

2019

Sport & Exercise Science Education

IMPACT ON THE UK ECONOMY

Key findings



Participating universities and colleges

Thanks to the universities and colleges listed below for their contribution and support to this analysis. Please note the views in this report should not be attributed to these individuals or institutions.

Abertay University	St Mary's University, Twickenham
AECC University College	Solent University
Bangor University	University Campus of Football Business
Bishop Grosseteste University	University College Birmingham
Bournemouth University	University of Bath
Essex University	University of Bedfordshire
Hartpury University	University of Chichester
Leeds Trinity University	University of Exeter
Liverpool Hope University	University of Portsmouth
Liverpool John Moores University	University of South Wales
Loughborough University	University of Suffolk
Manchester Metropolitan University	University of Sunderland
Newman University	University of Winchester
Northumbria University	University of Worcester
Plymouth Marjon University	York St John University



Front cover image courtesy of Bangor University



Foreword

We are delighted that The Physiological Society and GuildHE have partnered with Emsi to commission an independent analysis of the contribution Sport and Exercise Science (SES) makes to the UK. Using standard methodologies and analyses, the study assesses the benefits of SES courses to local and national economies, focusing on the contributions of students, universities, and colleges working in the field. It analyses institutions of all sizes throughout the UK that offer SES courses, and points to some of the contributions that this important field makes to the wider UK economy.

The results show that SES courses added £3.9 billion in income to the UK economy, with average salaries for SES graduates at £21,100 per annum after six months of employment. The report also examines the social value of SES courses. Graduates and postgraduate researchers demonstrate critical thinking, attention to detail, interdisciplinary working and, in all four nations of the UK, are using these skills during and after their courses to benefit their local communities and the UK as a whole.

One vital component of SES courses is physiology, the science of the functions of living organisms. Physiological understanding is the foundation of advancements in sport training, performance and health; just as athletes and coaches seek to maximise performance and reduce injury, SES graduates are involved in disciplines as diverse as health education, research into the impact of exercise on physical and mental health, disease prevention, and post-operative outcomes.

SES is also a useful lens through which to recognise the value of diversity and inclusivity in science. The data kindly provided by institutions, supplementing national statistics from the Higher Education Statistics Agency, identifies SES as an area where diversity and inclusivity are both strong and are leading to positive outcomes. For example, case studies within the report highlight the contribution of SES courses in promoting women in sport and working with people from disadvantaged backgrounds.

The case studies also illustrate the impact and importance of SES knowledge exchange activities. Staff and students undertake work that benefits local communities and make crucial contributions to wider society in areas as diverse as flexibility therapy to adventure tourism.

This report is just the beginning. For both our organisations, it will form the bedrock of ongoing work within SES. Importantly, we hope that it will also serve as a useful tool for sport and exercise scientists and professionals in highlighting both the economic and social value of this field of research and study in the UK.

Bridget Lumb
President, The Physiological Society

David Llewellyn
Chair, GuildHE
Vice-Chancellor, Harper Adams University

Acknowledgements

Emsi gratefully acknowledges the support of all the Sport and Exercise Science focused universities and colleges in making this study possible. Special thanks also go to The Physiological Society and GuildHE for their input on this report, and Professor Mike Tipton, University of Portsmouth, and Professor Jamie McPhee, Manchester Metropolitan University, for their review and expertise. Any errors in the report are the responsibility of Emsi and not any of the mentioned institutions or individuals. To see full documentation of the study, please contact The Physiological Society or GuildHE.



Introduction

Sport and exercise science (SES), a varied set of disciplines involving the health and science of physical activity, is a hugely important part of the UK economy, with Sport England estimating that sport-related activity generates £20.3 billion per year for the English economy alone, supporting over 400,000 jobs.¹ SES plays a crucial role in this and the wider UK economy. SES includes, but is not limited to, physiology, biomechanics, psychology, strength and conditioning, sport development, and management. SES has as part of its core the study of how the human body works during exercise. Physiology – the science that aims to

understand the mechanisms of living – is a fundamental component of SES.

of exercise on a wide range of major physical and mental health conditions, including inactivity, obesity, diabetes, cancer, cardiac rehabilitation, and depression. This is one of the ways the exercise component of SES is intimately related to important health outcomes. Research in this area helps prevent and treat

*Sport and Exercise Science (SES) higher education provision provides an impact of **£3.9 billion** in added income to the UK economy.*

The “sport” aspect of SES includes the examination of sport performance, coaching and officiating, and the impact of sport on the nation. The “exercise” component of SES includes investigation of the positive and preventative impact

conditions and diseases, such as diabetes, that accrue significant direct costs to the National Health Service (NHS), as well as resulting in indirect costs to the UK economy, such as due to loss of productivity. For example, Type 2



Graduate impact CASE STUDY HIGHLIGHT

Community connected learning

York St John University



In Sport and Exercise Science, gaining practical experience is as important as studying theory in the classroom, but this can be challenging to arrange. To ensure students gain the opportunity to learn their skills practically, York St John University’s School of Sport places students in a variety of positions with community organisations. By volunteering their time with sports clubs, sport and exercise therapy clinics, and similar businesses, students build their skills and enhance their future employability. They also provide organisations access to resources they might not otherwise be able to afford. In the first semester of 2018, students provided 1,356 hours of experience time, and a further 980 were committed for the second semester, which represents a value of at least £13,782.

diabetes treatment costs the NHS around £8.8 billion every year, which is just under 9% of the annual NHS budget.²

Other widely transferable health-related work undertaken beneath the umbrella of SES include the study of healthy ageing; the production of occupational fitness and health standards; the investigation of the health-related benefits of different supplements; and the examination of the causes of sport-related deaths and injuries including soft tissue injuries, sudden cardiac death, and drowning. Thus, by its very nature, SES brings together researchers from across different specialties, universities, and colleges throughout the UK to undertake research into human activity and health.

