cardiorespiratory capacity in children. Regular aerobic exercise enhances cardiovascular function. Children who are physically active have significantly lower resting heart rate and higher cardiorespiratory function. Regular physical activity results in reduced sympathetic nervous system activation resulting in lower blood pressure and heart rate at activities with higher intensity. This further enhances the capacity to take part in prolonged periods of high intensity physical activity. All of these parameters are essential for a healthy cardiorespiratory function in adulthood and reduces the risk of developing diseases such as hypertension, high blood cholesterol and coronary artery disease. Children with higher cardiorespiratory capacity has greater endurance and can take part in vigorous strenu-

ous activity without difficulty. Normally cardiovascular disease is not considered to be a childhood disorder, but the evidence obtained from research definitely indicates that physically inactive children and those with lower cardiovascular (aerobic) fitness are more likely to possess risk factors for disease such as a high cholesterol, higher blood pressure, raised insulin levels and excess fat (Lee & Paffenbarger, 2000; Lee et al., 1997; Lee et al., 2003; Morris & Froelicher, 1993; Paffenbarger & Lee, 1997).

### ▶▶ *Immunity*

Regular physical activity can also boost the immune system and reduce susceptibility to infections. Exercise is known to transiently elicit an innate immune response and there is an increased activity of neutrophils and natural killer cells. Increased activity of these cells improves surveillance against invading pathogens and helps to reduce infections. This provides protection from illness caused by the pathogens (McMurray et al., 2007).

### ▶▶ *Puberty*

Participation in regular exercise helps children adapt better to physical and emotional changes that occur with the onset of puberty. The benefits of exercise includes better body image, weight management, and reduced stress (Chang, Liu, Zhao, Li, & Yu, 2008).

### ▶▶ *Psychological and social development*

Physical activity is extremely important for the development of social skills amongst children and also for their psychological well-being (Steptoe & Butler, 1996). Children with little or no physical activity often suffer from anxiety and emotional distress. Achievements through Sport and exercise helps children build empathy, team spirit, cooperation and self-confidence. This further contributes towards enhanced social well-being, self-esteem and positive perceptions of body image and competence. Moreover, children with higher physical activity levels are also more likely to have better cognitive functioning (Akko, Koutsandreou, Murillo-Rodriguez, Wegner, & Budde, 2020; Etnier, Nowell, Landers, & Sibley, 2006; Jia et al., 2021; Lees & Hopkins, 2013). It would be safe to speculate that participation in sport and physical activity may be associated with lower levels of juvenile delinquency (e.g. involvement with gangs, drug use, etc.) but the research is currently not equivocal.

Lack of regular physical activity is contributing to increased obesity, insulin resistance, abnormal lipid profile and elevated blood pressure in children. This in turn is probably responsible for the increasing prevalence of type 2 diabetes in children and adolescents, a disease that until recently was usually only found in overweight and obese adults (Tansey et al., 2006; Wolfsdorf, 2005).

## 2.2▶ Health benefits of childhood physical activity in adult life

Childhood obesity usually persists into adulthood. Obese children are more likely to continue to remain over weight as adults (Serdula et al., 1993). Regular physical activity during childhood therefore provides protection against obesity later in life. In addition, obese children are at risk to develop health problems as adults resulting in chronic illness and mortality. Childhood exercise which promotes weight management prevents obesity and diabetes in adulthood (Serdula et al., 1993). By maintaining higher aerobic fitness, physical activity during childhood reduces the risk of cardiovascular disease in adult life (Neville, Robson, et al., 2002). Exercise contributes to greater bone mineral density and improved muscular strength. This reduces the extent of bone mass (osteoporosis) and muscle mass (sarcopenia) lost during aging. This delays the age related deterioration of Musculo-skeletal strength and loss of mobility in old age. Weight bearing exercises during early puberty result in the attainment of greater bone mass which is protective against osteoporosis in old age (Neville, Murray, et al., 2002).

### ▶▶ *Developing a lifelong healthy behaviour in physical activity*

It has been established through strong research evidence that healthy behaviour and physical activity habits that are developed during childhood usually continues into adulthood (Janz, Dawson, & Mahoney, 2000; Kristensen et al., 2008; Telama, 2009). Children who are habituated throughout their school year in active sports and exercise participation feel more confident about their physical capabilities and therefore are more willing to continue to participate in similar activities throughout the lifespan. Children who are physically active and have positive experiences of exercise and sports tend to continue to find time to participate in such activities when they reach adulthood. Physical activity behaviour established in childhood therefore has lifelong implications in setting up a healthy lifestyle. The quality of the childhood experiences in physical activity and sports appears to have a stronger positive correlation with

physical activity habits set up in adulthood rather the quantity (Taylor, Blair, Cummings, Wun, & Malina, 1999; A. M. Thompson, Humbert, & Mirwald, 2003). Childhood experiences in exercise and sport has a lifelong impacts on subsequent participation as an adult. Any negative experience faced by a child during physical activity can become a significant barrier to future participation.

<p><b>1. Health benefits during childhood:</b></p> <ul style="list-style-type: none"> <li>• Maintenance of energy balance and prevention of overweight and obesity.</li> <li>• Promotes healthy growth and development of the musculoskeletal and cardiovascular system.</li> <li>• Reduces risk factors for:             <ul style="list-style-type: none"> <li>— cardiovascular disease.</li> <li>— type 2 diabetes</li> <li>— hypertension</li> <li>— hypercholesterolemia.</li> </ul> </li> <li>• Improves mental health and psychological well-being through:             <ul style="list-style-type: none"> <li>— reduced anxiety and stress</li> <li>— reduced depression</li> <li>— higher self-esteem</li> <li>— improved cognitive function.</li> </ul> </li> <li>• Improved social interaction.</li> </ul> <p><b>2. Improved health during adulthood:</b></p> <ul style="list-style-type: none"> <li>• Reduced probability of becoming obese during adulthood.</li> <li>• Reduced morbidity and mortality from chronic disease during adulthood.</li> <li>• Improved bone mass reduces likelihood of osteoporosis in later life.</li> </ul> <p><b>3. Establishment of lifetime activity patterns:</b></p> <ul style="list-style-type: none"> <li>• Improved likelihood of becoming an active adult.</li> </ul>
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**TABLE 1:** Health benefits of physical activity in children.

### 2.3► Health consequences of obesity in young people

The increase in prevalence of obesity in children and young people is a direct consequence of inadequate physical activity. Obesity and high BMI has serious negative effects on health including both physiological (medical) and psycho-social effects. One the most common and devastating consequences of obesity is psychosocial impact as obese children are targeted for bullying and systematic discrimination. This causes the development of poor self-image and low self-esteem which can persist into adulthood (Dietz, 1998). In addition, obese children and youth suffer from a large number of health related issues (Dietz, 1998; Reilly, 2005; Saha, Sarkar, & Chatterjee, 2011):

1. Elevated/abnormal blood lipid profiles (elevated triglycerides, elevated low-density lipoprotein (LDL) cholesterol and lowered high-density lipoprotein (HDL) cholesterol).

2. Glucose intolerance (*or* insulin resistance) leading to Type 2 diabetes.
3. Atherosclerotic changes within arteries (coronary heart disease).
4. Hepatic problems such as cirrhosis.
5. Hypertension/ high blood pressure.
6. Breathlessness due to poor oxygen uptake and delivery to tissues
7. Sleep problems.
8. Orthopaedic complications, especially of the hips and lower extremities.

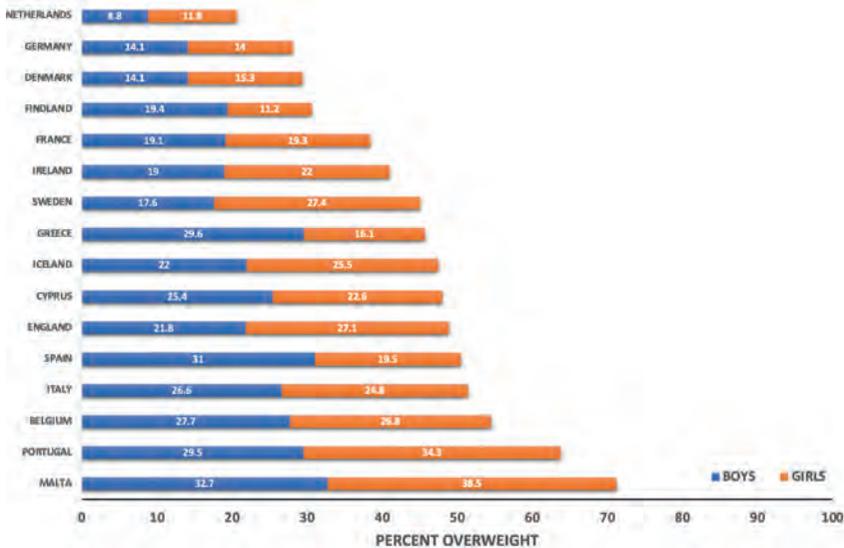
Childhood obesity is associated with an increased risk of adult all-cause mortality, coronary heart disease, atherosclerotic cerebrovascular disease, hypertension, colorectal cancer, diabetes, gout and arthritis, amongst other medical conditions. With increasing degree of obesity the risk of morbidity and mortality from these chronic diseases increases. As in adults the location of the excess fat in the abdomen has greater correlation to the risk of developing cardiovascular issues than the actual percent fat. Studies have shown that fat accumulation in the central (abdominal) region is associated with increased risk factors such as excessive blood triglycerides, low HDL cholesterol, hypertension, insulin resistance, endothelial dysfunction and arterial wall stiffness (Dietz, 1998; Reilly, 2005; Saha et al., 2011). In contrast, fat accumulation around the lower body region (hips and thighs) is far less dangerous. Regular participation in physical activity amongst children and youth is extremely important and can prevent childhood obesity and should therefore should be a key component of all interventions designed to improve children's health.

### ▶▶ *Obesity in young people across Europe*

The rise in childhood obesity has been recognised as an important public health issue across Europe. Overweight children are likely to grow up into obese adults. Obesity can lead to serious life threatening illness resulting in a higher risk of premature death and disability in adulthood. Complications stemming from obesity and excessive body fat (such as diabetes, heart disease and cancer), are amongst the highest causes of premature death especially mounting to 2.8 million people every year. An alarming 40% of the current global population, men and women, that is over 2.2 billion people are currently overweight or obese. Who has declared childhood obesity as a modern day global *epidemic*. At present it is estimated that being 17% of children worldwide are over-

weight. In 2019, 38 million children under the age of 5 were found to be obese. According to a recent WHO report “one in three children aged 6 to 9 years was overweight or obese” in the European Region. Childhood obesity is associated with a whole range of serious consequences for health and social life in childhood, as well as a higher risk of premature death and disease in adulthood. “Overweight and obesity, and related diseases, are largely preventable”. The prevention of childhood obesity “must therefore be given the highest priority,” according to WHO. The main cause for this growing prevalence of obesity can be attributed to the lack of proper physical activity and is further compounded by the consumption of poor quality, high calorie processed food.

The Figure 3 below shows the prevalence of obesity in European countries amongst adolescents aged 12-18.



**FIGURE 3:** Incidence of childhood obesity amongst boys and girls in selected European countries. (data obtained from the website of the International Obesity Taskforce: <http://www.who.int/databases/ChildhoodTablebyRegionFeb06.htm>).

The burden imposed by obesity related disease is immense, both in terms of economic costs to health systems and, on an individual level, reduced quantity and quality of life. Therefore immediate actions need to be taken to reduce obesity in children. This can be achieved through increased opportunities for physical activity and a healthy diet.

## ►► *Prevalence of physical activity across EU Member States*

The WHO recommendations for physical activity in children states that that children 5 years and above need to participate in at least 60 minutes of moderate-to-vigorous physical activity every day. However, these recommendations are not being met by majority children and adolescents across all countries in EU. The following section summarises the current estimate of physical activity practices found in EU member states. It can be readily seen that the prevalence of physical activity is inversely correlated to obesity. It is important to note here that tools and methods used to collect the data varied significantly across states. However it is still possible to draw a general overview of the state of physical activity in these countries.

There is definitely a significantly large group of young people who regularly take part in physical activity. There is also a trend that while one group of teenagers are mostly inactive there is another group that has increased participation in vigorous activities. This leads to the creation of two distinct groups of adolescents, very active and inactive. The polarisation is caused by an increase in organised sports at the expense of informal play and leisure time activities.

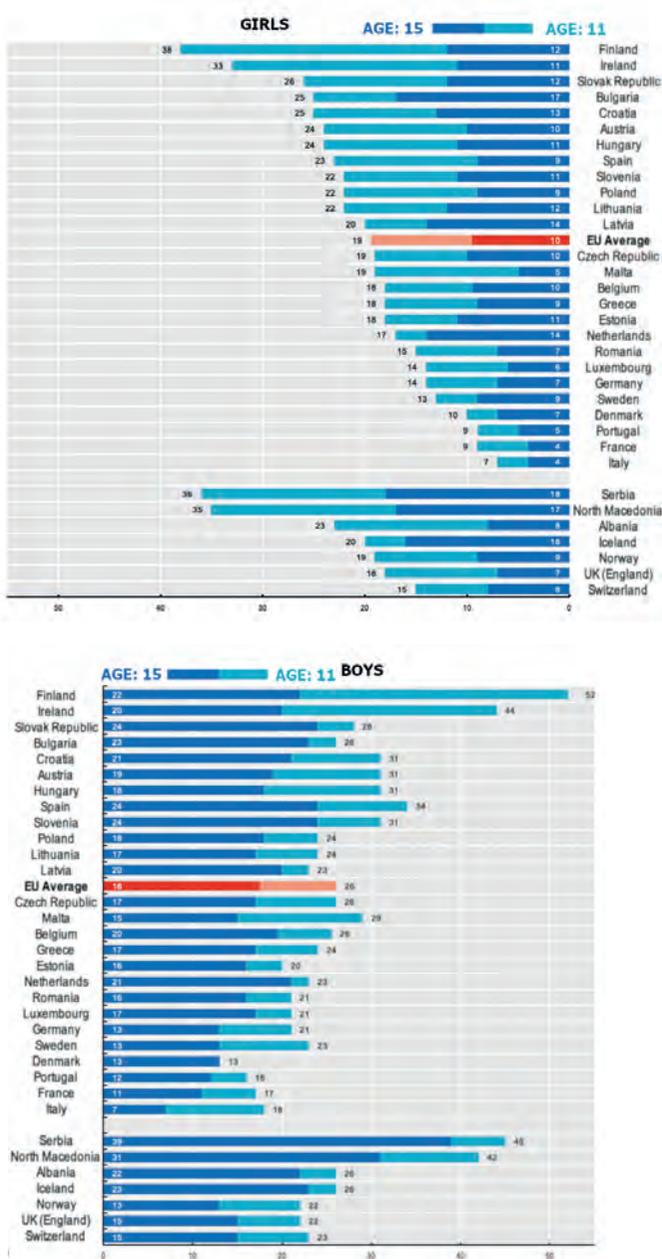
A survey conducted by WHO in 2018-2019 revealed that on an average only one out of four 11-year-olds and only one out of seven 15-year-olds reported that they undertook moderate-to-vigorous exercise at least one hour daily across EU states (Figure 4) (Guthold, Stevens, Riley, & Bull, 2020; Inchley, Stevens, Samdal, & Currie, 2020). In all countries, girls were found to be less physically active than boys in both age groups. There was a sharp decline in physical activity between the ages 11 to 15 in both boys and girls in most EU countries. The lowest prevalence of physical activity was found in Italy, France, Portugal and Denmark. There is a decline observed in the proportion of children and adolescents undertaking moderate-to-vigorous physical activity in all countries from 2006 to 2018 both boys and girls, and in all age groups (Figure 5). For boys aged 11 years old and 13 years old, the rate decreased by 4 percentage points, narrowing the gap with the physical activity level of girls at the same age (Guthold et al., 2020; Inchley et al., 2020; Owen, Curry, Kerner, Newson, & Fairclough, 2017).

