**Work package 3 Module development**

***Complex HEPA challenge:***

***“Understanding the changes of the human body and the impact of nutrition and physical activity on adults (40-59 years)”***

# The issue

At the age range of 40-59, most adults face the challenge of juggling work and family life and commitments, lifestyle changes and living busy and often stressful lifestyles with little time for physical activity and exercise. How can a physical educator or coach support an individual to understand the ongoing changes of the human body at this phase in life, such as the impact of nutrition and a slowdown in the metabolic rate? What are the typical changes that the human body undergoes in adulthood (40-59)? What informed choices do people need to make to address nutritional and weight related problems and diseases that are typical at this age? What nutritional and physical activity research informed programmes would you, a physical education teacher and a coach be able to offer as a service in an organised setting or through an enterprise? How can you lead an individual get engaged with Health Enhancing Physical Activity (HEPA)? How can wearable technology help monitor HEPA?

Although people aged 40-59 potentially have access to information at their fingertips through various sources of published and digital media; World Wide Web; academic open sources; wearable technology; the obesity records of this age group[[1]](#footnote-1) indicate that nutritional knowledge needs to be enhanced to impact healthy living. Furthermore, the workforce in sports, leisure, fitness, exercise and healthy weight management domain has been providing various practical, counselling and behaviour change services to support health enhancing physical activity to this age group. Therefore, although access to information about the changes of the human body; and the impact of nutrition and physical activity in available, there remains misconceptions about HEPA, and the impact of nutrition on the human body. Moreover, the provision of physical activities is often fragmented and inaccessible due to time, travel and costs constraints.

# The setting

While Physical Education teachers and Sports Coaches (participant orientated) primarily work with children and young adults, it is not unusual for them to offer a provision of physical activity for other age groups. Parents and carers of children who participate in out of school activities with their PE teachers and coaches often yearn to do some physical activity for themselves while their children are completing their sessions. Meanwhile, some adults (40-59) who enjoyed playing team sports such as football, basketball, hockey and netball at highly competitive levels and picked up some injuries along the way are often advised to refrain from participating at competitive level to limit the potential injuries of high impact sports on their aging bodies. Thus, the emergence of “walking sports” ([http://www.saga.co.uk/magazine/health-wellbeing/exercise-fitness/walking-sports#](http://www.saga.co.uk/magazine/health-wellbeing/exercise-fitness/walking-sports); <http://www.over50s.com/walking-sports-50/>) are gaining acceptance by some governing bodies such as:

* basketball (<http://www.surreysportspark.co.uk/sports/Basketball/Walking%20Basketball/>)
* netball (<http://www.englandnetball.co.uk/my-game/Walking_Netball>)
* rounders (<http://www.roundersengland.co.uk/play/rules/>)
* football (<http://www.walkingfootballunited.co.uk/> ; <http://www.worldamputeefootball.com/rules_i.htm>)
* hockey <https://www.youtube.com/watch?v=HRPYmHzI70s>
* rugby (<http://www.telegraph.co.uk/news/health/elder/11816791/Rugby-as-youve-never-seen-it-before-older-players-give-game-a-more-genteel-pace.html>)

Meanwhile a report by Special Eurobarometer 412: Sport and physical activity (March, 2014 <http://ec.europa.eu/health/nutrition_physical_activity/docs/ebs_412_en.pdf>) revealed that 61% of those aged 46-54; and 70% of those aged 55+ seldom or never participate in physical activity and sports.

At the same time, the Wearable technologies are a relatively new entrant in the health and fitness sector. Examples of health and fitness wearable devices and applications include health monitors, fitness trackers, activity monitors, and analysis aids. According to Orange (2014), fitness and medical wearables accounted for 60% of the wearables market in 2013 and it is predicted that the health wearables market will be worth roughly £ 3.7 billion by 2019. The increase of wearable health and fitness devices remains an ongoing trend; the technology associated with these wearable devices is improving at a fast rate. Devices are becoming increasingly smaller and more energy efficient, making them better suited for continuously sensing and giving feedback. Shuger *et al* (2011)[[2]](#footnote-2) in the *International Journal of Behavioural Nutrition and Physical Activity* concluded that continuous self-monitoring from wearable technology with real-time feedback might be particularly useful to enhance lifestyle changes that promote weight loss in sedentary overweight or obese adults. This strategy, combined with a group-based behavioural intervention, may yield optimal weight loss Nevertheless, Middelweerd *et al* (2014) [[3]](#footnote-3) noted that although the most frequently techniques of wearable technology include self-monitoring, providing feedback on performance, and goal-setting the qquality of applications (apps) with regards to health behaviour change techniques is unclear. This case will be challenging the knowledge, understanding, skills and leadership required to engage participants in HEPA.