The aim of the work presented in this report is to independently and objectively assess the economic value of SES to the UK.

About this report

This analysis of the economic value of SES higher education provision on the UK economy was undertaken by Emsi, an independent economic modelling company that provides economic impact studies and labour market data to universities and institutions. The work was carried out on behalf of The Physiological Society, the largest network of physiologists in Europe, and GuildHE, one of the UK's recognised representative bodies for higher education.

The study focuses on the economic impact of SES courses, in terms of added income to the UK economy and jobs supported. It builds on information generously provided by institutions representing over a quarter of a million students from across the UK. The report features case studies from a diverse range of universities and colleges, large and small, demonstrating the wider benefits for students and

graduates, the national economy, and wider society.

This report is aimed at students considering SES courses, universities and colleges that are creating or expanding SES departments, and policymakers responsible for funding and supporting these endeavours. We are enormously grateful to those institutions that have taken the time to share case studies recognising the human, as well as financial, impact that their SES students, practitioners, and researchers have had on local and national economies.

This document is a short report summarising the key findings from the study. A link to the full report can be found on the websites of both The Physiological Society and GuildHE.

1 See www.sportengland.org/research/benefits-of-sport/economic-value-of-sport/

2 See www.gov.uk/government/publications/health-matters-preventing-type-2-diabetes/health-matters-preventing-type-2-diabetes

Glossary of terms

Graduate impact Graduate impact refers to the SES graduates' higher wages, increased productivity, and associated multiplier effects in Academic Year (AY) 2016-17. This is an annual impact.

Multiplier effects Multiplier effects refer to the additional income and jobs that are created due to the impacts of SES graduates. For example, as an SES graduate earns more money, they create additional demand for goods and services across the wider economy due to their increased spending.

Social benefits Social benefits, also referred to as benefits to society, are benefits accruing to the public purse and private UK citizens over time as a result of graduates receiving an SES education. They are measured in

terms of higher earnings, added tax revenues, social savings, and public purse savings.

Present value Present value refers to expressing projected future revenues and costs in today's terms. In other words, £1 today is not worth the same as £1 five years from now.

Benefit-cost ratio Dividing the benefits by costs yields the benefit-cost ratio. It demonstrates how many pounds are returned in increased earnings for each £1 invested.

Rate of return The rate of return is the annual percentage return to SES graduates in terms of increased earnings over their career.

Methodology

Data and assumptions used in the study are based on several sources, including survey data from participating universities and colleges; the most recent student completions, earnings, and demographic data from the Higher Education Statistics Agency; industry and employment data from Nomis official labour market statistics, and Emsi's input-output model. The study applies a conservative methodology and follows standard practice using only the most recognised indicators of economic impact.

The following two analyses are presented: 1) national economic impact analysis, measured in terms of graduate impact, and 2) benefits analysis to students, society, and the public purse. High-level methodology and results for both analyses are described more fully in each section later in this report. Student data reflect AY 2016-17, the most recent year for which full data were available. Please note a full breakdown of the methodology can be found in the long form report which can be accessed via The Physiological Society (www.physoc.org) or GuildHE (www.guildhe.ac.uk) websites.



Benefits to students CASE STUDY HIGHLIGHT

Disability sport

University of Worcester



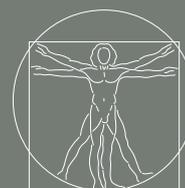
Image courtesy of the University of Worcester

“The benefits of sport are for everyone at the University of Worcester, where ‘The Worcester Way’ is to take the lead in disability sport. This includes establishing the International Centre for Inclusive Sport, which received national acclaim in 2019’s Guardian University Awards. The Centre pursues a global and inclusive perspective in developing university education in disability sport. We are proud to have started the world’s first degree programme

in disability sport education, and we ensure the University’s arena is properly inclusive. In 2018 more than 330 students took courses related to disability sport, and the University’s graduates are teachers, coaches, and volunteers in disability sport programmes across the UK and abroad. The University offers global inclusive teacher programmes as far afield as China and Japan and has published a handbook on best practices called ‘The Worcester Way.’”



Mick Donovan, Deputy Pro Vice Chancellor & Head of School of Sport & Exercise Science



What is physiology?

As the science of life, physiology underpins much of Sport and Exercise Science. Physiology is the branch of biology that aims to understand the mechanisms of living, from the atomic basis of cell function to the integrated behaviour of the whole body and the influence of the external environment. Research in physiology helps us to understand how the body works; it also helps us to determine what goes wrong in disease, facilitating the discovery of new treatments.



Benefits to students CASE STUDY HIGHLIGHT

Alumnus and former professional footballer finds success after football

Loughborough University



Image courtesy of Robbie Simpson

“Loughborough is well renowned for being a world-leading sporting university in the country and as I was playing semi-professional football at the time, I really wanted to go to an outstanding sporting institution. I obviously had a passion for sport, hence wanting to study Sport Science. The whole process I went through inspired me in the foundation of Life After Professional Sport (LAPS). The aim of LAPS is to help sport professionals and elite athletes plan for and transition into new fulfilling careers post their competing days. We offer guidance and advice on CV writing, interview technique, how to network and promote entrepreneurship.

Being a professional footballer there were points in my career I thought I may have to retire and look for a new career. However, there was no platform for a former footballer to turn to for help and support with this transition. I quickly realised through speaking with other Loughborough friends in different sports, that this is an issue in most professional sports.

We have information on over 200 job roles, including video interviews with over 75 former elite athletes who have transitioned into new careers explaining their transition and how sport has helped them. We also have thousands of job opportunities advertised on our platform ready for our members to apply for.”