Factors influencing the physical activity trend amongst children and teenagers include the availability of safe space and equipment, school curricula and increase in sedentary leisure time activities or pastimes, in particular on-screen activities. Children spend a large amount of time on mobile devices and the internet which reduces the time available for free play, thus reducing levels of physical activity<sup>1</sup> (Inchley et al., 2020; Owen et

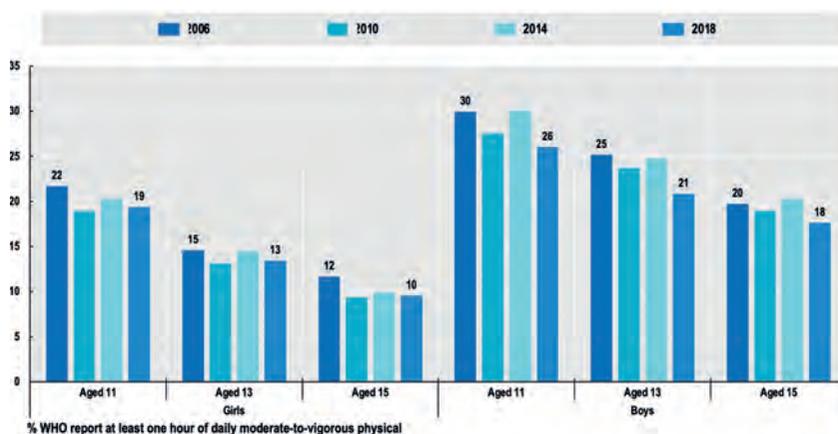
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<sup>1</sup> OECD, 2019 <https://doi.org/10.1787/67450d67-en>.

al., 2017). EU member states have taken a number of initiatives since 2018 to get children active. This is discussed briefly in the next chapter.



**FIGURE 4:** Proportion of 11- and 15-year-olds meeting WHO recommended daily physical activity, 2018 . Note: The EU average is unweighted. (Source: HBSC data from (Inchley et al., 2020) OECD, 2019 <https://doi.org/10.1787/67450d67-en>.)



**FIGURE 5:** Physical activity trend 2006-2018 amongst adolescents in EU member states. The EU average is unweighted EU. Source: HBSC data (Inchley et al., 2020); WHO (2018), *Physical activity factsheets for the 28 European Union member States of the WHO European region*, WHO Regional Office for Europe, Copenhagen; OECD (2019), *The Heavy Burden of Obesity: The Economics of Prevention*, OECD Health Policy Studies, OECD Publishing, Paris, <https://doi.org/10.1787/67450d67-en>; OECD/European Observatory on Health Systems and Policies (2019), *Slovenia: Country Health Profile 2019*, State of Health in the EU, OECD Publishing, Paris/European Observatory on Health Systems and Policies, Brussels, <https://doi.org/10.1787/79ba70a2-en>.

## 2.4 ▶ Safety issues concerning physical activity amongst young people

### ▶▶ Risk of injury and trauma

There is a significantly high risk of injury occurring during physical activity and sports amongst young people. This is perhaps the a potential disadvantage. An injury can become a significant burden for future physical activity and lead to several problems:

1. Possibility of long term physical damage and reduced capacity.
2. Possibility of recurrent injury.
3. Injury leading to immediate short term impact on the child's health and well-being.
4. Possibility of childhood injury impacting lifelong participation in physical activity.

When physical activities are performed by children that are inappropriate for their age or uses incorrect technique or equipment, this increases the chances of injury. Overuse injury is very common

amongst children and results from excessive or vigorous intensity of exercise. Repeated action with incorrect technique leads to excessive physical damage which over time develops into overuse injury. During ages 6-12 physical activity is mostly associated with fun and joyful play. During this early phase of life when a child is still discovering about their body, physical capacity and about fair and safe play within sport and physical activity. At this stage children should be allowed to engage in physical activity as an enjoyable recreation and not be forced into competitive sports (Washington et al., 2001). Participation in a rigorous training routine can lead to overuse injuries during this crucial developmental stage which can compromise healthy growth and development and result in long lasting physical and psychological damage.

Children start to participate in competitive sports from the age of 12. Sports injuries which occur in this phase resulting from incorrect training and inappropriate behaviour of the children themselves. It is important to make children aware of the consequences of risky behaviours (*e.g.* dangerous tackling in football, failing to wear a helmet while biking or skating, *etc.*). Awareness and education can help children take responsibility for their actions during sports and play and avoid injury (van Mechelen & Verhagen, 2005). If sport is considered as more for play and enjoyment than competition, there will be more sportsmanship and safe play in adolescence.

Children who suffer from an injury can develop fear of the risk of injury. This can severely hamper their willingness to take part in future activities. The greater risk to health is not doing enough physical activity. The advantages of being physically active far outweighs the risk of accident and injury. Sports and exercise injuries are, can be easily avoided through proper training and developing correct technique and behaviour (van Mechelen & Verhagen, 2005). The responsibility for proper education lies with parents, trainers, coaches, teachers and health professionals involved with physically active youth.



## Chapter 3

# Physical Activity Guidelines and Recommendations in EU

BY CONOR HUSSEY AND ANANYA GUPTA

There is an increase in barriers to physical activity and a corresponding decrease in opportunities to be active experienced as one progresses from adolescence to adulthood. Modern day changes in lifestyle have further reinforced this phenomenon. Due to the advent of modern day technology, the effort needed to complete a task has been significantly reduced. This is particularly evident in household chores and travel. Very little effort is necessary to complete household duties, or in transportation (car, bus). The most recent WHO survey shows that 40-60% of the EU adult population is leading a predominantly sedentary lifestyle (Bennie et al., 2013) (WHO factsheets 2018). More than 30% of adults in the EU do not meet the daily recommended minimum levels of physical activity. Therefore it is crucial that EU Member States prepare national plans and policies to support and promote physical activity and also to raise awareness of the benefits of these activities to health. These plans should aim to provide the necessary environment for exercise and take into account the customs and cultural characteristics of each country (WHO factsheets 2018).

In order to bring about a change in lifestyle the first step would be to provide suitable guidelines and educational material that can be used to raise awareness. The next step would be to make appropriate changes in policy and practice. This would require increased cross-sectoral (sports, health, education) cooperation and appointment of experts in leadership roles within the governing bodies to support implementation. Significant progress can be made through a large number of small changes in policy and practice across the board providing resources that allow our societies to become more open and supportive of an active and a healthy lifestyle.

Important documents published by WHO and EU commission are listed below:

1. World Health Organisation. Global strategy on diet, physical activity and health, 2004.
2. World Health Organisation. Physical activity strategy for the WHO European region 2016-2025, 2015.

3. World Health Organisation. Global action plan on physical activity 2018–2030: more active people for a healthier world. Geneva, 2018.
4. World Health Organisation. Global recommendations on physical activity for health. Geneva, 2010.
5. U.S. Department of Health and Human Services. 2008 physical activity guidelines for Americans. be active, healthy, and happy! 2008.
6. Pate RR, Pratt M, Blair SN, et al. Physical activity and public health. A recommendation from the centres for disease control and prevention and the American College of sports medicine. *JAMA* 1995;273:402–7.
7. European Commission. Eu physical activity guidelines. recommended policy actions in support of health-enhancing physical activity, 2008. 8 Official Journal of the European Union. Council recommendation of 26 November 2013 on promoting health-enhancing physical activity across sectors, 2013.
8. WHO Global action plan on physical activity 2018–2030: more active people for a healthier world. Geneva: World Health Organisation; 2018.

The above references were used as a guideline for the following sections.

### 3.1▶ World Health Organisation and formulation of the guidelines for physical activity

The World Health Organisation (WHO) provides “Guidelines on physical activity and sedentary behaviour” which consists of evidence based public health recommendations for children, adolescents, adults and older adults. It includes recommendations on the volume of physical activity (frequency, intensity and duration) required to obtain significant health benefits and to reduce risks for chronic illness. The most recent recommendations released in 2020 also provide evidence on the impact of prolong sedentary behaviour on health outcomes. WHO recommends that children and adolescents must participate in a minimum of 60 min of moderate-to-vigorous physical activity every day (WHO Guidelines 2020). WHO recommendations for children and adolescents is described in more details in the next section, Table 3 and Figure 3. The recent survey conducted as part of the WHO European Childhood Obesity Surveillance (Wijnhoven et al., 2013; Wijnhoven et al., 2014; Wijnhoven et al., 2015), revealed that 53.9% of children do not participate in organised sports, and approximately 40% do not use active modes of

transport such as walking or cycling while going to school. The Health Behaviour in School-aged Children study showed that amongst teenagers, only 25.0% of boys and 15.0% of girls admitted to meeting the WHO minimum recommendations for daily physical activity (Alleman, Murphy, Baskerville, & Chugh, 2017; Blondin, Giles, Cradock, Gortmaker, & Long, 2016; Bornhorst et al., 2015).

The WHO recommends a minimum of 150 minutes of moderate to vigorous physical activity for all adults aged over 18 (including older adults), or 75 min of vigorous-intensity physical activity or an equivalent combination of the two every week (WHO 2020) Figure 1. There are many ways to engage in physical activity, including while commuting, participating in leisure activities in the community, attending class, working, or just going about your everyday life at home. However, as most daily environments have become more sedentary, maintaining adequate amounts of physical activity is becoming more and more chal-



**FIGURE 1:** Summary of WHO Physical activity recommendations for Adults. Adopted from WHO Global action plan on physical activity 2018–2030: more active people for a healthier world. Geneva: World Health Organization; 2018. CC Licence: CC BY-NC-SA 3.0 IGO.

lenging (7, 8). The “Eurobarometer” (Bennie et al., 2013) is a public opinion poll on sports and physical activity, however despite the well-known health advantages of exercise, it found that over half (46%) of Europeans never exercise or play sports, and that number has gradually risen since 2009. Only 7% of individuals in Europe consistently exercise (at least five times per week), while a large percentage of adults in Europe spend more than five hours per day sitting, which may be a risk factor for death irrespective of physical activity (References 1-8 listed above).

WHO launched the “*Global action plan for the prevention and control of noncommunicable diseases 2013–2020*”, that proposes to reduce the prevalence of physical inactivity by 10% by 2025. In response to the WHO action plan and global policies many countries have developed their own regional guidelines and policies to lower the risk factors associated with poor physical activity. Towards this goal a number of the European Union (EU) Physical activity guidelines and policies were published (Reference 7) such as; *the Council of the European Union recommendation on promoting health-enhancing physical activity (HEPA) and the WHO physical activity strategy for the WHO European Region 2016–2025* (Kahlmeier et al., 2015) (Reference 7). To further support and extend the monitoring and implementation of HEPA in the EU member states a collaborative project was established by the European Commission Directorate-General for Education, Youth, Sport and Culture and the WHO Regional Office for Europe. In order to obtain and validate national data on physical activity, focus groups consisting of key members have been appointed in every EU Member State to oversee the partnership. The focus groups get together twice a year to discuss best practices and create campaigns to encourage exercise in the EU.

### **3.2▶ National Physical Activity recommendations for children and adolescents in EU member states**

To assist nations in attaining this goal, the WHO European Region’s physical activity strategy for the years 2016 to 2025 (Reference 2 and 8) was created. It serves as motivation for governments and stakeholders in developing policy in four areas: (i) providing leadership and coordination; (ii) fostering the growth of children and adolescents (iii) encouraging older adults and adults to engage in physical activity; and (iv) providing tools and resources for monitoring, surveillance, setting up necessary framework for platforms, evaluation, and research. The World Health Assembly approved and the Global action plan on physical activity 2018–2030 (Cunha & Nunes, 2021; DiPietro et al., 2020; Hamalainen

et al., 2020; Lambert et al., 2020) which was introduced in the European Region in 2018, reinforcing the European strategy for physical activity.

There are numerous strategies to motivate people to engage in physical exercise, including encouraging more walking, cycling, active leisure, sports, and play. The Global Action Plan on Physical Activity 2018-2030 and the 2016 Bangkok Declaration on Physical Activity for Global Health (Cunha & Nunes, 2021; DiPietro et al., 2020; Hamalainen et al., 2020; Lambert et al., 2020) both identify these activities as contributing to the Sustainable Development Goals (8). Collaboration between the WHO, the European Commission, and EU Member States makes it easier to track how these initiatives are being implemented.

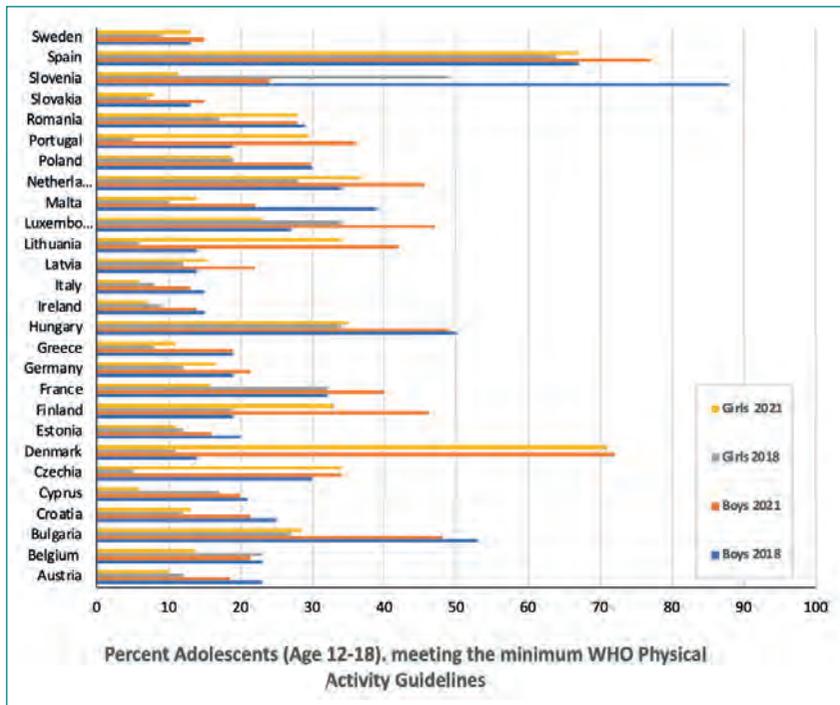
Based on the findings of this collaborative effort, a report was created that contributed to the creation of factsheets on HEPA (Bennie & Wiesner, 2022; Whiting et al., 2021) (<https://www.who.int/europe/publications>) in the EU Member States of the WHO European Region (DiPietro et al., 2020; Hamalainen et al., 2020). The factsheets offer a framework for tracking progress made towards achievement of the 23 parameters considered to be HEPA indicators (Whiting et al., 2021)<sup>1</sup>. The factsheets summarise the current level of physical activity prevalent in children and adolescents in all 27 EU Member States in the WHO European Region. The prevalence of physical activity amongst children and adolescence in the 27 states as documented in the factsheets is summarised below in Figure 2 and Table 1.

EU Member state	Percent meeting minimum Physical Activity levels in Children ages <12 (2018)		Percent meeting minimum Physical Activity levels in Adolescents ages 12-18 (2018)		Hours of weekly PE Mandatory in Schools	
	Boys	Girls	Boys	Girls	Primary	Secondary
Austria			23	12	3 to 4	2 to 3
Belgium (French and German)			23 (average)			2 to 3
Belgium (Flemish)			17 (average)		2	2
Bulgaria	42	24	53	27	3	3
Croatia	89	87	25	12	2 to 3	1 to 2
Cyprus			21	17	1 to 2	1 to 2.5
Czechia	30	15	30	5	2	2
Denmark	16		11 to 14		45 minutes	45 minutes
Estonia	1		20	12	2 to 3	2 to 3
Finland	45		19		2 to 3	>4
France	22		32		3	2 to 3
Germany	27		12 to 19		3	3
Greece	62	65	19	8	3	2
Hungary	50	34	50	34	5	5
Ireland	27	13	15	9	1	2
Italy	83	81	15	8	2	2
Latvia	22	15	14	12	2	3
Lithuania		14	6		2 to 3	2 to 3
Luembourg	34	21	27	34	2	2 to 3
Malta			39	10	2	2
Netherlands	57	54	34	28	2	2.5
Poland			30	19	3 to 4	3
Portugal	53	23	19	5	3	2.25
Romania			29	17	3	3
Slovakia			13	7	3	3
Slovenia	94	81	88	49	2 to 3	1 to 3
Spain	32	17	67	64	2	2

**TABLE 1:** Gives an overview of the percentage pre-adolescent and adolescent boys and girls who are meeting the minimum WHO recommended levels of Physical Activity in 2018. Source Data <https://www.who.int/europe/publications/i/item/EUR-RC71-R14>.