Physical Education Teachers will thus be working with their national professional association; and Sports Coaches with their awarding bodies to deliver a new provision of health enhancing physical activity and nutritional information for adults (40-59) thought the programme “Move for your health”. The overarching goal of the proposed programme is to increase physical activity in the target population (40-59). Participants will be trained to make informed choices about technology and to use wearable technology to meet the general guidelines of PA; understand when their activity is contributing to weight loss or cardiovascular fitness and to strengthen the efforts on tackling overweight and/or obesity. In addition, the programme is based on the latest research informed evidence, practice-based knowledge and expertise on ways to empower and inspire participants of the target population ().

In this case, PE and coaching students have to develop the following competencies: Develop, Recognise, Analyse, Apply, Record, and Use of digital technology.

# Challenge

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| *You (and your team) have been tasked by your professional body to develop a programme of health enhancing physical activity (HEPA) for a new client group, adults (40-59).* *This programme will be piloted in your region in the first instance with the intention of rolling it out nation-wide. Your programme needs to bring together various policies, provisions and stakeholders that provide Physical Activities for this age group. The unique characteristic of this programme will be the integration of information and wearable technology to support participants in their journey to understand the changes of the human body and the impact of nutrition and physical activity on their health.* |

| ***Title of the complex HEPA challenge:*** | ***Understanding the changes of the human body and the impact of nutrition and physical activity on adults (40-59 years).***  |
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| Estimated study load | *125 hours (10 ECTS)**50 hours of lectures, seminars, workshops, discussions, tutorials**75 hours of group work for the presentation, field experience and assignments* |
| Basic knowledge requirements | No pre requisits |
| How to use this case based challenge in your curriculum. | The case based challenge is being used to promote the understanding of declarative knowledge and its’ application to practice taking into account research, policies and the practicalities of rolling out health enhancing physical activities in various settings. In addition, the case based challenge underpins and strengthens the students’ knowledge, analytic and practical skills in relation to personal leadership; nutrition and physical activity policy issues, emerging physical activities for target populations, wearable technology, policy development and implementation. Furthermore, this case based challenge will instil employability skills such as cooperation with colleagues, strategic communication, adaptability, entrepreneurial skills, leadership and networking capabilities. |
| Competences | Develop, Recognise, Analyse, Apply, Record and Use of digital technologyWorking on this case student should obtain competences regarding:* developing an understanding of nutritional factors which influence physiological function and the associated links to health, fitness and participating in physical activities.
* recognising the role of physical education and coaching for a target population (adults 40-59) and applying scientific knowledge to develop programmes of physical activities.
* analysing and recognising scientific knowledge about nutrition and physical activity
* recognising and evaluating the use digital technology to record health enhancing physical activity
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| Integrated content  | Nutrition and Physical Activity for specific target groupPersonal leadership |
| EQF-level | 4,5,6, 7, Vocational Masters |
| Learning outcomes (LO) | Level 4-5 (Vocational)By the end of this module students should be able to:1. apply the principles of nutrition in a physical activity and / or sports coaching context 2. understand the interaction between nutrition and physiological function.3. record, analyse, interpret and evaluate data in this field, including the use of digital technology.4. reflect on individual needs of participants, assist in the development of a programme and evaluate the engagement of health enhancing physical activity for individuals or a target population. |
|  Level 6 (Bachelors) By the end of this module students should be able to:1. demonstrate systematic understanding and apply the principles of nutrition in a physical activity and / or sports coaching context 2. exhibit conceptual understand of the interaction between nutrition and physiological function.3. collect, present, record, analyse, interpret and critically evaluate data in this field, including the use of digital technology.4. recognise individual needs of participants and develop and critically eluate a programme of health enhancing physical activity for a target population and reach out to a target population to engage in physical activity. |
| Level 7 / MastersBy the end of this module students should be able to:1. have a systematic understanding of know, critical awareness, and apply the principles of nutrition in a physical activity and / or sports coaching context, much of which is aimed at academic discipline, or area of professional practice.2. deal with complex issues both systematically and creatively and understand the interaction and, between nutrition and physiological function.3. engage with conceptual knowledge and understanding, current research, methodologies and advance, and record, analyse, interpret and critically evaluate data in this field, including the use of digital technology.4. demonstrate self-direction and originality in tackling and solving problems, and provide scientific advice on nutritional strategies for an individual.5. act autonomously and exercise personal responsibility in planning and implementing tasks at professional level, and recognise individual needs of participants and develop a programme of health enhancing physical activity for a target population and reach out to a target population to engage in physical activity |
| *Combination learning outcomes and EQF level* | *EQF level 4 -5: Vocational**EQF level 6: Bachelors**EQF level 7: Masters* |
| Study unit description | This study unit will comprise of the study of the nutritional requirements of those involved in phsycial activity from both a health and performance perspective. This module will introduce the concept of energy balance in the human body, both at rest and during exercise. Nutrients will be studied in terms of their structure, breakdown, digestion and absorption in the human body. The role of key nutrients will then be explored in relation to homeostasis in the human body, with links to dietary strategies for health, exercise, and sports performance will be investigated.In addition, this module will focus on potential nutritional strategies that an applied practitioner may have to advise. The module will consider nutritional issues associated with body composition, specifically weight gain and weight loss from both a health and performance perspective. The module will also investigate ‘popular’ material and wearable digital technology that is aimed at the fitness/exercise/sport participant from a scientific perspective.This study unit will engage participants in planning and leading practical activities in different setting to develop competencies in a series of practice based activities such as walking sports. |
| Didactical methods | Lectures (lecture and class based learning), group discussion (group based learning), directed readings (e-learning), seminars (interactive learning), lab work: experimenting with and reviewing digital technology (practice oriented learning, problem based learning), individual study work (e-learning), workshops (practice oriented learning), tutorials (group and individual), orientation visits to work places, work based learning and internship (training, practice based learning), applying and reflecting on theory in practice and working with clients (training, practice based learning), virtual learning environment tasks (e-learning).  |
| Student assignment(s)  | 1. The aim of the assignemint is to provide the studnets with the tasks to achieve the learning outcomes of the module appropriate to the EQF level the module is taught at.
2. ***Activities*** *that students need to carry out*