*Robbie Simpson, Founder of Life After Professional Sport (LAPS) –
Loughborough University Alumnus*



Benefits to society CASE STUDY HIGHLIGHT

Research to optimise Paralympic swimming performances

Manchester Metropolitan University



Image courtesy of Manchester Metropolitan University

In tandem with Australia’s University of the Sunshine Coast, researchers at Manchester Metropolitan University have used new testing methods and data to better understand impairments affecting para-swimming competitors. By quantifying how different kinds of conditions and impairments affect technique, efficiency, drag, and power in competitive swimming, their research has created better definitions for the competitive classes in para-swimming. Their proposed revisions, including the use of 3D kinematic data and other forms of testing, offer an evidence-based classification currently being tested and evaluated by the International Paralympic Committee. The new system using quantifiable data improves upon the subjective assessments currently used. It is expected to be introduced after the 2020 Tokyo Paralympic Games.



Study highlights



GRADUATE IMPACT



Approximately 96%

of SES students stay in the UK after graduating. Their enhanced skills and abilities bolster the output of employers, leading to higher income and a more robust economy.



The accumulation of SES students currently employed in the workforce amounts to

£3.9 billion

in added income in the UK's economy each year. This is an annual impact and is equivalent to supporting over

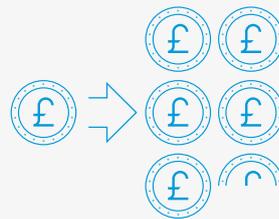
147,300 jobs





BENEFITS TO STUDENTS

Costs incurred by Academic Year (AY) 2016-17 SES student include **£304.4 million** for tuition fees and books and supplies, and **£395.4 million** in forgone earnings had they been working instead of learning. In return, they will receive **£3.8 billion** in increased earnings (present value) over their working lives. For example, a Level 6 graduate (equivalent to a bachelor's degree) will earn **£667,000** (not adjusted for inflation) more in earnings across their working life compared to if they had a Level 3 education (equivalent to A levels in England, Wales, and Northern Ireland and Highers/Advanced Highers in Scotland).



Overall, every £1 that students invest in their education in SES yields **£5.50** in higher future wages.



SES graduates will enjoy an annual rate of return of **20.9%** compared to their previous level of education.



BENEFITS TO SOCIETY & PUBLIC PURSE

The social and public purse benefits to the UK from AY 2016-17 SES students equal a present value of

£7.8 billion

These benefits include

£6.15 billion

in income from higher student lifetime earnings and increased business output and

£1.35 billion

in added tax revenues.



Additionally, the public purse and the rest of UK society will experience savings as better educated students lead improved lifestyles. This leads to a present value of

£267.1 million

in social and public purse savings related to health, crime, and unemployment savings.



TOP SPORT & EXERCISE SCIENCE OCCUPATIONS



Around 71%

of AY 2016-17 graduates are employed in SES or related occupations six months after graduation.

SES graduates work in a range of exciting and fulfilling careers that put their education into practice. Some graduates focus their career on the science of sport and exercise by working as sport scientists and physiotherapists, while other graduates work in occupations such as sport instructors, secondary education professionals, and coaches.



Benefits to society CASE STUDY HIGHLIGHT

Patients benefit from student-led activities

Plymouth Marjon University



Non-communicable diseases—such as cardiovascular diseases, cancers, chronic respiratory diseases, and diabetes—are the world’s biggest killers. Many of these deaths can be prevented by tackling risk factors such as smoking, unhealthy diet, physical inactivity, and the harmful use of alcohol.*

In collaboration with the NHS, Live Well Southwest, Sentinel Health Care, and many other community partners, students at Plymouth Marjon University support ongoing work providing lifestyle physical activity programmes to patients with a variety of non-communicable conditions. Students lead activities such as swimming, flexibility therapy, and aerobic fitness, as well as providing advice to patients on lifestyle factors such as diet and hygiene. This helps to improve the quality of life for patients with

fibromyalgia, leg ulcers, back pain, cancer, and chronic pain. Over the 12 years the programmes have been offered thousands of patients have participated, seeing results such as 80% acceleration in leg ulcer healing and significant quality of life improvements for cancer and back pain patients.

* See www.who.int/nmh/events/ncd_action_plan/en/



Benefits to the public purse CASE STUDY HIGHLIGHT

Studies on immersion physiology improve the prevention, search, rescue and treatment of immersion casualties

University of Portsmouth



Image courtesy of the University of Portsmouth

The University of Portsmouth research in cold water immersion physiology is the foundation of the search, rescue, and treatment of a large number of organisations worldwide. For example, research led by Professor Mike Tipton, Dr Heather Massey, Dr Clare Eglin, and Dr Martin Barwood (now Leeds Trinity University) has played a key role in the development of new approaches to drowning prevention and water safety education. Drowning is a significant risk for elite athletes and a leading cause of accidental death in the UK, particularly in young people, causing approximately 400 deaths per year. Aside from the human cost, drowning and related incidents cost over £63 million per year, costs that can be prevented by safety measures and education. To that end, Portsmouth’s research has underpinned the Royal National Lifeboat Institution’s “Respect the Water”

National Water Safety Campaign, informing its “know about Cold Shock” and “Float First” approach to cold-water survival. This campaign has been cited by a number of drowning-incident survivors, without solicitation, as the reason they survived an immersion.



Graduate impact CASE STUDY HIGHLIGHT

Students educate local communities on health and exercise

Abertay University



Image courtesy of Abertay University

Abertay University offers its sport students a variety of opportunities to put their learning to use by taking sustained placements as part of their second, third, and fourth years of their degree programmes. Dundee's high levels of economic deprivation lead to lower life expectancies and high rates of premature death. To assist this situation, the more than 20 hours per year of coaching work engaged in by Abertay students, through agencies like Active Schools, help Dundee residents make beneficial choices about health and exercise that have been linked to economic impact for the community. The programme also provides students with valuable and credible experience, with around 75% of former students surveyed indicating they are in graduate sport occupations, with a number starting up their own businesses.