<sup>1</sup> The WHO factsheets can be found here: <https://www.who.int/europe/publications/i/item/WHO-EURO-2021-3409-43168-60449>.

All the EU nations follow the physical activity guidelines defined by WHO recommendations (WHO 2020), however there is a wide variation in how they implement these guidelines and in methods used for spreading the message about physical activity. Some guidelines ask to count steps or use the stairs, others advise more outdoors time with family, or participate in dance, in a nutshell, the national guidelines provide practical recommendations through several national publications aiming to increase the awareness of the general public towards health benefits of an active lifestyle and for health professionals on how to meet the minimum essential levels of physical activity. Some states concentrate more on the implementation and promotion of the physical activity message through introduction of new policies. A few nations have created visually appealing communication aids, like a pie charts and/or pyramid, to demonstrate their physical activity recommendations.



**FIGURE 2:** Overview of the current level of physical activity amongst children and adolescents aged 11-17 years in EU member states. A comparison is made of the percent achieved in different EU member states in 2018 with the data obtained in the most recent survey conducted in 2021. Source data obtained from the factsheets which can be found here: <https://www.who.int/europe/publications/item/WHO-EURO-2021-3409-43168-60449>. CC Licence: CC BY-NC-SA 3.0 IGO.

National physical activity guidelines exist in a number of EU member states (23 out of 27), assisting public and private organisations in collaborating to encourage physical activity (WHO EU factsheet 2020). These physical activity recommendations frequently assist in allocating government funds to initiatives that promote increased physical activity. These documents are based primarily on the WHO recommendations and earlier work done by organisations such as the Centre for Disease Control and Prevention (CDC) and American College of Sports Medicine (ACSM). These international consensus documents are often cited as a “expert opinion” and evidence based reference document for developing national recommendations. These documents act as a model for creating and adopting action-oriented national physical activity policies. Therefore these guidelines have been adopted by government and public health bodies in most EU member states.

There is little evidence supporting the impact of national recommendations alone on increasing physical activity levels in a given population(9), the process of developing them is the first step towards prioritising promotion of physical activity and healthy lifestyle as a national initiative. As can be seen from the Figure 2 above some countries showed a significant increase in the percent prevalence in minimum physical activity levels amongst adolescents. This could reflect a better implementation of policies and strategies that increased participation. In contrast some countries showed a steady decline in physical activity levels in adolescents and young adults. This could be due to increasing barriers to exercise and decreasing awareness of the benefits in the population. Thus, national PA recommendations not only constitute a key information resource, but also serves as a guide for setting national targets, policy development, and serve as primary benchmarks for PA monitoring and surveillance initiatives. It also helps to identify barriers and build appropriate resources.

Out of the 27 EU member states 23 countries (82%) have published an official document termed as the national PA recommendations. However, out of this two countries did not provide a detailed guidance on minimum physical activity required for obtaining health benefits. Four countries are in the process of developing a national policy on physical activity and associated recommendations. One country reported that they did not have any plans on developing such a recommendation in the near future. In Belgium there were separate documents found for sub-populations living in the Flemish and Walloon regions (20-21).

The key features of these documents are summarised in the table below:

TABLE 2: Comparison of PA Recommendations in EU member states with WHO Guidelines							
EU MEMBER STATE	AGE (YEARS)	MINIMUM LEVELS OF PA RECOMMENDED (F.I.T)		ADDITIONAL RECOMMENDATIONS		SEDENTARY TIME	
		SIMILARITIES	DIFFERENCES FROM WHO	SIMILARITIES	DIFFERENCES FROM WHO		
WHO GUIDELINES	5 to 17		At least 60 min of moderate-intensity to vigorous-intensity PA daily. PA beyond minimum duration has additional health benefits.		Most of the daily PA should be aerobic. Vigorous-intensity activities should be incorporated, including those that strengthen muscle and bone, at least three times per week.	Advise on Reducing Sedentary time	
Austria	NS	Yes		Yes	Additional activities recommended for improving coordination and flexibility	Yes	
Belgium	6 to 17	Yes	Minimum bouts of at least 10 minutes, build it up to 60 minutes	Yes	Give children the freedom of movement in accordance with their physical abilities. Exercise should be enjoyable and tailored to age	Yes	
Croatia	NS	Yes		Yes		NS	
Denmark	5 to 17	Yes	Minimum bouts of at least 10 minutes, build it up to 60 minutes	Yes	Ensure that children are physically active in various ways during the day. Ensure that children can move freely as much as possible. Vigorous-intensity activities that strengthen muscle and bone should last at least 30 min. Additional activities to improve flexibility are recommended	Yes	
Estonia	NS	Yes		Yes			
Finland	7-12 and 13-18		At least 1.5-2 hours/day for 7-12 years and at least 1-1.5 hours per day for 13-18 years. Minimum bouts – at least 10min.		Vigorous intensity PA recommended for both ages to be performed daily	Yes	
France	6-11 and 12-17	Yes	Minimum bouts – at least 5 min.	Yes	Activities that strengthen muscle and bone should last at least 20min (non-consecutive days).	Yes	
Germany	6-11 and 12-18	No	At least 180min/day for under 6 years At least 90min/day, moderate- to vigorous-intensity PA. At least 90min/day, moderate- to vigorous-intensity PA.	No	A safe environment must be ensured.  The large muscle groups should be subject to higher improve strength and endurance, taking into account intensity loading on 2-3 days a week in order to respective developmental stages.	Yes	
Greece	7 to 18	Yes		Yes	Encourage a variety of activities throughout the week. These activities should be both enjoyable and safe.	Yes	
Ireland	2 to 18	Yes		Yes		No	
Italy	5 to 17	Yes		NS		Yes	
Latvia	5-12 and 12-18	Yes		Yes	Encourage children to be active, developing their muscles and motor skills. Activities that strengthen muscle and bone should last at least 20min.	Yes	
Lithuania	6 to 17	Yes		No	Vigorous-intensity PA should be performed at least two times/week.	Yes	
Luxembourg	5 to 17	Yes		Yes		Yes	
Malta	5 to 17	Yes		NS			
Netherlands	4 to 18	Yes		Yes			
Slovakia	5 to 17	Yes		NS		No	
Spain	5 to 17	Yes	At least 180 mins per day, all levels of intensity	Yes	PA in safe environments, particularly through ground games or supervised activities in the water (swimming pools or bath time at home). Carry out activities and games that develop motor skills in different environments (at home, in the basic park, in the swimming pool and so on).	Yes	
Sweden	5 to 17	Yes	At least 180 mins per day.	Yes	PA encouraged from birth, particularly through floor-based play and water-based activities. In PA should be encouraged from birth, particularly safe environments.	Yes	

**TABLE 2:** A comparison of National PA recommendation for children and adolescents in EU member states with the WHO guidelines published in 2020.

NS = Not specified, PA = Physical Activity, F.I.T = Frequency, Intensity, Time (*Adopted with permission from Gelius P, Tcymbal A, Abu-Omar K, et al. Status and contents of physical activity recommendations in European Union countries: a systematic comparative analysis. BMJ Open 2020;10:e034045. doi:10.1136/bmjopen-2019-034045. Re-use permitted under CC BY-NC.*

►► **WHO Physical Activity guidelines for Children and Adolescents aged 5-17 years**

WHO recommendations on physical activity or the WHO physical activity guidelines published in 2020 details for different age groups and specific population groups on how much physical activity is needed for good health. Below is a brief summary of WHO recommendations for children over ages 5 and adolescents:

- Should do at least an average of 60 minutes per day of moderate-to-vigorous intensity, mostly aerobic, physical activity, across the week.
- Should incorporate vigorous-intensity aerobic activities,
- Should engage in resistance and weight bearing exercises that strengthen muscle and bone, on at least 3 days a week.
- Should limit the amount of time spent being sedentary, particularly the amount of recreational screen time.



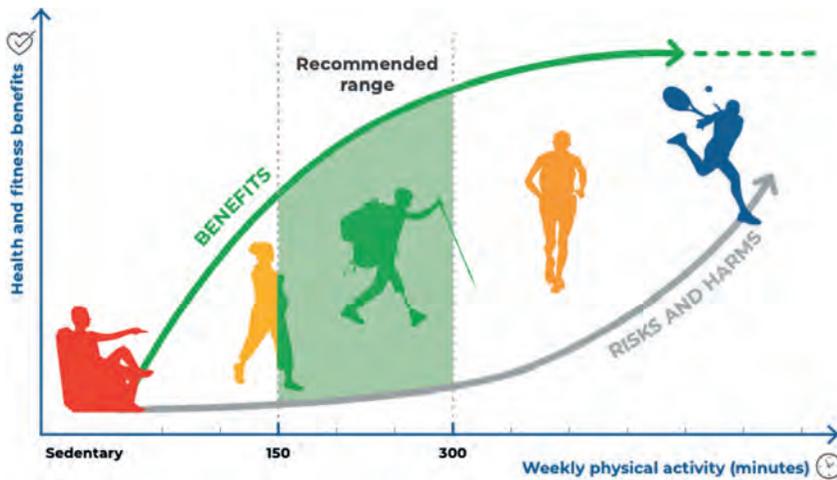
**FIGURE 3:** Overview of the WHO recommendations for Physical Activity for Children and Adolescents. Adopted from: Global action plan on physical activity 2018–2030: more active people for a healthier world. Geneva: World Health Organization; 2018. CC Licence: CC BY-NC-SA 3.0 IGO.

AGE GROUP	CHILDREN AND YOUTH AGED 5-17
<b>Types of physical activities</b>	<p>Children should participate in school and community activities that involves free outdoor play, games, sports, transportation, recreation, physical education, or planned exercise.</p> <p>In the context of family children should be encouraged to engage in free play and outdoor activities and active modes of transportation.</p>
<b>Physical activity Recommendations</b>	<p>To obtain health benefits children and youth must participate in a minimum of 60 minutes of moderate to vigorous intensity physical activity daily.</p> <p>A minimum of 300 minutes of moderate physical activity or 150 minutes of vigorous intensity aerobic exercise or an equivalent combination of moderate and vigorous activity is required per week.</p> <p>Any additional mounts of physical activity greater than 60 minutes per day or 300 minutes per week will provide additional health benefits.</p> <p>Daily physical activity should consist of mostly aerobic exercises that require large muscle groups such as running. There should be some vigorous-intensity activities included in daily routine.</p> <p>Children and youth should perform weight bearing exercises or resistance exercises that strengthen muscles and bones at least 3 times per week such jumping, hopping, and climbing.</p> <p>Muscle-strengthening activities should be done involving all major muscle groups on 2 or more days in a week.</p>
<b>Sedentary time</b>	<p>Children and adolescents should avoid being sedentary, reduce time spent in sedentary activities particularly the amount of recreational screen time.</p>
<b>Good practice statements</b>	<p>Performing some physical activity is better than none.</p> <p>For children and adolescents who are not meeting the minimum daily recommendations doing any amount of physical activity will be beneficial to health.</p> <p>Children and adolescents who are mostly sedentary should start by doing small amounts of low-moderate intensity physical activity, and gradually increase the frequency, intensity and duration of exercise over time.</p> <p>All children and adolescents should be provided with safe and equitable opportunities, and encouragement, to participate in physical activities that are enjoyable, offer variety, and are appropriate for their age and ability.</p>

**TABLE 3:** WHO 2020 recommendations for physical activity in children and adolescents.

### 3.3► Strategies for attaining sufficient physical activity for children and adolescents

The physical activity guidelines provide the minimum levels of physical activity essential to obtain health benefits recommended for young people. If a child or an adolescent participates in physical activity levels above these recommended guideline it will result in additional benefits to health. The relationship between levels of physical activity and health benefits is graded linear as shown below in the form of a dose response curve. Similarly there is a linear and inverse relationship with risk factors for disease. The risk factors for developing disease later in life reduces with increasing physical activity. The recommended range for maximum health benefits is 150-300 minutes of moderate physical activity.



**FIGURE 4:** The Dose Response Curve showing the relationship between levels of activity and health status. Adopted from WHO guidelines on physical activity and sedentary behaviour. Geneva: World Health Organisation; 2020. CC Licence: CC BY-NC-SA 3.0 IGO.

The best approach for young children to achieve the target of 60 minutes is to engage in short bouts or phases of activity throughout the day and build it up to at least 60 minutes. This can be consisting short periods of physical activity in school and in longer durations of engaging in organised structured sports and longer duration of free outdoor play time. This follows a normal routine that children can have while at school, through games and free play time at break time in school,

walking to and from school to home, organised play during physical education classes walking to and from school, and other programmed activity such as, participation in sports, swimming or games.

It is important to keep children engaged in physical activity and sports, it is important to include a variety of activity. For example, running and other moderate-vigorous aerobic activities will improve cardiorespiratory fitness. In addition, movements that involve using body weight such as jumping, hopping, skipping, climbing and gymnastics – will help children build muscle and bone mass, and build strength and endurance. It will also help to maintain energy balance and reduce the risk of obesity. For improving bone density, children should participate in several bouts of weight bearing exercises. Games and play that involve quick movements, balance and agility help to develop and maintain muscular fitness and flexibility. To obtain all of the health benefits across all the body systems described above children's activities during the week must include a range of different modes and intensities of. Such variations in activities and intensities need to be built in to the planned physical education sessions at school. Schools and communities need to have playground equipment that allows for a variety of movement during free play. Families should encourage and support more outdoor active play for their children after school.

All of the activities and the associated health benefits also hold true for adolescents. Adolescents can also achieve these targets through structured exercise in school and by engaging in a variety of sports. Many adolescents tend to adopt adult-like activity patterns and may require to achieve the recommended activity levels through a more organised or structured exercise opportunities provided through training and sports. These activities in addition to sports and gym classes can also include walking or cycling to and from school, and recreational activities such as dancing.

The activity patterns described above if built in to the daily life of a child and adolescent it will promote a full range of health benefits. In addition it will build a habit or lifestyle that will persist through adulthood. To make physical activity engaging to young people, it is important that educational programmes help children and young people to obtain experience and enjoyment in a range of activities. This will help young people feel confident about their physical capabilities, children will look forward to participation, this will help children to appreciate the importance and benefits of activity for health.

Table 4 below outlines strategies for increasing “levels of physical activity” to achieve the minimum recommended, to include the required variety of activity pattern needed to achieve that level, and the health benefits that each level offers. The typical activity pattern for each level includes personal transport, and school-related and recreational activities. For any physical activity pattern, the resultant “level” is a composite measure of the activities performed, how often, how hard and for how long (type, frequency, intensity and time).

LEVEL	DESCRIPTOR	TYPICAL ACTIVITY PATTERN	HEALTH BENEFITS
1	Inactive	<ul style="list-style-type: none"> <li>– Always driven to school or takes public transport.</li> <li>– Does very little PE or active play at school.</li> <li>– Spends a lot of time watching TV, surfing internet or playing video games at home.</li> <li>– No active recreation.</li> </ul>	None
2	Lightly Active	<ul style="list-style-type: none"> <li>Will do one or more of:                             <ul style="list-style-type: none"> <li>– Some active commuting to school by foot or bike.</li> <li>– Some PE or active play at school (&lt;1 hour/ day).</li> <li>– Some demanding activities at home, such as sweeping, cleaning or garden activities.</li> <li>– Some active recreation at light intensity (&lt;1 hour/day).</li> </ul> </li> </ul>	Some protection against chronic disease. Can be considered a stepping stone to the recommended level (level 3 below).
3	Moderately Active (Level recommended by WHO and national PA guidelines)	<ul style="list-style-type: none"> <li>Will do one or more of:                             <ul style="list-style-type: none"> <li>– Regular active commuting to school by foot or bike.</li> <li>– Active at school in PE or playtime (&gt;1 hour/ day).</li> <li>– Regular household or garden activities.</li> <li>– Regular active recreation or sport at moderate intensity.</li> </ul> </li> </ul>	High level of protection against chronic disease. Minimal risk of injury or adverse health effects.
4	Very Active	<ul style="list-style-type: none"> <li>Will do most of:                             <ul style="list-style-type: none"> <li>– Regular active commuting to school by foot or bike.</li> <li>– Very active at school in PE or playtime (&gt;1 hour/day).</li> <li>– Regular household or garden activities.</li> <li>– Regular active recreation or sport at vigorous intensity.</li> </ul> </li> </ul>	Maximal protection against chronic disease. Slight increase in risk of injury and possibly some other adverse health effects.
5	Highly Active	<ul style="list-style-type: none"> <li>– Performs high amounts of vigorous or very vigorous sports or training.</li> </ul>	Maximal protection against chronic disease. Increased risk of injury and possibly some other adverse health effects.

