Institution: Loughborough University

Unit of Assessment: C26 Sport and Exercise Sciences, Leisure and Tourism

a. Context

The Unit is within the multi-disciplinary School of Sport, Exercise and Health Sciences. It is acknowledged to be the country's leading academic and performance centre for sport and exercise with an established track record of delivering top quality research impact in sports performance, lifestyle and management. The Unit is based within the "University of the Year for Sport" (Times Good University Guide 2014). This tradition of sporting excellence attracts staff with an unusually strong interest in, and commitment to, sporting excellence, an enthusiasm that feeds the research endeavour of the Unit. The Unit received the top ranking in the research assessments of 1996, 2001, and 2008. The campus has the country's largest concentration of world-class training facilities (57 acres of playing fields) across a wide range of sports and with more than 3,000 sq. m of research laboratory space in the Unit alone. These facilities provide an unrivalled environment in which we can research sporting performance, coaching, organisation, psychology, physiology, biomechanics, nutrition, ethics, injury, rehabilitation and equipment. Loughborough is the home of several national sport organisations including GB Swimming, the England and Wales Cricket Board (ECB), British Gymnastics, the English Federation of Disability Sport and the Youth Sport Trust. In a symbiotic relationship, these bodies capitalise on our research capability but also act as the vector by which our research has impact at the national and international level. Loughborough alumni go on achieve the highest standing in sports governance (e.g. Lord Coe, Sir Clive Woodward), sports commentary (e.g. Paula Radcliffe, Bob Wilson) and politics (e.g. Dame Tanni Grey-Thompson). They are emissaries for our research capability. This profile attracts major sports-related businesses (e.g. PepsiCo) to commission research from the Unit. Sport research excellence, together with unrivalled facilities, has enabled our research to extend impact into areas of health and wellbeing. Loughborough has been at the forefront of research into exercise and obesity, eating disorders, and the empowerment of women and those with disabilities. This work not only benefits the individuals that participate in the research but also professionals in health care, social services, teaching and government. We work hard to impact the general public to increase awareness of the importance of physical activity for health across the lifespan – an objective which will be substantially enhanced through the operation of the National Centre for Sport and Exercise Medicine.

The Unit's multidisciplinarity means that research impacts a wide range of **non-academic user groups** including: national and international governmental organisations; national and international non-profit sport organisations; commercial businesses; high performance athletes, including athletes with disabilities; coaches and other support staff; and national and international community health and physical activity professionals and organisations. We work with these user groups at a variety of levels, including strategic and organisational, individual and teams of practitioners, athletes and the general public. An example of the reach of the Unit since 2008 is that outcomes of research (funded by the British Heart Foundation; BHF) reached not only a broad range of professionals working in physical activity promotion, but also 6,000 individuals who attended training courses that utilised material generated by the Unit, 800,000 who visited the BHF websites to download resources and information and 575,000 who received printed resources – a total of over 1.4 million adults, young people and children impacted by the research. The work of the Unit has also been significant in driving major changes in sporting practice for example, the REF 3b case studies on twisting somersaults (Yeadon), reducing injuries in fast bowling (King) and, the use of probiotics by GB athletes and the impact on immune response to exercise (Gleeson). Similarly, our research into sport governance led to policy changes in the International Olympic Committee and the Japan Anti-Doping Agency (Henry and Houlihan). Another example of impact, but one not presented as a case study, is the decision by the Singapore Ministry of Education to substantially reduce the formal national fitness testing of school children (Harris and Cale).

The **main types of impact** include:

a) Changes in policy, management and organisation of sports organisations.
b) Increasing public awareness of the importance of increased physical activity and the risks of

sedentary behaviour for health across the lifespan.
c) Influencing government policy
d) Stimulation of practitioner debate; influence on professional practice and training/CPD.
e) Performance at the team and individual levels across a variety of sports and end-user groups varying in age, gender, level of ability and level of disability

This breadth of impact reflects the **range of research activity in the Unit** in the areas of sport policy, physical activity and health, nutrition, physiology, coaching, adapted physical activity, and biomechanics. Our work is driven not only by intense intellectual curiosity, but also by the need to achieve solutions to a range of social, economic, and industrial problems.

b. Approach to impact

Our approach to impact is underpinned by the strength of our staff interaction with end users. The majority of returned staff have been involved in sport throughout their lives, at all levels including international and Olympic performance, and maintain contact with leading sport organisations. In addition, our long-standing reputation as the UK's leading "Sport University" means that we are regularly and frequently approached to provide advice and practical research assistance in a variety of sports science scenarios. These opportunities, and our utilisation of patient and public involvement (PPI) strategies and knowledge transfer partnerships (e.g. PepsiCo – Walkers Crisps), provide us with tangible impact pathways that have direct influence on the general public. Our overriding approach to impact is to encourage and facilitate this interaction between the Unit and sports organisations, groups, policy makers and individuals throughout the UK, Europe and globally.