Task 1: Knowledge Enrichment Activity (20%)Task 2: Assignment: Scientific report (group task) (40%)Task 3: Portfolio of engagement with clients and the workplace (individual task) (40%) |
| Assessment | ***Task 1: Knowledge Enrichment Activity (20%)***This task can be a short question and answer written or oral task. ***Task 2: Assignment (group task) (40%)***Coursework: Prepare a factsheet supported by scientific research and research informed practice on the changes of the human body and the impact of nutrition and physical activity on adults (40-59 years). You may like to address some of the following issues:* + 1. What are the typical changes that the human body undergoes in adulthood (40-59 years)?
		2. What informed choices do people need to make to address nutritional and weight related problems and diseases that are typical at this age phase?
		3. What digital wearable and other technology is available to support engagement in health enhancing physical activity and what criteria can help one make an informed choice on selecting the appropriate technology for the needs of individual participants?
		4. How can an individual lead a physically active life and understand the changes of the human body, in particular the impact of nutrition?
		5. What nutritional and health enhancing physical activity research informed programmes would you, a physical education teacher and a coach be able to offer as a service in an organised setting or through an enterprise?
		6. How can a physical educator or coach support an individual to understand the ongoing changes of the human body during adulthood (40-59), such as the impact of nutrition and a slowdown in the metabolic rate?