**TABLE 4:** Levels of Physical Activity.

Table adopted from: Department of Health Physical Activity, Health Improvement and Prevention. At Least Five a Week: Evidence on the Impact of Physical Activity and its Relationship with Health. A Report from the Chief Medical Officer. London: Department of Health; 2004.

### 3.4▶ Reducing Physical Inactivity and sedentary behaviour

Children reaching adolescence often experience a number of changes in their physical capabilities, as well as in their environment which leads to a sharp decline in participation in physical activity. This is more pronounced in case of girls. Due to this it is important to establish a physical activity behavioural pattern and participation in sports in children which can be sustained through adolescence into adulthood. If proper physical activity habits are instilled in childhood then children continue to have a positive attitude towards exercise and sports through adolescence and adulthood. However if children are forced to participate in physical activity and sports then they do not enjoy these activities and can develop a negative attitude towards exercise and sports. If chil-

dren are forced into participation against their wish then they will reject those activities as adolescence thus ascertaining their independence and also in the future as adults. Negative experiences and fear associated with physical activity can be further complicated by the physiologic and developmental changes that occur with the onset of puberty. Developmental and social changes can make young people more self-conscious which can become a barrier to maintaining physical activity. Adolescents can experience a large number barriers towards exercise and physical activity such as time limitations, academic pressure, lack of interest/motivation, poor energy levels, unconducive weather, social constraints from peers, barriers related to self-image and lack of self-confidence, barriers related to other social factors (H. Stanish et al., 2015; H. I. Stanish et al., 2016; Vasquez, Fernandez, Haya-Fisher, Kim, & Beck, 2021). We need to understand the factors leading to these barriers in order to build strategies and interventions aiming to promote physical activity in this age group.

It is important to realise that even though the physical activity guidelines for children and adolescents are the same, the activities that are sufficiently challenging and will be of interest to adolescents. Adolescents are likely to adopt sports and activities that are more structured and can achieve the recommended activity levels through more adult-like activities than free play. Such activities include recreational exercise and sports, walking/cycling to and from school, structured physical activity programme and exercise classes, and recreational activities such as dancing/skating/skateboarding.

### ▶▶ *Roles and responsibilities of schools and communities*

Strategies to increase youth physical activity levels needs the involvement of schools and communities. There has to be a collaborative approach between schools, community organisations, families and individuals. The following list of helpful advice has been compiled based on international guidelines and can be utilised to encourage children and teens to exercise more in their homes, schools, and communities (adapted from the Guidelines for School and Community Programs to Promote Lifelong Physical Activity for Young People – CDC).

1. Families
  - Organise family activities for participating in exercise and sports.
  - Encourage active travel (walking and cycling) whenever possible.

- Encourage regular outdoor play time.
- Encourage and facilitate participation in sports and games.

## 2. Schools

- Support high-quality physical education in the classroom.
- Physical education sessions are mandatory.
- Include a component on physical exercise in health education session.
- Promote the addition of brief physical activity breaks to the school day.
- Encourage kids to ride their bikes or walk to school.
- Create a volunteer network of parents who alternate serving as chaperones for kids riding bikes or walking to school (such as a “walking bus” initiative).
- Improved access to school facilities on the weekends, holidays, and after hours.
- Support programs that encourage physical activity and sports for all kids.
- Prohibit utilizing physical activity (laps, push-ups, etc.) or denying physical activity (free play, recess) as a form of punishment.
- Helping kids develop motor skills related to lifetime physical activities.
- Encourage kids to employ behavioural techniques towards an active lifestyle (goal setting, self-monitoring, decision making).
- Improve kids’ knowledge on how to engage in physical activity and its benefits.
- Promote positive attitudes and beliefs about physical activity.
- Encourage school staff to make physical activity enjoyable and engaging for kids.

## 3. Communities

- Promote a neighbourhood that is bicycle-friendly.
- Promote a neighbourhood that is friendly to pedestrians.
- Create and keep parks and playground support programs for group exercise by planning events, promote sports and games.
- Encourage the establishment of and usage of community facilities for physical activity.

- Encourage more people to use the local facilities for physical activity.
- Volunteer to run sports leagues or as a coach.
- Plan community-wide events for increasing physical activity (e.g. car-free days).
- In recreational sports, put more emphasis on having fun than on winning.
- Inform kids about all of the programmes organised by the community.
- MAKE FITNESS FUN AND INTERESTING for everyone.

## Chapter 4

# Analysing young people healthy behaviours: a questionnaire

BY VALERIO GIANGRANDE

### 4.1 ▶ Aims and methodology

A serious information about physical activity habits is essential for surveillance and evaluating public health initiatives in this area. Previous studies have shown that question order and differences in wording result in systematic differences in people's responses to questionnaires; however, this has never been shown for physical activity questions.

The method used for the preparation of the SEARCH questionnaires took absolutely into account the principles of project design.

Questionnaires have been implemented:

1. to raise the awareness of young people on the importance of sport-related issues;
2. to enhance the achievement of personal objectives;
3. to create a perspective for changing future behavioural patterns.

Teaching young people to live a healthy life and play sport consistently means changing the approach to sports of children, youngsters, and their parents. Sport is both a precursor and an innovator, unlike other disciplines which take a long time to develop skills; being aware of the advantages related to the practice of sport (lifestyle, well-being) is essential.

The questionnaires have been implemented keeping in mind the following concepts:

- for a proper nutrition style;
- in stories of inclusion, integration, full citizenship.

Questionnaires can be classified as both quantitative and qualitative method, depending on the nature of questions. Specifically, answers obtained through closed-ended questions (also called restricted questions) with multiple choice answer options are analysed using quantitative methods. Everything can be illustrated using tabulations, pie-charts, bar-charts and percentages.

Answers obtained to open-ended questionnaire questions are analysed using qualitative methods. Primary data collected using open-ended questionnaires involve discussions and critical analyses without use of numbers and calculations.

Questionnaires as primary data collection method offer the following advantages:

- Uniformity: all respondents are asked exactly the same questions.
- Cost-effectiveness.
- Possibility to collect the primary data in shorter period of time.
- Usually enough time for respondents to think before answering questions, as opposed to interviews.
- Possibility to reach respondents in distant areas through online questionnaire.

At the same time, the use of questionnaires as primary data collection method is associated with the following shortcomings:

- Random answer choices by respondents without properly reading the question.
- In closed-ended questionnaires no possibility for respondents to express their additional thoughts about the matter due to the absence of a relevant question.
- Collecting incomplete or inaccurate information because respondents may not be able to understand questions correctly.
- High rate of non-response.

The SEARCH questionnaire that follows has been prepared keeping in mind all these principles and obviously the complexities of the subject. The various surveys implemented reached the aim to increase the awareness of students of their knowledge of the benefits of sports, well-being and proper nutrition, healthy lifestyle, inclusion, integration and full citizenship (see chapter 8).

## 4.2▶ The SEARCH questionnaire

### Personal data

1. Age
2. Gender
3. City

### Eating habits

4. For a healthy diet:
  - I prefer meals composed of Proteins, Carbs and fats

- I prefer only carbs (Pasta, Bread and fruits)
- I prefer only proteins
- I prefer meals rich in fats (Nuts, oil)

→ **Correct Answer:**

Our body needs to be fed with specific nutrients in a correct proportion, with an unbalanced diet our body gets alarmed and transforms everything we eat in fats.

5. The bond between a healthy lifestyle and a healthy diet...:
- Does not subsist
  - Does subsist only in a specific population
  - Does subsist only for female individuals
  - Is of critical importance for everybody and it was proven with many studies

→ **Correct Answer:**

Food fuels our bodies and provides energy for physical activity. If not carefully selected, it will lead to a decrease in performance.

6. A correct eating habit must:
- Pleases my personal tastes
  - Create a balance between my calorie intake and burned calories
  - Satisfy my feeling of satiety
  - Balance my senses and my economic needs

→ **Correct Answer:**

To burn the calories contained in a single chocolate chip cookie, you need at least 50 burpees.

7. Why is it very important to drink at least 2 litres of water on a daily basis?
- To sweat more
  - To be smarter
  - To refresh yourself
  - To maintain a correct water balance

→ **Correct Answer:**

Water brings many effects to our body, like cellular regeneration, proper blood circulation, skin hydration and many more.

8. For a healthy diet you must choose:
- Highly processed and refined food
  - Low processed, raw and seasoned food
  - Peeled fruit
  - Fried food

→ **Correct Answer:**

Whole meals are usually low processed foods and avoid ingredients dangerous to our body, and they have the advantage of being able to slow down the release of nutrients (glycaemic peak).

9. What does “oligo mineral water” mean?
- There is a high presence of dissolved salts
  - There is a low presence of dissolved salts
  - It has an above average caloric content
  - It is naturally effervescent

→ **Correct Answer:**

Suggested for a low fixed residue, avoids the formation of kidney stones.

10. To have a healthy breakfast (the first meal of the day), you must ...
- eat only cereal
  - insert proteins (eggs, dried fruits and whole bread)
  - Drink coffee, milk and eat cookies
  - Not eat

→ **Correct Answer:**

To avoid the carbohydrate paradox and to not alter the caloric intake of our body.

11. To be in shape and to lose fat mass you must:
- Fast and walk a lot
  - Eat less and run more
  - Calculate your calorie intake and increase lean mass (muscles)
  - Eat more and train or play sports.

→ **Correct Answer:**

By increasing muscle mass, you can accelerate your metabolism, increase hormones production and facilitate reduction in body fat.

12. The highest energy reserve (Kcal/g) is found in...:
- Proteins and Fats equally
  - Carbohydrates
  - Proteins
  - Fats

→ **Correct Answer:**

To activate body fat consumption it is necessary to push your body into intensive regimens of training and eat a proper diet.

13. What is the calorie intake of a glass of water?

- Less than 5
- More than 10
- Between 20 and 25
- 0

→ **Correct Answer:**

It is fundamental to drink water during the day and there are no compelling reasons not to do it.

## Socialisation

14. The expression “Active living” indicates...:

- A lifestyle in which the physical activity is not integrated in your daily routine
- A lifestyle in which the physical activity is directly integrated in your daily routine
- A passive lifestyle
- An active Lifestyle

→ **Correct Answer:**

Active living is a combination between physical activity and recreational activities to encourage a healthier lifestyle, like for example riding a bike or walking to work.

15. Sports can teach you how to excel with sportsmanship. Perseverance in your training, Sacrifice and Competition Increase...:

- Strength
- Popularity
- Intelligence
- Self-esteem

→ **Correct Answer:**

Sports are one of the most reliable and effective tools in improving personal growth and social inclusion.

16. Sports make you encounter unforeseen situations and unexpected changes, increasing your...:

- Friendliness
- Cunning
- Craftsmanship
- Creativity

→ **Correct Answer:**

Fast decision-making, being under pressure and fatigued, boosts the development of new skills.

17. Sports, Team sports specifically, enable you...:

- To learn Teamwork and team dynamics
- To exclude the less skilled individuals
- To get used to passing the blame to others
- To train less intensively

→ **Correct Answer:**

Sharing written and unwritten rules, it is the basis of group activities. To live these experiences, introduces you to the adult world.

18. How much do you think sport is important in meeting people from other cultures?

- Not at all
- Indifferent
- Enough
- Very much

→ **Correct Answer:**

Professional sports have become promoters of social inclusion through players, clubs and national teams thanks to their impact on society.

19. To achieve well-being a human must try...:

- To get along with others and to feel good about themselves
- To achieve a good body
- To eat in a healthy manner
- To achieve physical, mental and social well being

→ **Correct Answer:**

Mens sana in corpore sano (Mind sound, Body sound), a concept born in the first century a.C.

20. In which measure do think physical activity impacts your social well-being:

- Not at all
- Indifferent
- Enough
- Very much

→ **Correct Answer:**

It is proven that training with others boosts your performances.

## Health

21. Walking through nature represents...:

- A healthy opportunity that goes beyond simply recovering your fitness

- An opportunity solely dedicated to recover your fitness
- It cannot be considered a fitness opportunity
- It indicates a passive lifestyle

→ **Correct Answer:**

Spending time immersed in nature has a revitalizing effect. Researchers have highlighted that your vitality is directly affected by the presence of natural elements in the environments.

22. Outdoor exercising could also... :

- Help you in living a healthy life
- Not help against osteoporosis
- The subject does not actively forge the surrounding environment
- It doesn't influence your body in any way, since the human body cannot be modified

→ **Correct Answer:**

A sedentary lifestyle increases the probability of developing illnesses.

23. Physical exercise :

- Does not make your bone tissue more elastic or less fragile
- It delays aging and helps fight osteoporosis
- It does not help against osteoporosis
- It accelerate the aging process of the individual

→ **Correct Answer:**

Physical exercise helps in aging better, mentally and psychologically, it controls hypertension and lipid profile, in particular, it also helps cholesterol levels, and it negate or delay the insurgence of chronic diseases connected to aging such as osteoporosis.

24. The physical activity, competitive and non-competitive, enables you... :

- To stress yourself through the production of adrenaline
- To relax yourself through the production of endorphins that improve your mood
- To develop pain and inflammation caused by lactic acid
- To lower your hunger caused by stressing your digestive system

→ **Correct Answer:**

Endorphins are chemical substances produced by the brain provided with strong analgesic and stimulating properties.

25. If you don't have enough time to do physical activities you must at least... :

- Stay upright for 1 hour a day
- Stay seated and cross-legged for 1 hour a day

- Frequently change position
- Eat a lot of proteins

→ **Correct Answer:**

We spend nearly 17 years seated on a chair and 11 years on the sofa watching T.V. during our lifespan. Low movement is the cause of 30% of cardiac diseases, 27% of diabetes diagnosis and more than 20% of breast or colon cancer diagnosis.

26. Which one of the following statements is not strictly related to physical activity?
- Increase of basic metabolic rate and energy consumption
  - Stimuli of melanin production and consequential impact of skin pigmentation
  - Increasing vascularity and oxygenation of the brain, improving your memory, concentration, planning and organizing skills
  - Positive modulation of your immune response mechanisms

→ **Correct Answer:**

Melanin is the pigment that protects us from solar radiations. The quantity of this substance depends on genetics and behavioural habits.

27. How often should you train in a week to stay healthy?
- 2
  - 3
  - 4 or more
  - At least 30 minutes every single day.

→ **Correct Answer:**

Health is determined by many factors and it is advisable to dedicate some time to train on a daily basis.

28. Which one of the following conditions can be traced to a sedentary life?
- Type 2 diabetes
  - Breast cancers
  - Colon cancers
  - All of the above

→ **Correct Answer:**

Unfortunately, these are not the only diseases related to this bad habit.

29. There are 4 human behaviours that are indicated to influence the development of chronic-degenerative diseases. Which ones?
- Gambling, working in a biological risk environment, excessive use of medicines, consumption of caffeine

- Alcoholism, Nicotine addiction, unhealthy eating, sedentary life-style
- Social media use, smartphone addiction, TV addiction , nightlife
- Generosity, empathy, sensitivity, recreational activities

→ **Correct Answer:**

This answer also indicates the order of severity. Alcoholism is more severe and is the cause of numerous pathologies and deaths.

30. Health is a process driven by variables. Which ones?

- Genetic, environmental and behavioural
- Genetic, relational, social
- Somatic, environmental, phenotypic
- Hereditary, sentimental and relational

→ **Correct Answer:**

Genetic variables are not modifiable, but environmental and behavioural variables can change.

## Mind

31. Physical activity can...:

- Improve Inter-personal communication
- Develop linguistic abilities
- Improve comprehension of communication
- Boost and improve abilities and capabilities

→ **Correct Answer:**

If we compare it with computers, skills are the software and capabilities are the hardware.