Benefits to society CASE STUDY HIGHLIGHT

Identifying the physical and health benefits of tennis

Liverpool Hope University



Image courtesy of Liverpool Hope University

Recently, an interdisciplinary team of researchers from Liverpool Hope University led by Professor Omid Khaiyat have received national attention for their study of the various benefits of playing tennis. The team evaluated a wide range of variables in cardio-metabolic, musculoskeletal, nutritional and psychosocial factors, variables as diverse as grip strength, depression, and haemoglobin levels. Compared with similarly active individuals who do not play tennis, the researchers found tennis players have higher musculoskeletal function and lower cardio-metabolic risk profiles. These findings have been gathered into two articles for future peer-reviewed publication, featured on media outlets such as BBC Breakfast, BBC Northwest, and Liverpool TV, as well as shared with various community groups and organisations to help in advocacy for tennis and exercise in general.



Results

Graduate impact



The education and training Sport and Exercise Science (SES) provides for students has a

large impact on the UK economy. Students who have studied SES are entering the workforce with greater knowledge and skills, including numeracy and statistical analysis, scientific evidence-based

reasoning, and report writing. All of these skills supplement the discipline-specific knowledge. After graduation, 96% of SES students stay in the UK and are more productive compared with not attending university because of the quality education they received.

Over time, the skills of former SES students accumulate, steadily increasing the training level and experience of the UK's workforce. As the skills embodied by former



students build up, their higher earnings generate additional rounds of consumer spending, while new and enhanced skills and training translate into increased business output and higher property income, causing still more consumer purchases and additional spending. The sum of all these direct and multiplier indirect effects comprises the total impact of the students' added skills in the UK economy.

As a result of their SES education, students receive higher earnings and increase the productivity of the businesses that employ them. In AY 2016-17, SES graduates generated £3.9 billion in added income for the national economy. For context, this is equivalent to supporting over 147,300 jobs in the UK, or approximately 0.3% of the total gross domestic product (GDP) of the UK in AY 2016-17.

In AY 2016-17, SES generated the most impact in the sport, tourism, leisure, and culture industry sector – creating just under £1 billion in added income, or 26% of the total impact of SES graduates (see Figure 1).³ These are impacts that would not have been generated without the presence of SES in the UK.

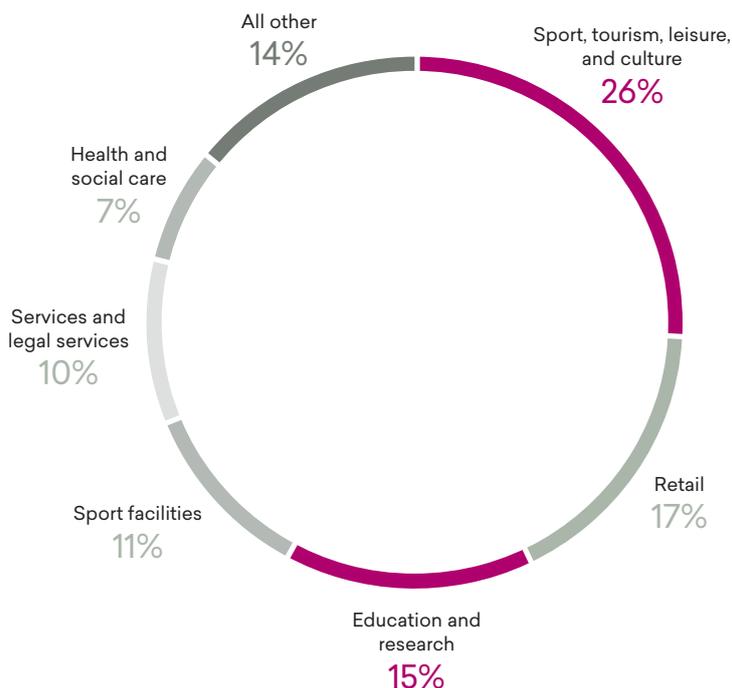
³ For the full breakdown of industries, please see Appendix 4 of the full report.



TABLE 1: IMPACT CREATED BY SES IN AY 2016-17



FIGURE 1: TOP SES STUDENT EMPLOYERS BY TOTAL ADDED INCOME



Benefits to students



In AY 2016-17, around 51,800 students studied SES in the

UK. In order to attend universities or colleges, the students paid for tuition (except for 'home' students at Scottish institutions), fees, books, and supplies. Additionally, students did not earn money they would have otherwise earned had they been working instead of attending university. The total investment made by SES students in AY 2016-17 amounted to £699.7 million, equal to £304.3 million in out-of-pocket expenses and £395.4 million in delayed earnings.

In return for their investment, SES students will receive a stream of higher future earnings that will continue to grow throughout their working lives. For example, the average SES graduate from AY 2016-17 will gain employment with an annual salary of £21,100 six months after leaving with a SES qualification. These earnings of an SES graduate are higher than if they had not received an SES qualification. For example, a Level 6 graduate (equivalent to a bachelor's degree) will earn £667,000 (not adjusted for inflation) more in earnings across their working life compared to if they had a Level 3 education

(equivalent to A levels in England, Wales, and Northern Ireland and Highers/Advanced Highers in Scotland). Comparing the increase in earnings across all AY 2016-17 SES graduates yields £3.8 billion in higher future earnings over their working lives as a result of their education and training in SES.

Subtracting the £699.7 million in costs from the £3.8 billion in benefits yields £3.1 billion in net benefits, also called net present value. The students' benefit-cost ratio is 5.5. In other words, for every pound students invest in SES, in the form of out-of-pocket expenses and forgone time



Benefits to students CASE STUDY HIGHLIGHT

Research identifies physical demands in occupations

University of Chichester



Image courtesy of the University of Chichester

The University of Chichester's Occupational Performance Research Group (OPRG) develops evidence-based solutions to enhance the health and performance of personnel working in physically demanding occupations. This research is founded in physiology and typically involves quantifying the physical demands of a task which are then used to inform applied evidenced-based solutions which can be implemented by organisations.