***Task 3: Portfolio (Individual task) (40%)***You are expected to work as an assistant in a professional setting and to put together a portfolio of activities and tasks at the work place. Your portfolio needs to show evidence of your engagement with clients and professionals at the work place and a reflection on your undertakings. Furthermore, you need to demonstrate the impact that you will make on the workplace as evidenced by engagements with clients, colleagues and other relevant sources (e.g. use of technology). Some of the items that you might like to reflect upon may include:1. Induction to the workplace (client, safety issues)
2. Client consultation
3. Information session: nutrition and health enhancing physical activity
4. Workshop: wearable technology and apps for nutrition and health enhancing physical activity
5. Plan of a practical session
6. Data and analysis to inform a client consultation session
7. Challenging experience at the workplace
8. Successful experience at the workplace
9. Relationship with the clients
10. Use of information systems and reporting
11. Impact of your engagement for the employer
12. Research to inform practice
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| Literature & supportive content: | ***Sample of Supportive content (See Ancillary Resources document)******Health Enhancing Physical Activity and Nutrition***;Duan, Y., Brehm, W., Strobl, H., Tittlbach, S., Huang, Z., Si, G. (2013) Steps to and correlates of health-enhancing physical activity in adulthood: An intercultural study between German and Chinese individuals. *Journal of Exercise Science & Fitnes*s.<http://www.sciencedirect.com/science/article/pii/S1728869X1300035X> Fink, H. H., Burgoon, L.A. and Mikesky, A.E. (2009). *Practical Applications in Sports Nutrition*. Sudbury, Massachusettes, Jones and Bartlett.Holt, N.L., and Talbot, M. (2011) *Lifelong engagement in sport and physical activity: participation and performance across the lifespan.* Abingdon: Routledge and International Council of Sport Science and Physical Education. Manore, M. & Thompson, J. (2009) *Sport Nutrition for Health and Performance*. Champaign, Illinois: Human Kinetics.***Other Learning Resources*** Sport Discus (With Full text). *Annual Review of Nutrition.* *Applied Physiology, Nutrition and metabolism.* *Australian journal of Nutrition and Dietetics.* *International Journal of Sports Nutrition.* *Journal of the International Society of Sports Nutrition**Journal of Exercise Science & Fitness.****Leadership in Physical Education and Coaching***Armour, K. (2011) *Sport Pedagogy: An Introduction for Teaching and Coaching.* Abingdon:Taylor and Francis Routledge. Kidman, L. and Hanrahan, S.J. (2011) *The coaching Process: A practical guide to becoming an effective coach*. Abingdon: Routledge Martens, R. (2012) *Successful Coaching*. Champaign, Illinois: Human Kinet Metzler, M.W. (2011) *Instructional models for Physical Education* 3rd ed. Scottsdale, AZ: Holcomb HathawayNash, C (2014) *Practical Sports Coaching*. Abingdon: Routledge Sports coach UK and Women’s Sport and Fitness Foundation (2011) ‘*Women and Informal Sport: A Report for the Women’s Sport and Fitness Foundation’*, [www.sportscoachuk.org/women-informal-sport](http://www.sportscoachuk.org/women-informal-sport)* basketball (<http://www.surreysportspark.co.uk/sports/Basketball/Walking%20Basketball/>)
* netball (<http://www.englandnetball.co.uk/my-game/Walking_Netball>)
* rounders (<http://www.roundersengland.co.uk/play/rules/>)
* football (<http://www.walkingfootballunited.co.uk/> ; <http://www.worldamputeefootball.com/rules_i.htm>)
* hockey <https://www.youtube.com/watch?v=HRPYmHzI70s>
* rugby (<http://www.telegraph.co.uk/news/health/elder/11816791/Rugby-as-youve-never-seen-it-before-older-players-give-game-a-more-genteel-pace.html>
* Physical Activity and Adults <http://www.who.int/dietphysicalactivity/factsheet_adults/en/>
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| Estimated costs | Cost that need to be factored in:* Digital technology, licenses and applications
* Wearable digital technology
* Student travel for fieldtrips
* Student travel for internship / apprenticeship / work based experience
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| ***Teacher guidelines for:*** |  ***“Understanding the changes of the human body and the impact of nutrition and physical activity on adults (40-59 years) ”*** |
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| Relevance of this study unit for a future PE teacher / Sportcoach | This study unit is a curricular innovation that extents the professional leadership of Physical Education teachers and Sports Coaches (participant orientated) to work with a specific target population: adults (40- 59) who enjoyed playing team sports such as WALKING football, basketball, hockey and netball. These are gaining acceptance by some governing bodies such and it is timely that PE teachers and Sport coaches extend their professional leadership. (http://www.saga.co.uk/magazine/health-wellbeing/exercise-fitness/walking-sports#; http://www.over50s.com/walking-sports-50/ ) |
| Suggestions for Didactical methods including suggestions how to apply them | Lectures (classroom based learning), group discussion, directed readings and seminars (interactive learning), lab work: experimenting with and reviewing digital technology (practice oriented learning), individual study work (reading and presenting), workshops (practice oriented learning), tutorials (group and individual), orientation visits to work places, work based learning and internship ( applying and reflecting on theory in practice and working with clients), virtual learning environment tasks. |
| Suggestions for a week to week schedule | See annex I |
| Assessmentprotocol | Task 1: Knowledge Enrichment Activity (20%) LO: 1, 2, Task 2: Assignment: Scientific report (group task) (40%) LO: 1, 2, 4.Task 3: Portfolio of engagement with clients and the workplace (individual task) (40%) LO: 1, 2, 3, 4. |
| Specific points of consideration for PE | Nil |
| Specific points of consideration for CO | Nil |