32. How many hours of sleep are necessary to achieve a complete rest in adolescents?

- Less than 5 hrs
- From 5 to 7 hrs
- From 7 to 8 hrs
- From 8 to 10 hrs

→ **Correct Answer:**

The circadian rhythm influences teenagers' sleep. The release of melatonin (that induces sleep) is delayed by the brain. That is why young people tend to sleep late.

33. Which of the following statements is false?

- Daily mobility can be “travelling by foot”
- Daily mobility can be “buying groceries”

- Daily mobility can be “writing on the computer”.
- Daily mobility can be “riding a bike”

→ **Correct Answer:**

A wrong posture, wrist inflammations, sight decrease are all derived from a long exposure to PC (screen).

34. Which one of the following statements is true?

- Training at least 7 times per week is useless
- Training at least 7 times per week is essential
- Training 3 times per week is useless
- Training in a continuous manner is fundamental

→ **Correct Answer:**

The offer on the market is moving towards high intensity and short duration training to give everybody the chance to pursue a continuative training program to cope with people’s busy work schedules.

35. Which one of the following statements is false?

- Sports help your social relations
- Sports help with social inclusion
- Sports feed your stress
- Sports increases physical strength

→ **Correct Answer:**

Physical activity plays an important role in managing psychological stress; it reduces anxiety and moderate feelings of depression increasing the tolerance of physical and psychological stress.

36. Europe has a high percentage of senior citizens over 60 years old. What is suggested, in sports terms, to this category of individuals?

- Intense physical activity on a daily basis
- Intense physical activity 3 times a week
- Moderate daily physical activity
- Watching other people practice sports

→ **Correct Answer:**

This category of people has little possibilities to practice. Their possibilities are related exclusively to personal initiative and private offers of gentle exercise.

## Body

37. The sportsman’s heart rate (at rest) compared to a sedentary person’s heart rate, is...:

- Slightly Higher
- The same

- Higher
- Lower

→ **Correct Answer:**

An intense and long exercise can cause many physiological changes. It increases the muscle mass of the left ventricle by increasing the dimension of the heart. It increases the stroke volume (or “SV” for short) and contributes in a lower cardiac frequency when at rest.

38. Which one of the following options do you think is a suitable example of physical activity?:
- Coming down the stairs
  - Playing console games
  - Cleaning the house
  - Playing Basketball

→ **Correct Answer:**

Eccentric movements (Braking) are much more tiring than concentric movements (acceleration).

39. The body loses fluids through sweat and evaporation. These mechanisms enable you to...:
- Dissipate heat produced by physical activity. Your performance is going to decrease after you lose a certain amount of fluids without rehydrating properly
  - Dissipate heat produced by physical activity. Therefore the body is lighter and there’s an increase in performance
  - Lubricate joints thanks to liquids flowing inside your body
  - Lose weight. Weight loss due to liquid loss

→ **Correct Answer:**

Sweating when practicing sports is more important than in other activities. It cools down our body, making the performance is much more effective.

40. Which of the following methods is the most efficient in achieving weight loss?
- A steady state run over long distances
  - Fast walking for very long distances
  - Variation in rhythm over medium durations
  - Very fast sprints with fast reps over short distances

→ **Correct Answer:**

High intensity and interval training has a series of benefits such as the EPOC (a physical state in which our body continues to work to stabilise its energetic reserves, increasing the effect of your workout).



**PART B**

**PROJECT PRODUCTS  
AND RESULTS**



## Chapter 5

# The SEARCH Open Portal as a web-based resource

BY SONJA BERCKO AND WOLFGANG EISENREICH

### 5.1▶ The rationale behind the portal

Nowadays Internet has become one of the dominant ways of obtaining information and providing education. It is regarded as a reliable and accessible source of information especially for health information, and one out of every three people uses Internet to obtain information about health and nutrition.

In this light, the project SEARCH - Sport Education for Active and Responsible Citizenship through Health Caring aims at training young European citizens and increasing their awareness of the importance of sports-related issues, potentially resulting in behaviour focused on well-being, inclusion and full citizenship. Unfortunately, most people in Europe still do not reach the minimum levels of physical activity recommended by the WHO, particularly people from low socio-economic backgrounds, minority ethnic groups and people with disabilities. Therefore, enhancing sports education is the key objective of this project, and the SEARCH Open Portal has been designed as the first portal dedicated to the enhancement of sports education. The target groups are students, student-athletes, teachers and sports tutors.

The SEARCH Open Portal is an investigative tool where young people can learn about the benefits of sport, the right lifestyle, well-being and proper nutrition and where they can develop skills to develop a behaviour and, in the long run, a culture which embraces sport and all its values in order to have a long-term social and economic impact.

SEARCH Open Portal will strengthen the initial competences of the participants as each school and sports institution will devote a part of the activities on the importance of sport as a good daily practice.

The platform contains information and popular content on the subject in English and the seven languages of the partnership, which can be accessed free of charge, as well as being a point of exchange between tutors, teachers and students. The contents cover an informative part and a survey to be administered to students and athletes.

In the information part, the themes related to physical well-being are expressed through different materials dealing with adequate physical activity and nutrition.

The survey consists of multiple-choice questions which help understand their knowledge about the benefits of sports, healthy lifestyle, well-being and proper nutrition, inclusion, integration and full citizenship.

## 5.2▶ The SEARCH Open Portal

The portal is accessible in the Internet at [www.searchproject.eu](http://www.searchproject.eu).



The main features of the portal are:

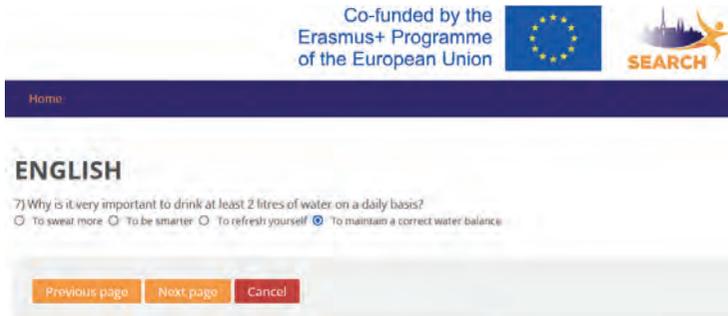
- Student test
- E-learning Course
- Mobile app
- News
- SEARCH magazine
- Handbook

In the following, we will describe their contents and the corresponding didactic approach in more detail.

In addition to the six main features of the portal, the navigation line at the top offers also access to information about the background of the project, the partnership, the innovative aspects of the project and its outputs.

### 5.2.1 ▶ Student Test

This test does not require registration: the person is only asked for some personal data (age, gender, location). This section leads to 40 multiple-choice questions which help assess the knowledge about the benefits of sports, healthy lifestyle, well-being and proper nutrition, inclusion, integration and full citizenship.

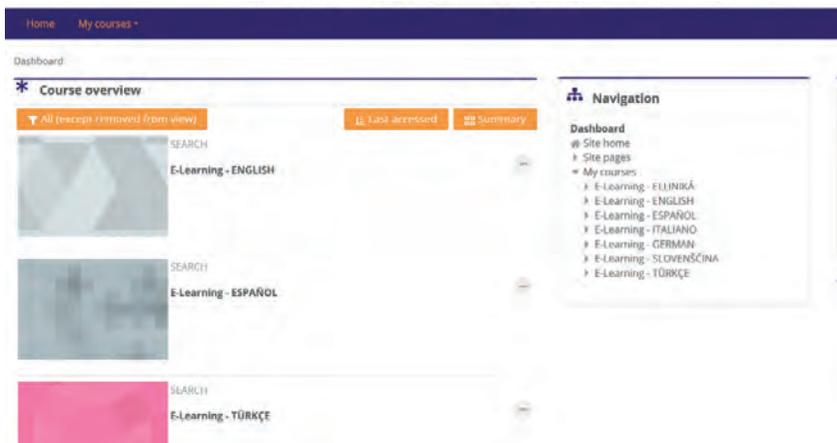


After finishing the test, the user obtains feedback to all questions which have not been answered correctly.

All questions and the feedback are presented in Chapter 4.

### 5.2.2 ▶ The e-Learning Course

To participate in the e-learning course, a registration is necessary. After log-in with username and password, the screen offers the selected course:



Usually, the learner receives only one of the seven language versions which S/he has requested. In the illustration above, the person has access to all seven language versions.

After clicking on the symbol for the respective language, the following screen shows all units of this course. In the case of module one, the user can choose between nine units:

### Module I - Enhancing the educational activity of sport

1. Sport as a fundamental character of the development of the personality of children: association and affective area.
2. The educational role of sport: sensory-motor and social area.
3. Learning to communicate through body movement.
4. The educational role of sport towards a healthy life.
5. Educational activity of sport as a means of resilience and social redemption.
6. Educational value of team sports: leadership and shared responsibilities contribution to the education.
7. The school as the main “spreader” of sports practice.
8. The school as a workshop of sports practice to build the integral man.
9. Sports practice at the heart of the teaching methodology.

The screenshot shows a navigation bar with 'Home' and 'My courses -'. Below it, the breadcrumb path is 'Dashboard > My courses > E-Learning - ENGLISH'. The main heading is 'Module 1 - ENHANCING THE EDUCATIONAL ACTIVITY OF SPORT'. A list of 9 units is displayed, each with a document icon and a red '1' icon. The units are:

1. Sport as a fundamental character of the development of the personality of children: association and affective area
2. The educational role of sport: sensory-motor and social area
3. Learning to communicate through body movement
4. The educational role of sport towards a healthy life
5. Educational activity of sport as a means of resilience and social redemption
6. Educational value of team sports: leadership and shared responsibilities contribution to the education
7. The school as the main "spreader" of sports practice
8. The school as a workshop of sports practice to build the integral man
9. Sports practice at the heart of the teaching methodology

Each unit is available in two different types:

- as interactive slide show with integrated audio file where the text is read aloud by an avatar. The speaker can be muted. This function is only available in the English version. In all other languages, the text and illustrations are displayed;
- as pdf file which can be downloaded by the user.

**Sport** plays a significant role in developing the personality of young people, as its action is directly related to four fundamental areas of the human being:

- a. Cognitive area
- b. Affective area
- c. Perceptive area
- d. Motor area




### Social area

Group sports practices:

- represent a relationship model with a certain effectiveness in socially difficult conditions;
- play a significant role concerning education, as they often become much more attractive than the school itself.



This is why youth sports groups take on social patterns of behavior:

- They shape self-identity
- They significantly structure adult's personality

The units of the other modules are:

## Module 2 - Encouraging sports practice for one's own psycho-physical wellbeing and to control national social and health costs

1. Motor activity as a medicine.
2. Human lifespan and development.
3. Respiratory system.
4. Cardio-circulatory system.
5. Digestive system.
6. Metabolism.
7. Body temperature.
8. The diet.
9. Conclusions: man as a machine.

## Module 3 - The social function of sport

1. The impact of sport on society: historical and comparative perspectives.
2. Sport as a path of potential personal development and improvement of well-being.
3. Participation, inclusion and social changes encouraged by sport.
4. A project management strategy for youth education.
5. Teaching to comply with the rules: sharing civic values.
6. Team sport.

7. Sport and resilience.
8. How to create a “social impact” by planning and creating sports events.
9. When sport, art and fashion meet: teaching “beauty” in sport.
10. Landscape and physical activities outdoor.
11. Sport as a tool for international cooperation.

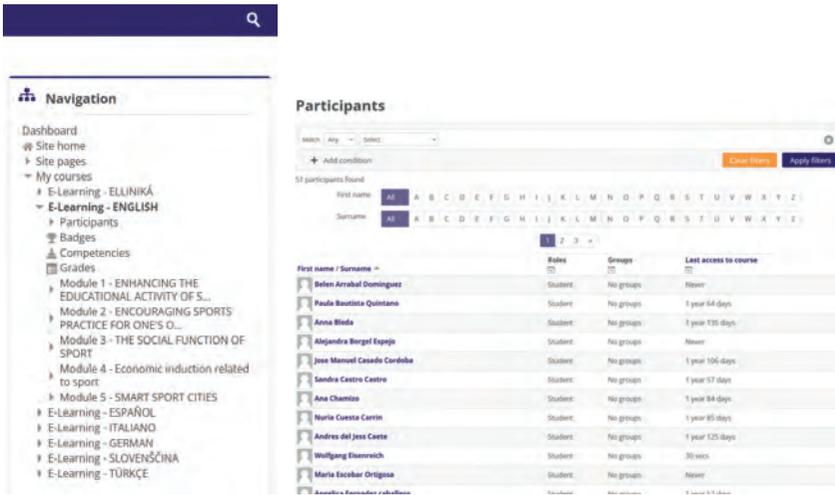
#### Module 4 - Economic induction related to sport

1. Direct and indirect economic impact.
2. Sport and macroeconomics.
3. Sport and employment.
4. Sport and development.
5. Sport and events.
6. Social Effect of sport.
7. Suburban and abandoned places renewal.
8. Territorial marketing.
9. Corporate social responsibility (CSR).

#### Module 5 - Smart sport cities

1. An economic paradigm shift .
2. Smart cities.
3. Sport and smart city: incubators and accelerators.
4. Urban planning and physical activity.
5. Sport and technology, opportunities: events, facilities, medicine, tools.
6. Physical activity, outdoor spaces and social relations.
7. The role of business in promoting health and well-being.
8. Sport as a driver to active citizenship education.

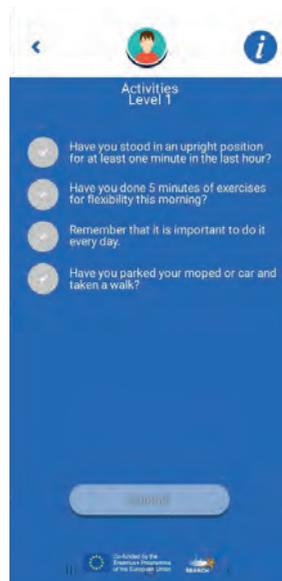
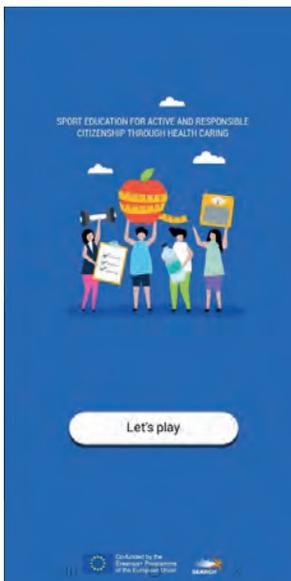
The navigation area shows more features. Many of them are especially interesting for teachers and trainers when they accompany organised courses, e.g. with blended learning where they can monitor the progress of the participants.

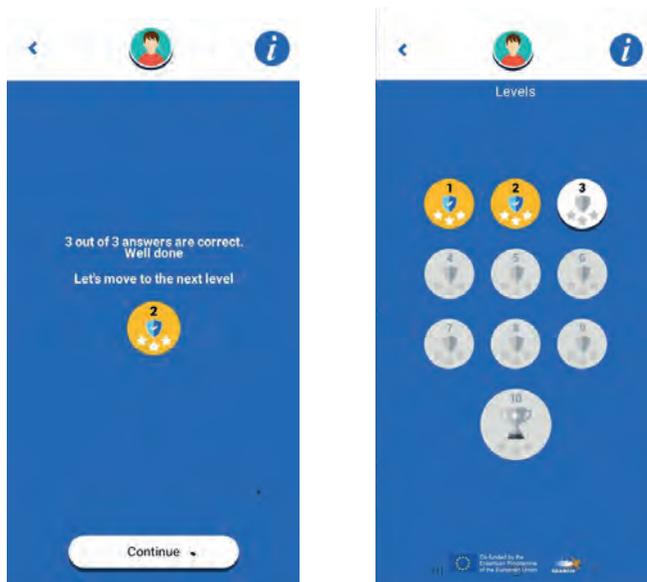


### 5.2.3 ▶ Mobile app

The project has also developed a SEARCH mobile app which is available to download on mobile phones, both Android and Apple/iOS.

The app offers games and quizzes at ten levels. Upon completion of each level, the user receives a badge.





#### 5.2.4 ▶ *News and SEARCH Magazine*

These two sections display various articles and information related to the theme of the project.