Research that has been published by the OPRG includes the impact of nutrition on the recovery of muscle function, the application of mathematical models to estimate load carriage ability, and the development of gender-free, role-related physical employment

standards for the UK's military and emergency services. The OPRG's research ranges from quantifying the physical demands of the military and emergency service personnel operating in extreme environments to identifying genes that may be linked with the responses to physical training. The OPRG team is led by Professor Steve Myers and Dr Sam Blacker and comprises 12 researchers and six PhD students from Sport and Exercise Sciences backgrounds with specialties that include physiology, dance science, nutrition, biochemistry, biomechanics, and statistics.

and money, they will receive a cumulative value of £5.50 in higher future earnings. The students' investment in SES has an average annual internal rate of return of 20.9%, which is an impressive rate of return compared to other types of investments, such as the average 8.8% annual return on the UK stock market.⁴

4 FTSE 100 2009-2018 (www.ftse.com/Analytics/Factsheets/Home/DownloadSingleIssue?issueName=UKX&IsManual=False)

TABLE 2: STUDENT PERSPECTIVE

 Lifetime higher earnings, Level 6 graduate

£667,000

 Net present value

£3.1 billion

 Students gain for every £1 invested

£5.50

 Rate of return

20.9%



Benefits to students CASE STUDY HIGHLIGHT

Rugby player brings her studies from the classroom to the pitch

Hartpury University



Image courtesy of Hartpury University

Hannah Jones, who plays for Gloucester and Wales, came to Hartpury University to pursue an education in Sports Therapy. Hannah chose Hartpury because of the connection between theoretical and practical education:

“I’ve always had an interest in issues like injury and how athletes are then treated and rehabilitated so it’s great to be able to study at a place like Hartpury University where there are lots of opportunities to gain practical experience on campus.”

She also says she’s seen a significant improvement in her on-pitch performance, mentally and physically, because of the personalised coaching and conditioning but also because of the increased understanding of her own biomechanics and physical needs that her classwork has provided.

“I’m a practical person and being able to get hands on with the course is really useful. From therapy practicals to sport massages, I’ve been able to put what I learn in lectures to the test in a range of situations.”

Benefits to society & public purse



Universities and colleges with SES courses are providing social and economic, as well as academic, benefit. They aim to improve the lives of young people and adults by expanding their knowledge, increasing their employability and raising their individual potential. They generate shared wealth in the UK economy, including to the public purse, through the higher earnings of students and the increased output of businesses. Further, they help tackle social problems such as crime, unemployment, and poor lifestyle habits by

positively influencing the health and wellbeing of their students. As demonstrated in the case studies, students and staff pass this learning on to their communities in terms of research, knowledge exchange, and promoting healthier lifestyles to UK citizens. This section discusses these benefits in terms of higher earnings and subsequent increased tax receipts, as well as social and public purse savings.

HIGHER EARNINGS & INCREASED TAX RECEIPTS



As discussed under the benefits to students, SES students earn more because of the skills and

qualifications they acquire while attending university. Business output is increased because the enhanced skills of the students boost wider productivity. This in turn raises profits and other business property income throughout the national economy. Together, increases in earnings and business output stimulate corresponding increases in value added to the UK economy, making society in the UK more prosperous.

Furthermore, the tax base is expanded since as SES students earn more they make higher income tax payments and National Insurance contributions. The portion of the higher earnings



Benefits to society CASE STUDY HIGHLIGHT

Exercise interventions in people living with and beyond cancer

Northumbria University



Image courtesy of Northumbria University

Research at Northumbria University led by Professor John Saxton, in collaboration with clinical colleagues based in Newcastle, Norwich, and Sheffield, is investigating the important role that structured exercise programmes can play in improving the quality and duration of cancer survivorship. Cancers of the breast, prostate, and colon are amongst the most common in western societies and although survival rates are increasing, the physiological impact of these cancers and their treatments is long-lasting.

Current research is focused on (i) the role of exercise training, in conjunction with dietary advice, in reversing adverse body composition changes in hormone-positive breast cancer patients, (ii) exercise interventions for ameliorating the side-effects of prostate cancer and its treatments, and (iii) how exercise programmes prior to surgery can be used to improve fitness and treatment outcomes in colorectal cancer patients. Macmillan Cancer Support predicts that support for people with cancer beyond their initial treatment will cost the NHS at least £1.4 billion every year by 2020. This research is closely aligned with NHS treatment pathways and is helping to build a solid evidence-base to support the use of exercise in the clinical and self-management of people living with and beyond cancer.



Sport science programme uses data to aid the Exeter Chiefs

University of Exeter



Image courtesy of the University of Exeter

“At the University of Exeter, the combination of research, technology, and real-world evidence in our sport medicine programme has created a strong relationship between us and the Exeter Chiefs rugby team. In order to support performance improvements and greater individual and team outcomes, University researchers use data from a variety of measurements to qualitatively establish baseline data for each athlete’s biomechanical measures, such as movement, loading, and strength. We use these data to inform rehabilitation programmes in the event of injury, to identify players at specific risk, and to improve overall training and conditioning. This evidence-base has proven very useful in preventing and managing injuries.”



Dr Sharon Dixon,
Associate Professor in Biomechanics

that students spend also leads to higher value added tax (VAT) receipts. Likewise, as employers increase their output and make more purchases for supplies and services, they benefit the public purse through their higher corporation tax and VAT payments.

The higher earnings of students and businesses, along with broader increases in income across the UK arising from these higher earnings, amounts to a present value of £6.15 billion. Due to these higher earnings, the public purse will see an additional present value of £1.35 billion in added tax revenues. Together, this means society and the public purse will see a total present value of £7.5 billion in higher earnings and increased tax revenues over the course of the AY 2016-17 SES students’ working lives.