The Unit engages with non-academic users, beneficiaries, and audiences in a number of ways:

1. Through **knowledge transfer** activities, which allow training of our non-academic user groups and internal communication within an organisation. Examples include Houlihan and the Japanese Anti-Doping Agency; Cameron with the Football Association; Meyer with British Gymnastics, British Athletics, British Triathlon and EIS.
2. Through **workshops/meetings and sandpits with external organisations (together with associated funding).** These provide collaborative and levering opportunities to access funding (e.g., National Lottery). Examples include our fast bowling research work with ECB coaches.
3. Through significant involvement in locally and nationally hosted **public engagement events** that highlight the impact and relevance of our research to end-users. For example, colleagues across the Unit (most recently September 2013) played a central role in the Natural History Museum's Science Uncovered event where researchers presented projects on high intensity training, lab-grown muscles, hopping for health, the impact of overeating, risk in white water rafting guides, and findings from our Olympic legacy work.
4. Through **direct consultancy** that arises via the research outcomes being made visible by collaborating partners, press releases and attendance at academic and non-academic conferences. Consultancy examples include Biddle with Weight Watchers; Sherar with the Greater London Authority; Amara with the International Centre of Sport Security; Nevill with the Amateur Swimming Association; Downward with UEFA; Harris with the House of Commons Education Select Committee on 'School sport following London 2012' (2013). Within their contracts, all staff have an allocation of 25 days consultancy to support these activities.
5. Through **activities funded** by the Higher Education Innovation Fund (HEIF), Knowledge Transfer Account (KTA) and, more recently, EPSRC Impact Acceleration Account. Examples include HEIF support for Cushion to develop a "Coach analysis intervention system"; KTA support for Ferguson for "The Dissemination and Launch of the East Midlands Clinical Exercise Research Group"; KTA and HIEF support for Meyer to assess the feasibility of a National Centre for Eating Disorders in Sport.
6. Through **membership of research user bodies**: e.g. UK Sport Research Advisory Group - Downward (2008-13); UK Sport Performance Lifestyle Steering and Advisory Group - Fletcher (2010-12); EC expert group on Sport's policy and physical activity and sport – Garcia Garcia; Scientific Advisory Board in the Swiss Academy for Development, Switzerland - Giulianotti; FA Psychology Advisory Board - Harwood.

The Unit supports these activities by:

a) Allowing specific time in academic workload models for impact-related activities (such as training of end users which includes coaches, clinicians, athletes).

b) Providing strategic internal funds at Unit level that can be allocated to stakeholder-engagement activities e.g. publicity, travel, the organisation of information dissemination events.
c) Using 'pathways to impact' funds to enhance impact to a variety of stakeholders e.g. Tolfrey V organising the "Pushing to London 2012" day at Stoke Mandeville Spinal Injuries Unit.
d) Expecting all funded research projects from whatever source to produce a 'pathways to impact' statement, in line with the practice of major grant awarding bodies.
e) Sharing best practice and communicating funding and publicity opportunities through the Associate Dean (Enterprise) and the School/Loughborough University Enterprise Committees.
f) Continued development of patient and public involvement (PPI) through the Unit's various interactions with clinical populations.
g) Extending the diversity of public engagement methods, for example by public lecture and open-seminar or web-based social networking technologies, and by assessing the nature and extent of stakeholder engagement through widespread use of Websites, Blogging and Twitter.
h) Utilising public relations and marketing opportunities to celebrate and publicise outcomes, e.g., recent (2012-2013) TV and national press exposure of Timmons' research on the health benefits of short bursts of intensive exercise; Lewis' article on lab-grown muscle in the Metro newspaper (3.5 million readers); Meyer's interview on Sky Sports Sportswomen programme.

c. Strategy and plans

Our strategy is to maximise the impact of our existing activities, extend the **reach** to new stakeholder constituencies and increase **significance** by encouraging relevant research of the highest quality in priority areas, where possible involving user groups in the development of protocols and on steering groups. We also recognise that it is vital to maintain and enhance our long-standing tradition of collaboration with external agencies so that the **reach** and **significance** of our research is evidenced by the diversity of global users and beneficiaries of our research. For example, the impact of our biomechanics research reaches a global user group through national sporting organisations across four continents (Europe, Asia, N America and Australasia). Likewise, our research involving the development of international growth standards reaches parents and children throughout the world via the World Health Organisation (WHO) dissemination programme.