As per spring 2022, the following articles and in-depth interviews with sports teachers and other experts are available:

- Smart sport cities
- Physical activity as a tool of resilience
- Physical activity as a medicine
- What role does sport play in youth growth?
- World Health Organisation – healthy diet
- World Health Organisation – 12 steps to healthy eating
- The 2013 Council recommendation on promoting health-enhancing physical activity across sectors
- The EU physical activity guidelines
- White paper on sport
- Economic induction related to sport

Co-funded by the Erasmus+ Programme of the European Union

SEARCH

SPORT EDUCATION FOR ACTIVE AND RESPONSIBLE CITIZENSHIP THROUGH HEALTH CARING  
**OPEN PORTAL**

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January 2022

**SMART SPORT CITIES**  
Anissa  
My path has not been very linear, I start from [...]

**SEARCH PROJECT IN - DEPTH SEMINAR**  
Prof. FABIOLA CASARSA  
University of Turin, Italy  
In summary, I deal with studying the various facets of [...]

### 5.2.5 ▶ *The Handbook*

In this section, this Handbook will be available in pdf format. The Handbook will be available both in printed and electronic formats in English and in the languages of the partnership, i.e. Italian, German, Spanish, Greek, Turkish, and Slovenian.



## Chapter 6

# SEARCH E-learning tools for the physical education provider

BY İDİL MEREY

It is internationally accepted that a healthy diet, physical activity and healthy lifestyles are crucial for the well-being of the community. Considering both the highly negative impact of sedentary life in modern societies and the emerge of some diseases caused by bad habits and lack of movement, strengthening of sports education is vital for all countries. Furthermore, it is also emphasised that healthy lifestyles lead to important and significant financial savings in health systems.

Regularly practicing sports has both mental and physical benefits: helps taking good care of the body and being aware of the body, encourages a good healthy diet, helps relieve stress and tension and increases the energy, improves self-esteem, resilience and social relations.

This is why, in the school context it is a question of spreading the culture of sports in a systematic way. Schools have to provide a coherent, cohesive and functional training of sports for a balanced development of personality and healthy life style. For this reason, teachers and sports tutors must educate young people on proper nutrition, regular sports practice and raise the awareness of importance of how the healthy life style decreases the future health problems.

SEARCH E-Learning Course, a tool leading teachers, sports tutors and parents, is formed of five modules focused on the enhancement of educational activity in sport, lead to encourage young people to play sports, make sport an instrument of social inclusion and resilience, increase the economy of sports through proper management and sports facilities. The course is offering its users the opportunity to learn about the new methodological approaches to the enhancement of educational activity of sports at school.

SEARCH E-Learning Course offers an online training which provides the users a flexible training schedule. Users are able to use the tool according to their availabilities from both PC and mobiles. The modules are in seven languages of the partner countries which will raise the opportunity to reach broad audience.

SEARCH e-Learning course consists of five modules and each module is divided into nine segments that lasts about 10 minutes.

Each segment in the module also provides key words, reminder and self-assessment questions for the users. Self-assessment questions are short answered questions that enable users to test their previous and newly gained knowledge about the context.

The variety of information given, format of the context and the flexibility is the advantage and innovation of SEARCH e-Learning course.

## MODULES

### 6.1▶ Enhancing the educational activity of sport

#### ▶▶ *Sport as a fundamental character of the development of the personality of children: association and affective area*

The segment is focused on the development of cognitive skills with sports. It draws the attention to the relationship with regular training of sports and body movement in human relations, resilience, social inclusion and intelligence.

Children who do sports have strong reflexes and high focusing skills, although it varies according to the sport they do. This feature significantly increases their cognitive development.

While the children in the team participate in sports activities, they learn to act, win or lose, and obey the rules within the group. It is less stressful, less anxious. Depression is less common in these children.

They are skilled at making quick decisions and solving. For this reason, their mathematical success is very high, they learn more quickly, organise and manage adverse conditions much better than children who do not do sports.

#### ▶▶ *The educational role of sport: sensory-motor and social area*

The motor system in modern vision is even more deeply connected to the others as the concept of motor system has been radically changed in the last twenty years. Sport can express a balanced way of experiencing life and acting as a fundamental character of the development of the personality.

The segment focuses on the relationship between sports and the development of social skills, sensory motor area.

### ▶▶ *Learning to communicate through body movement*

In order to understand the importance of body movement in communication, it is necessary to consider first of all how gestures are highly significant in human oral transmission, which represents the main path of expressive art. Gestures have, indeed, a strong communicative power and the body and its ability to move develop simultaneously, resulting in a process that is called psychomotor development. Body movement is crucial throughout the development across childhood and school-age, just as gestures are fundamental for children to achieve their modes of communication.

The segment attracts the attention of users how sports, especially team sports increases the development of body movements of young people and eases their way in communication with others.

### ▶▶ *The educational role of sport towards a healthy life*

Practicing sports has both physical and mental benefits. A constant and measured sporting activity encourages:

- From a physical point of view, to know and to take care of your body;
- Regarding the prevention, to implement a real protective action concerning the physical problems that may occur over time;
- From the nutritional point of view, it can encourage a good caloric balance and a truly healthy physical condition;
- As regards mental health, it allows to relieve stress and tension accumulated during the day and to recharge with new energy;
- From a psychological point of view, it improves self-esteem and social relationships.

In this segment, the idea of “Education in sport means teaching psycho-physical-mental well-being, that is, a *complete well-being*” is main key of the sports education. Users will be able to raise the awareness of importance of a healthy life style and regular training.

### ▶▶ *Educational activity of sport as a means of resilience and social redemption*

Research has shown that athletes can recover quickly despite several setbacks thanks to mental strength which is developed through training sessions that are quite demanding from the point of view of resistance to physical fatigue and emotional stress. It allows them to float while others sink.

Sport is an excellent opportunity to apply everything we can learn to our routine. It can provide us with very important skills to cope with problems for which we weren't prepared.

The segment is focusing on how sports is affective in raising the children's resilience, problem solving and communicating skills in even unpleasant situations.

▶▶ *Educational value of team sport: leadership and shared responsibilities contribution to the education*

An individual dealing with team sports throughout his development and education life; his skills such as responsibility awareness, ability to cope with feelings of success and failure, awareness of being a part of a team and communication skills that will help him at every stage of his life will have much more chance to develop.

In addition to a disciplined work, we should not forget that all these skills are the main factors that will bring success in education.

▶▶ *The school as the main "spreader" of sports practice*

This segment focuses on the schools and their approach to students playing sports, underlining the two pillars specified in the Treaty of Lisbon(2007). The possible problems of students playing sports in the school and suggestions for the solutions are mentioned.

▶▶ *The school as a workshop of sports practice to build the integral man*

Schools have to provide a coherent, cohesive and functional training for a balanced development of the personality.

▶▶ *Sports practice at the heart of the teaching methodology*

The school must welcome the sports club as a peninsula of its own continent, making these two realities a single learning environment co-operating in harmony for the successful training of the student athlete.

## 6.2▶ Encouraging sports practice for one's own psycho-physical wellbeing and to control national social and health costs

### ▶▶ *Motor Activity as a Medicine*

Although sports activities are mentioned to be the main subject for a healthy life, the health condition of the individual affects the type of sports that s/he should play. There are motor activities largely recommended even for people suffering from specific pathologies, but in general it is always better to undergo a health screening before starting the activity.

The segment focuses on the types of activities, their needs and the importance of choosing the right activity for the individual. The benefits of a proper activity is described in details.

### ▶▶ *Human lifespan and development*

The life span of human, the physical, psychological and mental development stages and the effects are explained in this segment.

### ▶▶ *Respiratory system*

The respiratory system of human, effects of aging, effects of disorders and smoking are explained.

### ▶▶ *Cardiocirculatory System*

The cardiocirculatory system is explained in details.

### ▶▶ *Digestive System*

The digestive system is explained in details. The importance of healthy diet and how it should be is mentioned.

### ▶▶ *Metabolism*

The nutrients and their effects in body, the metabolic reactions are explained.

### ▶▶ *Body Temperature*

The body temperature, the effects that changes body temperature and the importance of water is explained.

### ▶▶ *The Diet*

The term Diet refers to every solid and liquid substance we put into our bodies. Diets can therefore be *normal*, *hypo* or *hyper*-caloric, depending on the caloric intake of the different substances, by maintaining, reducing or increasing body weight while consuming the same amount of food.

Diets are deemed *balanced* if they contain a healthy balance of sugars, fats and proteins as well as water, minerals and vitamins.

This segment refers to the keys to a healthy diet.

### ▶▶ *Conclusions: man as a machine*

Higher levels of muscular strength are associated with a significantly better cardiometabolic risk factor profile, lower risk of all-cause mortality, fewer CVD events, lower risk of developing physical function limitations, and lower risk for nonfatal disease. The evidences of regular physical activities decreasing the risk of various health issues are pointed out.

## 6.3▶ **The social function of sport**

### ▶▶ *The impact of sport on society: historical and comparative perspectives*

Besides physical activity, values of respect, responsibility, commitment and dedication are instilled, among others, serving a process of socialisation and involvement with the improvement of social structures and attitudes. Sport contributes to establish social relationships between different people and different cultures and thus contributes to instil the notion of respect for others, teaching how to compete constructively. Another important social value in sport is learning how to win and how to recognise defeat without sacrificing goals and objectives.

### ▶▶ *Sport as a path of potential personal development and improvement of well-being*

Effective personal development enables people to be successful in all aspects of their lives — at home, at school, at work and in society. Personal development is a lifelong process through a variety of experiences. Practicing sports or physical activity is a contributor to this process.

### ▶▶ *Participation, inclusion and social changes encouraged by sport*

Sports might be an instrument for social inclusion and social change independent from the socio-economic conditions and cultural conditions of people. Sports promote participation, inclusion, human values, acceptance of rules, discipline, health promotion, non – violence, tolerance, gender equality, teamwork, among others.

### ▶▶ *A project management strategy for youth education*

More studies are showing the possible impact that sports can have on at-risk youth and it has resulted in an increase of these sport programs. At-risk youth increases their awareness to life and asking help when playing sports. Exercise improves thinking and learning, attention and focus, emotional regulation, self control, stress management, decrease in anxiety and depression.

### ▶▶ *Teaching to comply with the rules: sharing civic*

Rules are principles that direct human behavior, provide social order and must be followed. Rules are structures that exist in all areas of our lives. Children with self-discipline fulfill their responsibilities and easily adapt to the social order.

### ▶▶ *Team Sport*

By playing, children learn to be creative: they experiment their cognitive abilities, discover themselves, interact with their peers and thus develop their whole personality.

Team sport helps socializing, knowing how to with others, respecting rules and fighting selfishness, increases academic performance, help acquiring good health habits, prevents diseases, increases creativity and personal development, resilience, accept not being the winner.

### ▶▶ *Sport and Resilience*

Resilience is the ability to be happy, successful, etc. again after something difficult or bad has happened (Cambridge Dic.). Resilience implies two conditions: adversity and positive adaptation despite this adversity. Sport help individuals to increase resilience. Athletes focus, learn never to give up, try over and over again.

### ▶▶ *How to create a “social impact” by planning and creating sports events*

Sports activities can create both positive and negative effects due to location such as; direct and in direct economic impact, construction and renovation of facilities, promotion of locality, environmental pollution.

### ▶▶ *When sport, art and fashion meet: teaching “beauty” in sport*

Our way of clothing is one of the ways we express ourselves. Sports-wear fashion is one of the main tools that one can express her/his social and psychological conditions, address the group s/he belongs. A sports style is constantly rising and improving itself by appealing everyone.

### ▶▶ *Landscape and physical activities outdoor*

The development of an awareness of respect for the environment starts with schools, educating and raising awareness today among the adults of tomorrow. Therefore, through the development of educational activities based on the context of activities in nature, it is intended to work in school learning based on respect, protection and knowledge of the environment. On the other hand, we want to recover the natural play space and take advantage of the opportunities it presents for the enrichment and socio-cultural development of nature. Finally, in the current context of the global *COVID 19* pandemic, specialists do not stop recommending us to carry out outdoor activities, reminding us that *perhaps we have lost contact with nature and perhaps it is time to recover it.*

The segment is suggesting five activities outside the classroom both for learning and physical training.

### ▶▶ *Sport as a tool for international cooperation*

Since team sports require a lot of communication, both verbal and non-verbal, we can say that maintaining the success of the team depends on strong communication. Olympic games and internationally organised sports competitions are invaluable blessings in this respect.

## 6.4▶ Economic induction related to sport

### ▶▶ *Direct and indirect economic impact*

Economists and researchers have widely studied the role of sport in economic growth, as well as the importance of sport in promoting physical activity for people. However, taking into account the growing role of sport in economic processes, it is necessary to further analyze the theoretical aspects of sports economics. Many people love sports. Sport is a dynamic and fast-growing sector within the European Union, which amounts to 1.76% of the EU's gross value added (€173.86 billion), with a share in national economies that can be compared to a combination of agriculture, forestry and fisheries.

### ▶▶ *Sport and macroeconomics*

Sport keeps not only you but also the industry fit. Sport is not only a leisure activity and good for your health, but it has a big industrial, touristic and economic impact. When talking about sports economics, it is important to include all upstream industries producing goods and services needed for sport and downstream industries for which sport is an important input-media, tourism, advertising and so on.

### ▶▶ *Sport and employment*

In 2019, 1.37 million people worked in sport within EU-27. In terms of gender balance, men (54%) outnumber women, a percentage aligned with the one observed in total employment. The employment rates and data of researches are mentioned in the segment.

### ▶▶ *Sport and development*

“In order to make ten people excellent at sports, it is necessary that one hundred people practice intensively and at least one thousand are interested or intrigued by the culture of sport,” said Pierre de Coubertin, the founder of the modern Olympic Games.

Sport has become not only a consumer good, it produces economic wealth and jobs, and at the same time brings benefits in terms of health and education to those who practice it. Researches have shown the lack of sports activities, sports tutors and athletes in developing countries due to the economical difficulties. In this segment, it is explained how this problem is solved and the number of sport athletes, tutors and facilities have increased in developing countries.

### ▶▶ *Sport and Events*

Even medium level events, as well as global events, such as the World Cup, give a boost to companies in different sectors, with a positive effect on the benefit/cost ratio, including public funding, from the organisation of the event. The economic impact, is one of the most widely used studies to define the degree of influence that different sized sports events have (for example) on regional income and employment rate.

### ▶▶ *Social Effect of Sport*

Sport has a strong potential to contribute to smart, sustainable and inclusive growth and the creation of new jobs through its positive effects on social inclusion, education and training, and public health. It helps containing the increase in health spending and social security expenditure by improving health and productivity of the population and ensuring a better quality of life in old age.

### ▶▶ *Suburban and abandoned places renewal*

Recovery and valorisation for social purposes of unused real estate assets, considered as a common good that should be available to the community: reuse and regeneration of spaces, both urban and non-urban. The recovery and renovation of suburban and abandoned places for the planning of a sports activity raises the cities' life quality.

### ▶▶ *Territorial Marketing*

The identity of territory is sometimes defined with the sports activities, sports teams or athletes belonging the region ;eg. Ferrari, Wimbledon, Usain Bolt, etc. The regional sports industry increases the well-being and wealth of inhabitants of that territory.

### ▶▶ *Corporate social responsibility (CSR)*

The Green Book of the European Commission published in 2001 defines corporate social responsibility as the “voluntary integration of corporate social and environmental concerns in their commercial operations and in their relations with the parties concerned”.

## 6.5▶ Smart sport cities

### ▶▶ *An Economic Paradigm Shift*

Although capitalistic model allowed a large part of the population to achieve a high life standard, it has exploited the planet's resources beyond its possibilities. This model needs to be rethought, to ensure a growth respecting the natural environment, the quality of human relations and economic performance. The signs of the unsustainability of this model are now clear: climate change, compromised biodiversity, impacts of globalisation, and an increasingly polarised distribution of wealth.

### ▶▶ *Smart Cities*

Cities play a key role in this process. Organisation at administrative, urban planning, environmental and service levels will play a key role in moving towards sustainability. The urban environment, supported by new technologies, can help solve many problems related to citizens' health and improve their quality of life. Clean air, sustainable mobility, neighborhood services, exercise and health education, low-impact means of transport, pedestrian paths, green areas and sports infrastructures encourage citizens to engage in a healthy physical activity. Smart cities are moving in this direction. A smart city offers enhanced economic and job opportunities. Investing in smart city technologies can have multiplier effect on business and workers.