SOCIAL & PUBLIC PURSE SAVINGS



SES’s social value also consists of the savings that accrue to society and the public purse through the improved lifestyles of students. Higher levels of education are statistically correlated with a variety of life changes that generate social savings in three main categories: 1) health, 2) crime, and 3) unemployment. By combining data sets that relate learning to improved social behaviour, we can quantify how education contributes to the lowering of social and public purse costs and ultimately improves quality of life.

Health service savings include avoided medical costs associated with smoking, obesity, and mental

ill-health. While the public purse primarily benefits from reduced NHS expenditures, the savings to the rest of society are multi-faceted. For example, individuals will see reduced private healthcare costs, spend less time away from work, and live healthier lives. Savings strictly to the public purse amount to a present value of £21.9 million, while savings to the rest of society are equal to a present value of £66.9 million. Together, the AY 2016-17 SES students will save the public purse and the rest of society a present value of £88.8 million over their working lives from healthcare and related costs. A strongly emerging theme is the amount of health-related research being undertaken with SES departments. Much of the research undertaken within SES has health benefits and thereby reduces NHS costs in



Benefits to the public purse CASE STUDY HIGHLIGHT

Research in biomechanics helps older adults to avoid stair falls

Liverpool John Moores University



Image courtesy of Liverpool John Moores University

“Stair falls are the leading cause of accidental death in older people. Falls on domestic stairs cause over 350,000 injuries to older UK residents each year, with personal consequences such as loss of independence, hospitalisation, and even death, not to mention £2 billion in demands on the NHS.

In hopes of understanding the mechanisms underpinning stair falls and developing the first stair fall screening tool for

older people, we run Research to Improve Stair Climbing Safety (RISCS). This is a multidisciplinary group with experience on empirical research, data analytics, community health provision and policy making, who are supported by both external and institutional funding to investigate how stair safety in old age can be improved.

The RISCS group uses state-of-the-art stair gait biomechanics and gaze behaviour measurements to investigate the complex relation of functional capabilities such as strength, balance, and cognitive status; environmental design factors like step dimensions and illumination; and behaviour elements such as knowing proper stepping technique and where to look and when.

Over the last ten years our ongoing research has been disseminated to scientific meetings, and it hopes to achieve a positive societal impact in the near future by providing means and tools, applicable at the community level, to minimise stair fall risk for older people.”



*Professor Costis Maganaris,
School of Sport & Exercise Sciences*

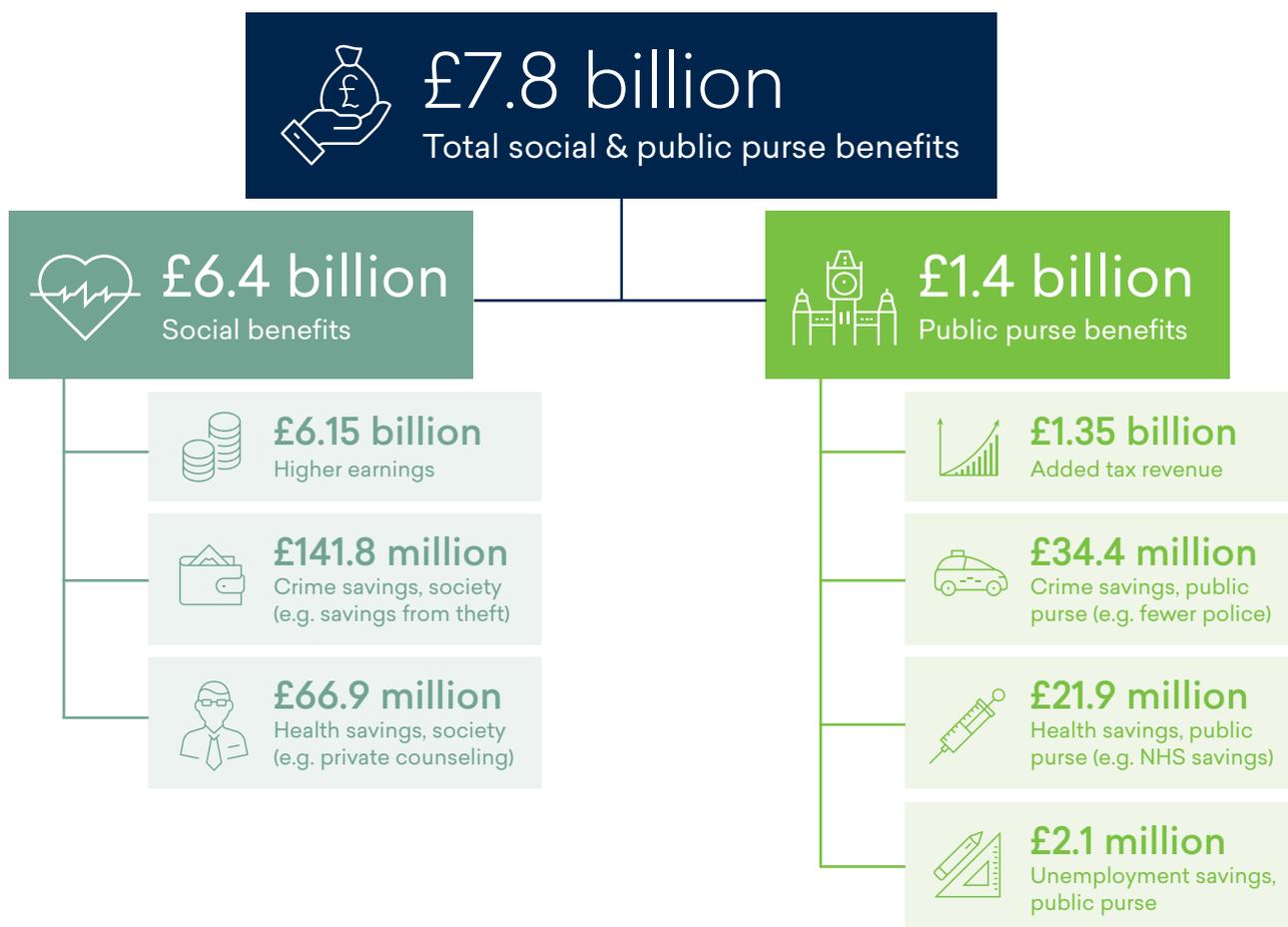
areas such as exercise for people receiving treatment for cancer and healthy ageing.