**Annex 1: suggestions for a week to week schedule**

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| **Week** | **Subject** | **Topic** | **Content** |
| 1/2 | Introduction | Nutrition and physical activity | Nutritional requirements of those involved in sport and exercise from both a health and performance perspective. Nutritional issues associated with body composition, specifically weight gain and weight loss from health perspective. understand the potential risks associated with poor nutritional advice. |
| 3/4 | Nutrition | Concepts and physical activity | The concept of energy balance in the human body, both at rest and during exercise. Differentiate between scientific and non-scientific recommendations.  |
| 5/6 | Nutrition | Physiological applications and HEPA | Nutrients will be studied in terms of their structure, breakdown, digestion and absorption in the human body. Nutritional intervention(s) based on the critical analysis.Complete a HEPA self-administered questionnaire that assesses the quantity, intensity, and type of physical activity (PA) and assess the stage of change (description, intervention, and diagnosis) (Duan, *et al*, 2013). |
| 7/8 | Nutrition | Physiological applications and HEPA | The role of key nutrients will then be explored in relation to homeostasis in the human body, with links to dietary strategies for health enhancing physical activity and exercise will be investigated through a problem based learning practical task.  |
| 9/10 | Field trip | Target population settings | Observe sessions and discuss with clients1. What do you want to achieve from participating in physical activity?
2. How would you rate your knowledge on nutrition and physical activity and what would you like to know more about?
3. What is the extent of use of digital and wearable technology in your physical activity and what would you like to know more?
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| 10/11 | Digital technology | Technology for health enhancing physical activity | Workshop: Digital and wearable technology will be reviewed and used in a lab based practical context. |
| 13/14 | Leadership | Practical Workshop:Walking physical activities for participants | • basketball • netball • rounders • football • hockey • rugby  |
| 15/18 -20 | Work based learning | Tutor and peer consultations (on line) | Work based learning and tutorials while student undertakes internship to build the case for the assessment (individual task). |
| 22-25 | Preparation Assessment | Tutorials | Group task |

1. The European Association for the Study of Obesity <http://easo.org/education-portal/obesity-facts-figures/> [↑](#footnote-ref-1)
2. [http://download.springer.com/static/pdf/534/art%253A10.1186%252F1479-5868-8-41.pdf?originUrl=http%3A%2F%2Fijbnpa.biomedcentral.com%2Farticle%2F10.1186%2F1479-5868-8-41&token2=exp=1456848267~acl=%2Fstatic%2Fpdf%2F534%2Fart%25253A10.1186%25252F1479-5868-8-41.pdf\*~hmac=0a5bb639b8579e8868cae5ce4977f0f488b94ea8c8a824c858c911324f68a72d](http://download.springer.com/static/pdf/534/art%253A10.1186%252F1479-5868-8-41.pdf?originUrl=http%3A%2F%2Fijbnpa.biomedcentral.com%2Farticle%2F10.1186%2F1479-5868-8-41&token2=exp=1456848267~acl=%2Fstatic%2Fpdf%2F534%2Fart%25253A10.1186%25252F1479-5868-8-41.pdf*~hmac=0a5bb639b8579e8868cae5ce4977f0f488b94ea8c8a824c858c911324f68a72d) [↑](#footnote-ref-2)
3. Middelweerd, A., Mollee J.S., van der Wal, N., Brug, J., te Velde, S. (2014)Apps to promote physical activity among adults: a review and content analysis *International Journal of Behavioral Nutrition and Physical* Activity 201411:97

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<https://ijbnpa.biomedcentral.com/articles/10.1186/s12966-014-0097-9> [↑](#footnote-ref-3)