A smart city reduces costs and has a significant return on investment.

### ▶▶ *Sport and smart city: incubators and accelerators*

Sport and technology can provide enhanced economic development opportunities for cities. Both through events, facilities and urbanisation projects but also by developing products and applications.

Some examples of smart cities and sports incubators and accelerators are: IeAd Berlin - Colosseum Innovation Center Tel Aviv - The Tremlin Paris - Sport Accelerator Trentino

### ▶▶ *Urban planning and physical activity*

"Mind Change" approach concerns all cities no matter their size is. Offering citizens more pleasant, sustainable and healthy environments is a priority task for administrations. Taking into account areas for physical activity at all levels and for all age groups is one of the crite-

ria for urban planning. Planning green spaces, safe paths and areas for physical activity can be enhanced by technology to ensure greater safety and better use and planning of spaces. Many cities are currently testing innovative and original solutions for structuring their spaces in terms of sustainability.

▶▶ *Sport and technology, opportunities: events, facilities, medicine, tools*

Today, sporting events represent a significant source of income and a showcase for the places hosting them. Besides events of global importance, which involve large urban centers as well as whole nations, even smaller sporting events can represent an important source of economic revenue and media visibility for several areas.

▶▶ *Physical activity, outdoor spaces and social relations*

Encouraging health and wellbeing involves not only large cities, but can be promoted and developed at neighborhood level or in smaller towns. The possibility of promoting physical activity in the city is connected not only to urban planning but also to the determination to create opportunities to enjoy space. In recent years, we have experienced the spread of events where a sporting competition is used to raise funds for a social cause. In all these contexts, sport becomes a powerful communication, social inclusion and participation tool. It is an opportunity leaving room for further evolution and the creation of new initiatives.

▶▶ *The role of business in promoting health and well-being*

Workplaces also represent a unique opportunity for health and well-being education. Ergonomics of the workstations, as well as lighting, ventilation, accessible outdoor spaces and indoor plants help improve employees' quality of life. Several corporate welfare plans are now including fitness courses or discounted access to external gyms, prevention courses, health days within the company, meals with a controlled diet. The concept of *Workplace Health Promotion (or WHP)* in employment contexts implies that a company not only should implement all measures to prevent accidents and occupational diseases, but also offer its workers opportunities to improve their health, reducing general risk factors mainly those most closely linked to causing chronic diseases.

## ▶▶ *Sport as a driver to active citizenship education*

Your well-being as an individual is built on your physical and mental health. Knowing yourself, your abilities and your limits is a prerequisite for growing and performing your skills and competences, whatever they are. Sport allows encouraging intergenerational aspects, inclusion and shared values. It is enough to see how sport is helping to break down gender stereotypes, condemn racism and give visibility to athletes with disabilities.

## 6.6▶ **Webinars about the SEARCH E-Learning Course**

Project coordinator IUL has designed several online seminars in order to support the SEARCH E-Learning Course.

### ▶▶ *In-Depth Seminar Nr.1 – What Role Does Sport Play In Youth Growth?*

A seminar with Prof. Daniele Aletti, expert in teaching by skills, certification of learning and methodological innovation. He has explained basic aspects how training sports can develop psychologically and physically.

### ▶▶ *In-Depth Seminar Nr.2 – Physical Activity As A Medicine*

A seminar with Prof. Mario Carletti, sports medicine specialist, Member of the Healthcare Technical Commission of the Ministry of Health.

Prof Mario Carletti has explained the training types, how the training affects health both in positive and negative ways and the importance of proper training.

### ▶▶ *In-Depth Seminar Nr.3 – Physical Activity As A Tool of Resilience*

A seminar with Prof. Patrizia Garista, Pedagogist, Phd in Health Education.

In this seminar, Prof. Garista highlights the conditions of resilience and draws attention to the relation between sports and resilience.

▶▶ *In-Depth Seminar Nr.4 –  
Smart Sport Cities*

A seminar with Prof. Caterina Carletti, Lecturer at the Department of Business and Social Sciences of the University School of Italian Switzerland.

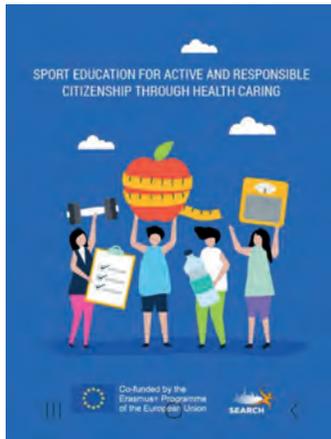
▶▶ *In-Depth Seminar Nr.5 –  
Make sport your profession  
without being professional athletes*

A seminar by Dr. Donatello Viggiano, communication and marketing consultant for sport and team manager. In this seminar you will explore all the professional possibilities that the world of sport offers alongside the real sporting activity.

## Chapter 7

# The SEARCH Mobile App and its impact on lifelong health

BY KONSTANTINOS TSIBANIS



The SEARCH Project provides a free to download Mobile App for both Apple iOS and Android smart devices, aiming at raising young European citizens' awareness on the importance of sports, health, nutrition, and wellness in everyday life.



With the aim to attract young people, the SEARCH Mobile App follows a gamified training process and creates a new perspective for changing future behavioural patterns by teaching them to live a healthy life and constantly practise sport.

### 7.1▶ Innovative aspects

The design of the SEARCH Mobile App follows innovative training strategies and techniques borrowed from the video game industry (gamification), rather than long texts, books and slides. The gamified training approach is the process of using game elements in an educational con-

text. In non-formal education, gameful thinking has many advantages over traditional learning approaches, by increasing learner motivation levels and improving knowledge retention. In other words, gamification increases engagement by providing incentives for learners to pay attention and complete activities. The added reward, even if it is intangible, it can encourage better listening and observation. When the learner is focused, they are more likely to absorb the information presented to them.

The SEARCH project provides sport education for active and responsible citizenship through health caring, copes with the issue of education to sport for a psycho-physical well-being of the individuals in their present but also in their future lives. This is the innovative subject of the SEARCH training because practicing physical activity means recharging your physical batteries that allows facing several situations in real life, with much more strength and guarantees physical and mental wellbeing.



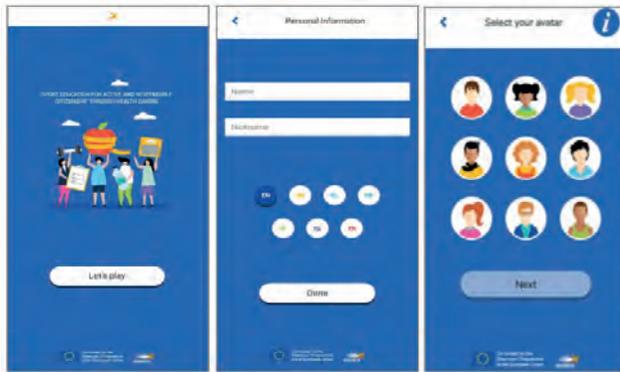
The SEARCH Mobile App introduces innovations in 4 pillars: Educational Approach, Gamification Techniques, Training Methods and Areas of Interest. Users through a personalised gaming environment have to overcome different levels through small activities and quizzes on sports, health, nutrition and wellness.

## 7.2 ▶ Structure - Scenario

The SEARCH Mobile App is an educational game that focuses on young people aiming at representing a new approach in teaching, technologically advanced, with the awareness that the tool is increasingly embracing every aspect of this digital era. The App is divided into three parts, the personalisation, the educational and the gamification part.



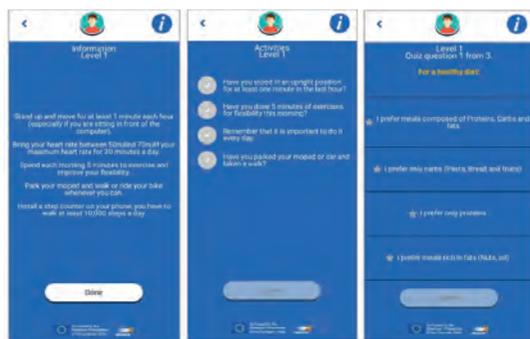
**Personalisation.** The SEARCH Mobile App is user-centred, suggesting creation of personal profiles through an easy process and allowing for tracking the learning progress and achievements. The App sends the message to potential users for a personalised gamified training approach (kids, let's play, learning by playing) from the intro – splash screen. The App gives several options for building a personalised profile by adding a Name, choosing a Nickname and selecting the language preferred for the content and the environment (multilingual) and an avatar from the embedded collection, instead of a user image. This personalised access supports a gamified anonymous approach with no personal data and no central storage for the results which is appropriate for underage youths.



**Educational.** The SEARCH Mobile App is conceived as a platform for learning and it provides high quality contents. It is available in 7 languages: Italian, English, Austrian, Greek, Spanish, Slovenian and Turkish. All material is freely accessible, offered in a simple everyday language in order to make understanding of the topics even easier.



The educational approach follows gamified techniques and the content is organised in three sections. The first section presents various information in simple sentences, five per level, regarding good practices, news about sport, healthy living, good nutrition and wellbeing information. The second section provides activities, simple actions for improving everyday life, health, nutrition and practicing physical activity. The third section is the quiz section. There are three multiple choice questions with four answers and only one correct in each level. The aim of the quiz is to measure the degree of understanding and absorption of the information by the trainees in order to proceed to the next level.



**Gamification.** The SEARCH Mobile App uses some innovative gamification techniques, which make the learning experience for young people more engaging. Such techniques include:

- Progression – moving gradually to more complicated learning material.
- Challenges – quizzes that a learner has to solve to progress towards the training completion.
- Achievements – collecting badges for completion of certain parts of the training, leading to a SEARCH training completion achievement.

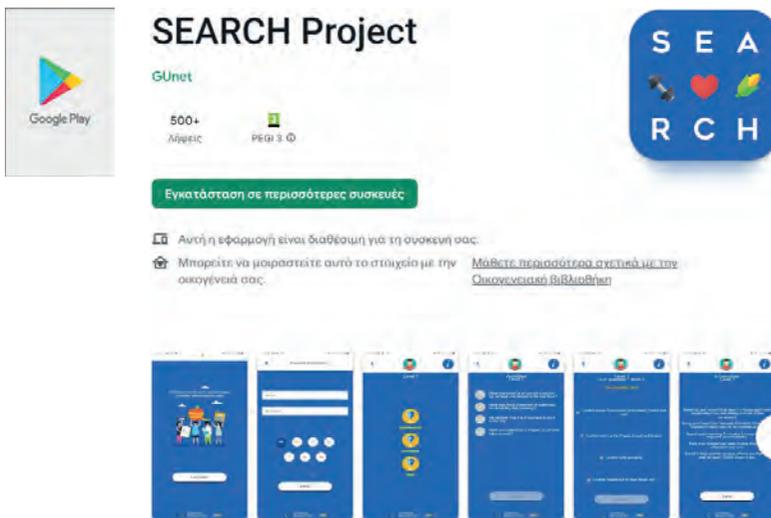


Gamification in education is a technique, which designers use in order to insert gameplay elements in training settings, so that they enhance user engagement. The SEARCH Mobile App introduces a ten levels educational game with badges and a final goal. Each level supports three levels of completion and the progression of the learning process between levels depends on the completion of activities and quizzes. After the completion of all ten levels the learner receives the final SEARCH training completion badge.

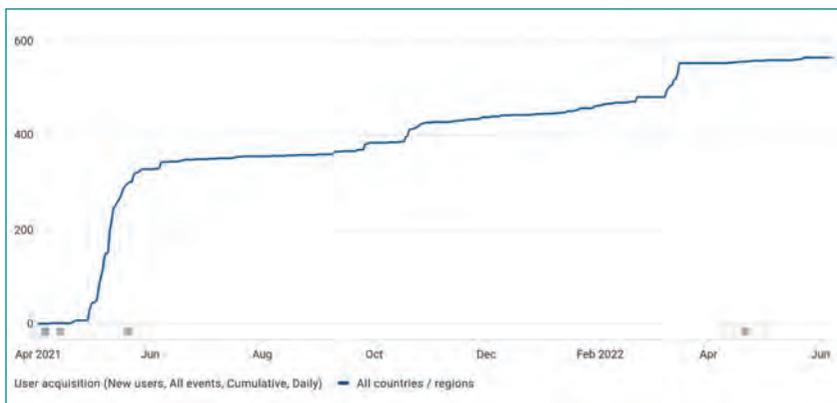


▶▶ *Android App – Google Play*

The SEARCH Mobile App for Android smart devices is available for free download in the official Google Play store. <https://play.google.com/store/apps/details?id=gr.gunet.search>

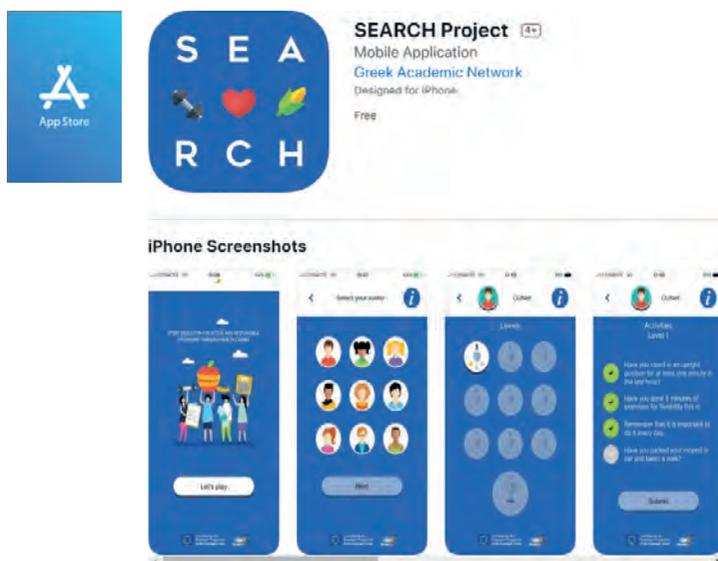


During the project training phase, the official SEARCH Android App had 583 downloads.



## ▶▶ Apple iOS App – App Store

The SEARCH Mobile App for Apple iOS smart devices is available for free download in the official Apple App Store. <https://apps.apple.com/app/id1561776727>



During the project training phase, the official SEARCH iOS App had *342 downloads*.



## Chapter 8

# Summary of results and validation: feedback from users

BY ANDRES DEL JESUS CAÑETE, CARMEN GUERRA RETAMOSA  
AND MARÍA JOSÉ LÓPEZ MONTIEL

SEARCH project – Sport Education for Active and Responsible Citizenship through Health caring – is aimed at training young European citizens and at concretely proposing an intervention to organise different realities related to the dissemination of culture and sport. The project aims at increasing young people’s awareness of the importance of sports-related issues, potentially resulting in behaviour focused on well-being, inclusion and full citizenship.

In order to get that, we have developed different outputs that have been implemented during these years, and that have been described in the previous chapters.

Now it’s time to analyse the different materials and actions implemented to see the impact of SEARCH.

We have mainly focus on:



The SEARCH mobile app



The e-learning course



The students’ test



The dissemination events

## 8.1► SEARCH mobile app

The APP, accessible to secondary and High school students from the different countries, has been conceived as an educational platform and was launched in the language of the different partners: Italian, English, Austrian, Greek, Spanish, Slovenian and Turkish.

The platform uses some gamification techniques, in order to make the learning experience engaging.

SEARCH Mobile App is user-centred and suggests the creation of personal profiles through an easy sign-up process that allows tracking both, the learning progress and the achievements.