Crime savings consist of reduced security expenditure and insurance administration, lower victim costs, and reduced criminal justice system expenditures. While the public purse will benefit from reduced costs on security expenditures, citizens across the UK will benefit from reduced costs of crime, such as damage or theft of property. Savings accruing to the public purse amount to a present value of £34.4 million while savings to the rest of society equal a present value of £141.8 million. Together, the AY 2016-17 SES students will save the public purse and the rest of society a present value of £176.2 million over their working lives from crime related costs.

Unemployment savings comprise the reduced demand for unemployment benefits, which is a direct saving to the public purse. The public purse will realise savings amounting to a present value of £2.1 million due to lower unemployment over the course of the AY 2016-17 SES students' working lives.

Altogether, the social and public purse savings of AY 2016-17 SES students, accumulated across their working lives, equal a present value of £267.1 million related to health, crime, and unemployment benefits in the UK. Figure 2 demonstrates the relationship between benefits to society and benefits to the public purse.

FIGURE 2: PRESENT VALUE BENEFITS TO SOCIETY AND THE PUBLIC PURSE



Benefits to the public purse CASE STUDY HIGHLIGHT

Reducing the risk of secondary stroke through physical activity

University of Winchester



In partnership with Hampshire Hospitals NHS Foundation Trust and Hobbs Rehabilitation, the University of Winchester recently launched the HELP (Health Enhancing Lifestyle Programme) Hampshire Stroke Clinic, a community-based and low-cost programme for those living with the effects of stroke. By providing exercise classes and lifestyle advice sessions from experts and students at the University, the Clinic will increase physical activity for stroke patients, thereby reducing their risk of secondary stroke while improving their physical and social quality of life and reducing the burden on the NHS. The newly-launched programme reports it has already seen more applicants than anticipated, boding well for its effectiveness in reaching a large number of people living with stroke in the local area.



Graduate impact CASE STUDY HIGHLIGHT

Alumni support adventure tourism in Wales

Bangor University



Image courtesy of Bangor University

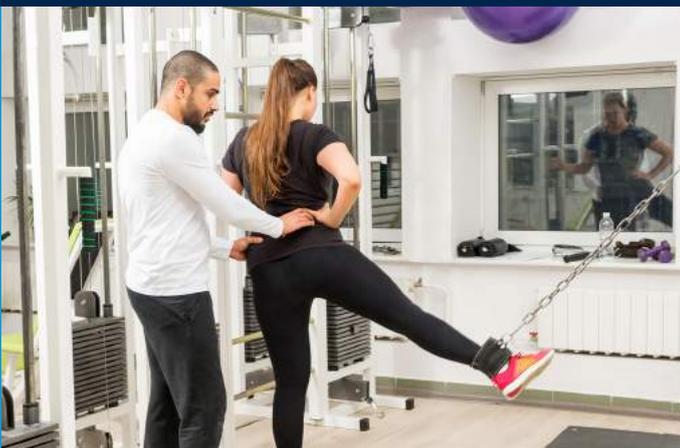
For 40 years, Bangor University's School of Sport, Health, and Exercise Science has produced research and students whose skills are a key part of Wales' growing adventure tourism economy. The School's postgraduate researchers provide insights to help businesses like Surf Snowdonia, Outlook Expeditions, and Snowdonia Watersports innovate in their offerings. The School's alumni use their insights in sport performance to provide training and advice to adventure tourism trainers and instructors. Alumni have also directly founded a variety of businesses and services. Approximately 30% of the School's 4,000+ alumni work locally, many directly in adventure tourism, helping create an industry that attracts tourism and investment to Wales and has helped Wales be named one of Lonely Planet's top 10 regions of the world to visit in 2017.



Benefits to students CASE STUDY HIGHLIGHT

Gaining real-world experience from providing rehabilitation services

AECC University College

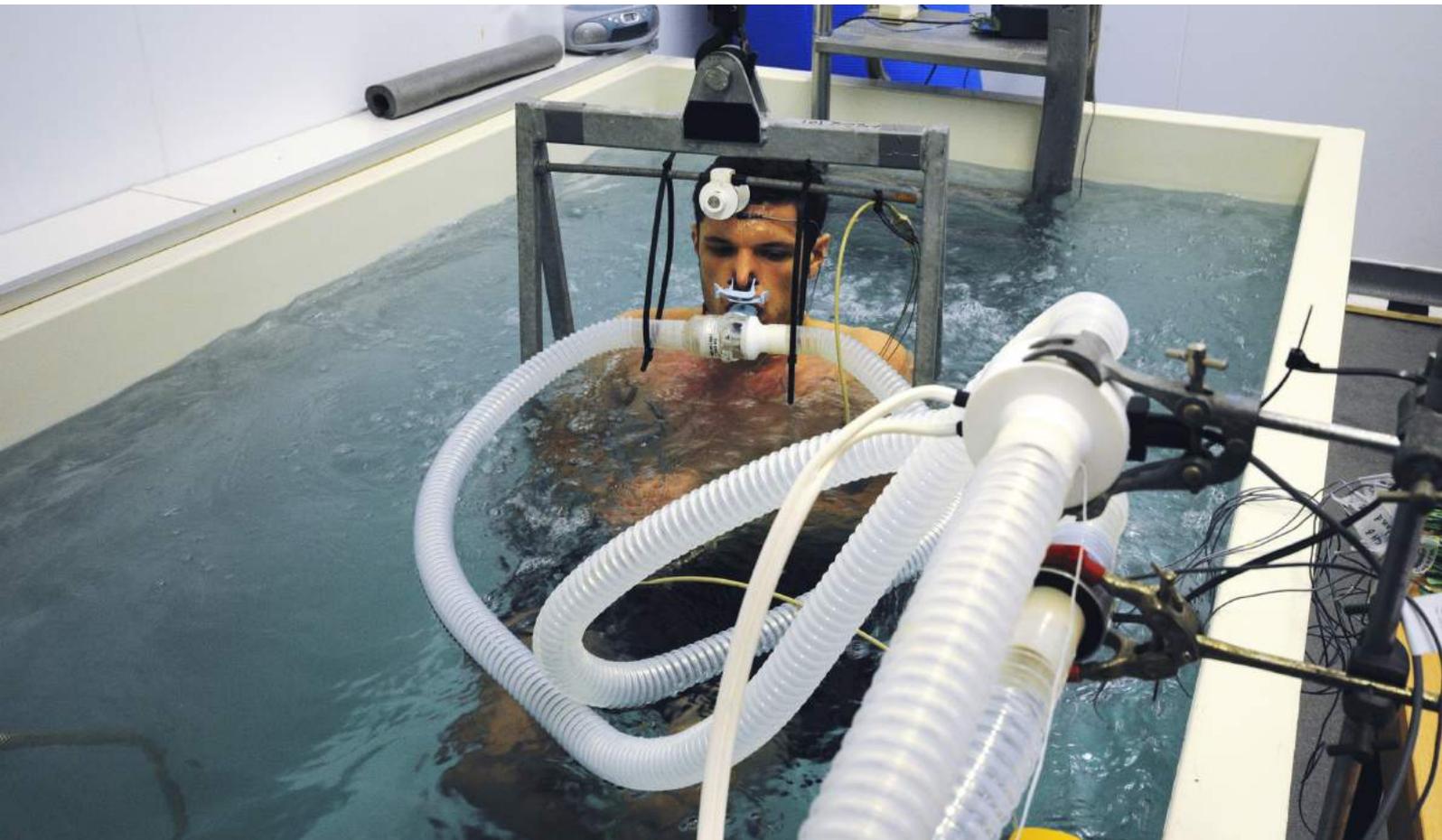


One of many ways AECC University College, a specialist health sciences institution, pursues its goal of "transforming lives through health science" is the support its Clinical Exercise and Rehabilitation students provide to the onsite physical activity centre. By helping with the centre's work, like physical activity programmes such as active walking and dance, students obtain practical experience working with patients who benefit from such activity. Under the supervision of scheme counsellors and activity leads, students gain the experience in delivering real programmes with real patients, while helping community members regain movement and independence.



Conclusion

The results of this study demonstrate that SES higher education provision found within universities and colleges large and small creates significant value from multiple perspectives. Overall, the accumulation of SES graduates in the workforce provides an impact of **£3.9 billion** in added income to the UK economy every year. In addition, the class of AY 2016-17 will contribute a present value **£7.8 billion** to society over the course of their working lives, including **£1.3 billion** in added tax revenues and **£267.1 million** in social savings across healthcare, unemployment benefits, and crime reduction. SES courses are also economically beneficial to the individual student. Every £1 a student spends on their SES course yields **£5.50** in higher future wages, an annual rate of return of **20.9%** compared to not having studied an SES course.



SES courses delivered in universities and colleges are academically rigorous; as a result, SES offers a wealth of career opportunities. Research careers in SES provide the evidence-base of the impact of physical activity on people's health and wellbeing, as well as exploring ways of enhancing performance for elite athletes. They include a focus on the relationship

businesses by increasing consumer spending and supports the development of new products and measures to drive excellence in sectors as varied as elite sport, rehabilitation, disease prevention, education, finance, recruitment, and public awareness campaigns. SES provision enriches the lives of students by raising their lifetime earnings and helping them achieve their individual

potential. It also benefits society as a whole by creating a more prosperous economy and generating a variety of savings through the improved lifestyles of students and the communities in which they engage.

As a result of this independent economic assessment, it is concluded that SES delivers significant value to students and society, in terms of research, teaching, and knowledge exchange across a wide range of disciplines. This should be recognised and supported by research, innovation, and teaching-related funding groups.

*SES courses develop **dynamic and engaged graduates** that are committed to addressing some of the major challenges facing society.*

between exercise and the human body from the cellular level to the body as a whole. These are key areas of scientific research and demonstrate the vital role of physiology within interdisciplinary teams in improving lives and the health of the nation. SES is a fast-moving, exciting field, with sport scientists breaking new ground through advances in a wide range of areas including physical and mental health and wellbeing, medicine, and technology.

More broadly, SES courses also develop dynamic and engaged graduates that are committed to addressing some of the major challenges facing society and are a critical part of a steady flow of qualified, trained workers to the workforce. SES benefits



Image courtesy of the University of Worcester

Partners



As the largest network of physiologists in Europe, with academic journals of global reach, The Physiological Society continues a 140 year tradition of being at the forefront of the life sciences. We support the advancement of physiology by promoting collaboration between physiologists around the world, and research that will contribute to a better understanding of the complex functions of living organisms. Research in physiology helps us to understand how the body works; it also helps us to determine what goes wrong in disease, facilitating the discovery of new treatments. The Society is therefore committed to ensuring that the full potential of SES courses in the UK is realised and that departments have the opportunity to showcase their work.

For more information, see: www.physoc.org or @ThePhySoc



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Our members prepare students for success in specialist careers, such as SES. They offer living and learning in small academic communities and focus on delivering practical research for real-world impact.

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