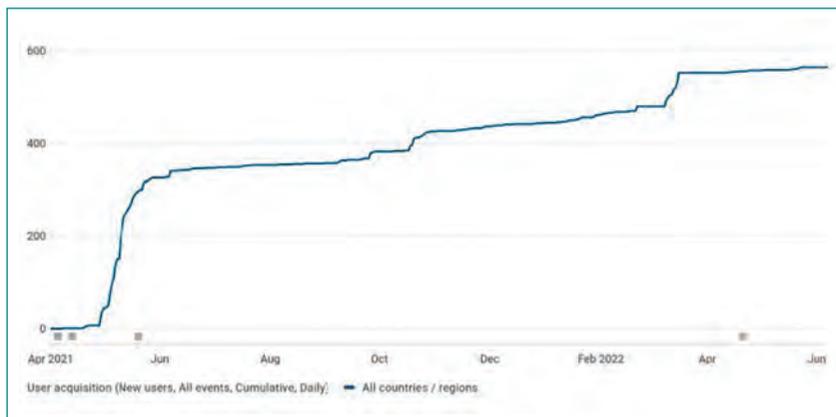
The user profile, lessons and progress are also uploaded to the cloud so that anyone can access and resume the lesson from any device. Each user will have 10 levels to overcome, through small quizzes on sports, wellness, and nutrition.

SEARCH PROJECT has developed two Mobile Apps with the same functionality.

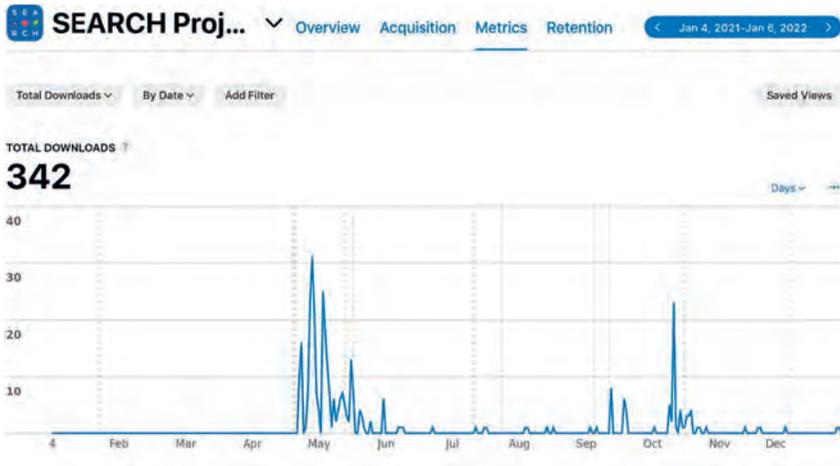
One for Android Devices available for free in Google Play Store and one for Apple iOS Devices available for free in Apple Apps Store:

- <https://play.google.com/store/apps/details?id=gr.gunet.search>
- <https://apps.apple.com/app/id1561776727>

We have registered 925 downloads.



**FIGURE 1:** SEARCH App Downloads in Google Play Store: 583.



**FIGURE 2:** SEARCH App Downloads in Apple App Store: 342.

Surprisingly, apart from the different countries involved in the project we have detected users from India, Nigeria, Kenya and Indonesia.

It's very important to remind the students the differences between an educational and a trainer app. SEARCH mobile app is an educational app so you will not be able to use it as step counter or a healthy habit reminder as some students were initially expecting.

The project has also designed a questionnaire to analyse users' opinion and their impact in their habits. The link to the google form is the following:

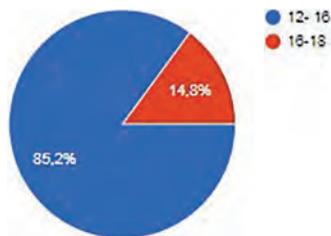
- <https://forms.gle/jwwFecF7QRpd5D36>

We have found these results:

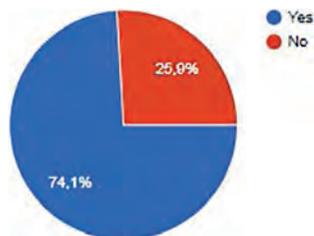
- Number of students: 216

Most of the students have enjoyed the app and would recommend it to their friends. They knew about the project in the school and most of them reach level 10 and found most of the activities available and the information clear. When asked if they had changed their habits most of them said that they had started using the stairs instead the lift and going on foot to school and having healthier breakfasts. Here you can find the graphs we got from the Google form.

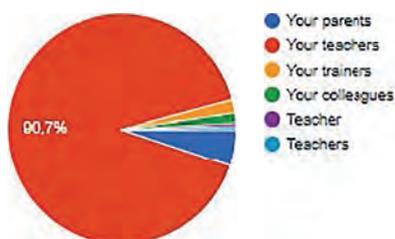
Age



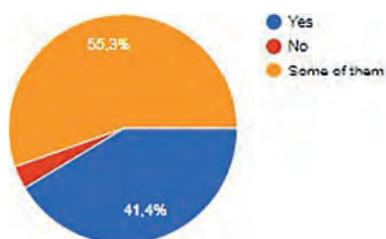
Have you been able to reach level 10?



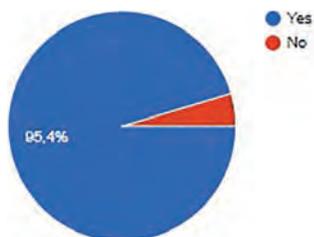
Who give you information about the SEARCH application



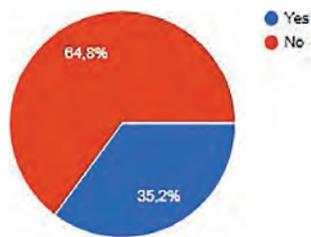
Were the activities easy to achieve?



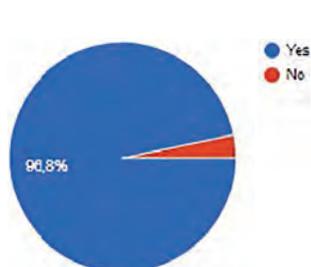
Did you find the app interesting?



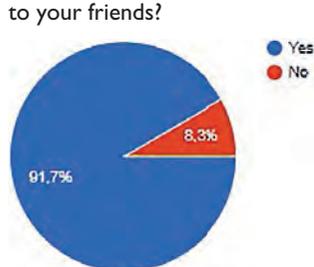
Have you modified any of your habits?



Was the information clear?



Would you recommend the app to your friends?



## 8.2► SEARCH online course participation

The project *SEARCH – Sport Education for Active and Responsible Citizenship through Health caring* copes with the issue of education to sport for a psycho-physical well-being of the individuals in their present but also in their future lives.

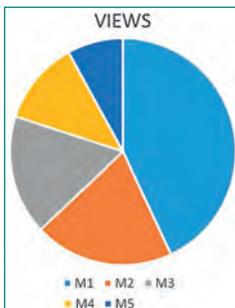
One of the main tools to get that objective has been the e-learning course that presents the following advantages:

- **From a technological point of view**, teachers and sports tutors can follow the e-learning lessons with a maximum degree of flexibility. They will always be available online and each of the attendants will have in any time the possibility to access and consult this resource. The platform will contain not only the modules, but also experiences, good practices and all the information which can be shared at national and international level with the European partners.
- **From an educational point of view** E-learning training for adults aims at representing a new approach to teaching technologically advanced, with the awareness that the “becoming” is the main aspect of the process. Materials will always be freely accessible and available in order to make the understanding of the topics even easier.

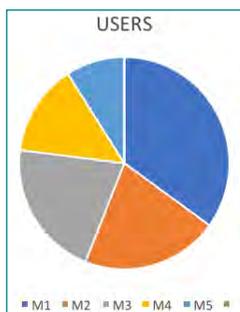
160 people from the different countries involved in the project have been enrolled in the course. During the project implementation, this number has been affected by the pandemic situation and how people were fed up with online activities as their studies and works had to be followed as well online.

We can observe than the number of users and views of every module has been decreasing during the development of the contents.

Data from views and users in every module:

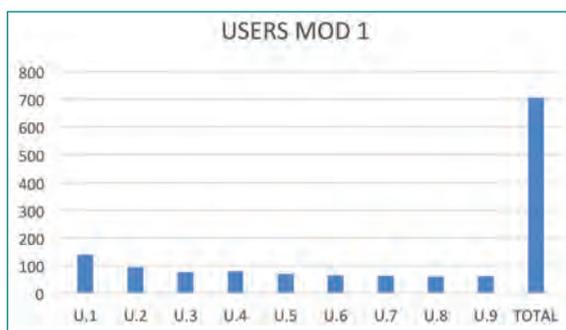


	VIEWS %
M1: <u>Enhancing the educational activity of sport</u>	43
M2: <u>Encouraging sports practice for one's own psycho-physical wellbeing and to control national social and health costs</u>	20
M3: <u>The social function of sport</u>	17
M4: <u>Economic induction related to sport</u>	12
M5: <u>Smart sport cities</u>	8



	USERS %
M1: <u>Enhancing the educational activity of sport</u>	35
M2: <u>Encouraging sports practice for one's own psycho-physical wellbeing and to control national social and health costs</u>	21
M3: <u>The social function of sport</u>	21
M4: <u>Economic induction related to sport</u>	14
M5: <u>Smart sport cities</u>	9

We can say that these data are consistent with the profile of the participants as most of them have been teachers and students. We think that if we should have offered a diploma the number of participants finishing the course should have been bigger.



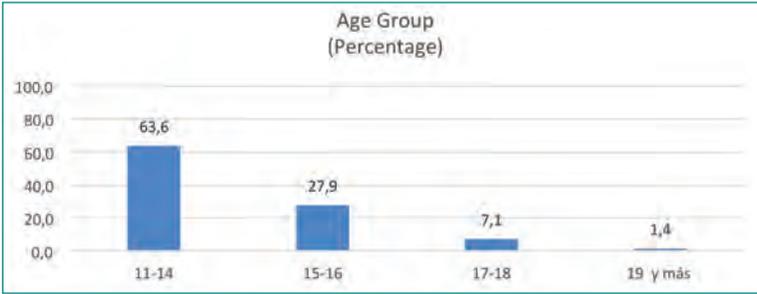
### 8.3 ▶ SEARCH test's results

#### ▶▶ Profile of participants

In both pre- and post- test phases, the majority of around 4250 secondary school students were 11-14 years old. We consider that the implication of teachers in the projects was very important in order to guarantee the follow up.



**After**



►► **Improvements**

In general, the questions referring to how the practice of sport can affect the perception of oneself and their relationship with others, as well as health, present very similar data in the previous and a posteriori test.

We observe a slight improvement in questions related to chemical concepts such as the ones signalled in questions 9 and 13.

**Q9 What does it mean oligo mineral water?**

**Before**



**After**

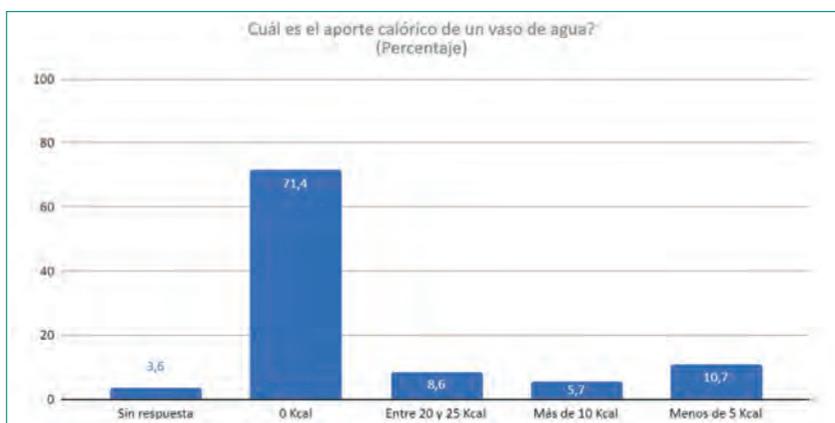


### Q13 Caloric ingestion of a glass of water

#### Before



#### After



It's important to see that results worsened in question related to sport and illnesses. We think that this can be linked to the profile of older participants. We have already shown that the number of over 19 years old participants in the test decrease from 6,6% to 1,4%.

**Q26** Which one of the following statements is not strictly related to physical activity?

Correct answer were 61% before and 53% after

**Q27** How often should you train in a week to stay healthy?

Correct answer were 54% before and 50% after

**Q29** human behavior that are indicated to influence the development of chronic-degenerative diseases

Correct answer were 80% before and 72% after

**Q33** What does it mean daily mobility

Correct answer were 78% before and 68% after

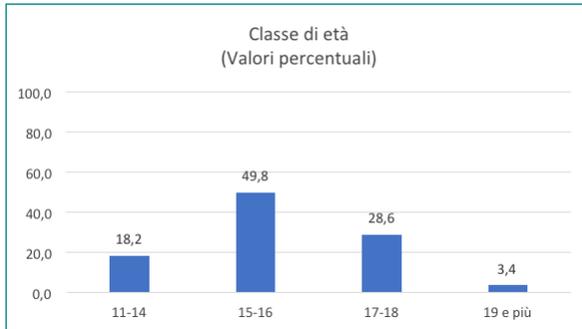
**Q36** Recommended physical activity to citizens over 60

Correct answer were 83% before and 75% after

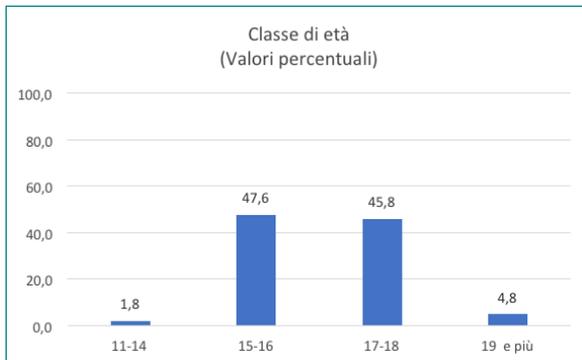
Taking all of this into account we can say that in general there has not been a significant improvement in the results but at least in secondary school students it has make them being aware of the importance of sport in different areas of their life.

The profile of Italians taking part in the test is slightly different as can be shown in the results.

### Before the course and app



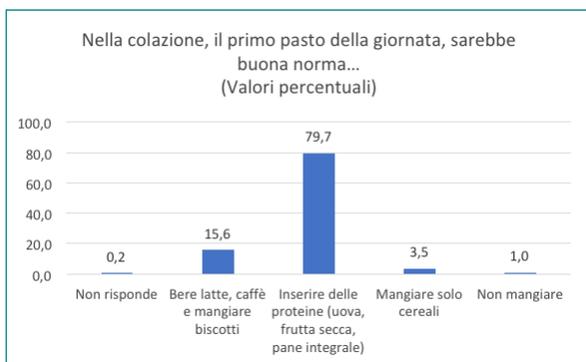
### After



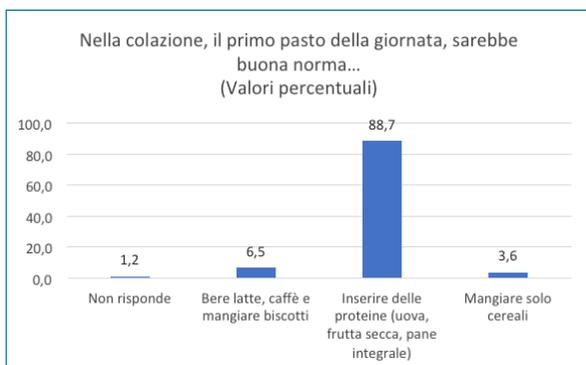
In this case we can see that the number of the youngest participants has decrease and the post-secondary students has increase.

All the data regarding scientific knowledge have improved as well the related to sport activity. It's relevant, especially in the Italian case and taking into account their alimentary breakfast habits (coffee and pastries) the following result:

### Before



### After



All the items regarding social aspects in sport do not show any relevant variation.

Regarding British test, we can see that the number of secondary school students has decrease as the post-secondary has increased. In general, all the answers have improved but we cannot be sure if the improvement is related to the course or to the intellectual maturity of the test's participants.

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This book presents the results reached by the SEARCH project (Sport Education for Active and Responsible Citizenship through Health caring), carried out in the years 2020-2022 by a consortium of seven organisations established in seven different European countries: Italy, Greece, Spain, Austria, Slovenia, Ireland, and Turkey. The work is structured in two parts. In the first part, importance of physical activity and its impact on growth, development and health is illustrated, together with highlines about the importance of physical activity in childhood and young people, and world and national recommendations on the topics of physical activity, health, and nutrition. The SEARCH Questionnaire, based on these premises and guidelines, closes this first part of the book. In the second part, all products and results of the project are presented: SEARCH Open Portal, E-learning Course, and Mobile Application. A summary of results and feedback obtained by the project closes the work.

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