In order to strengthen and maximise impact the Unit will:

a) Maintain the prioritisation of impact-related research within the Unit's research strategy, organisational structure, staff development process and general academic culture.
b) Build relationships with more national and international sport organisations and other user groups (e.g. diverse athlete and patient groups) which will be facilitated by the London campus.
c) Establish relationships with user groups (e.g., athletes, teachers, patients) through interactive situations such as knowledge transfer conferences. Additionally, working with these groups in the early stages of our research planning and across our research programmes. For example, *Cale* was invited chair of the Dept. for Education's National Curriculum Physical Education Expert Group, the remit of which was to provide guidance for teacher training providers, trainees, teachers and schools on the implementation of the new National Curriculum.
d) Maximise our culture of producing 'research with impact'. Communication both within and outside the Unit through in-house newsletters (e.g., Dean's and ADR newsletters) and University press releases and maximising opportunities for publicising the outcomes of the research via our website (http://www.lboro.ac.uk/departments/ssehs/research/impact/), and promotion at internal and external events.
e) Provide administrative support for impact through a designated Marketing and Publicity Officer with responsibility for the Unit.
f) Facilitate, and contribute to, impact-related events via strategically prioritising funding for these activities. All research proposals will be required to include a statement regarding impact.
g) Use the Unit's Research and Enterprise Committees to recognise the potential impact of research projects and to facilitate the development of impact with appropriate user groups.

d. Relationship to case studies

The implementation of these approaches and strategies is outlined below. We have indicated which of our approaches to impact (labelled 1-6 in section b) have facilitated these impacts.

Reducing compulsive exercise among eating disorder patients: Impact has been facilitated by first, the allocation of time in the workload of Meyer for her to engage in NHS outreach and collaborative

projects, such as the training of clinicians. Second, HEIF funds (5) have supported Meyer's visit to Australia to build health service collaborative links which resulted in a successful NHS MRC funding bid (2). Third, Unit funding facilitated travel to sports governing bodies (e.g., British Gymnastics) to deliver professional training. Fourth, the Unit enabled (via financial and administrative support) seven conferences and clinician training days to disseminate the research findings to end users (e.g. consultant clinicians, nurses, physiotherapists, nutritionists, dieticians). Finally, HEIF funds (5) enabled the assessment of the extent of the impact of the research.

Improving Paralympic athlete performance: Impact facilitated: first by knowledge transfer through work with individual coaches (1); second, by dissemination at practitioner conferences (1); and third by our status as Satellite Centre of the International Network for the Advancement of Paralympic Sports through Science (6).

Sport psychology and youth football: Impact on coaches, coach education awards, professional clubs and FA policies was facilitated by the Unit in three ways. First, collaboration with the FA on identifying the most impactful research-to-practice outcomes for coach education led to the appointment of an FA-funded, six year, Postdoctoral RA (2) linked to the performance analysis staff being located in Loughborough prior to the move to the new St. George's Park FA Centre. The RA role included resource development and integration of research findings into FA resources for the end users (i.e., the FA coaching department; licensed FA coaches; professional clubs). Second, the Unit facilitated the optimisation of impact via workshop presentations and meetings with end users (e.g., presentations to senior managers at the FA, club academy directors and coaches) (1, 2, 3, 4). Finally, by the production of FA-endorsed educational fact sheets and posters from Harwood's 5C's research (commitment, communication, concentration, control, and confidence) for clubs and coaches from grass roots to professional youth academies.

The first national guidelines on sedentary behaviour in young people: Impact facilitated: first, by workshops with stakeholders (2); second, by public engagement through BHF and Weight Watchers publications (3); and third by membership of DoH Sedentary Expert Group (6).*Development of strategies to monitor stress and help avoid infections in athletes:* Impact has been facilitated: first, by the development of a close relationship with industry partners (GlaxoSmithKline and Yakult Honsha) (2); second, consultancy with a variety of sports clubs (4); and third, by public engagement via dissemination of results in popular magazines and newspapers (3).

Modernising governance of international sports organisations: Impact was facilitated by the support and time allocation given by the Unit to enable the establishment of the Centre for Olympic Studies and Research (1) which strengthened the relationship between staff and research users in the Olympic movement; the willingness of the Unit to host visiting scholars working in the area of governance; allocating of credit for user-focused research in the School workload model; the granting of support to attend end-user conferences/workshops (2) in addition to research meetings; and encouragement of participation in advisory committees within research user organisations.

The impact of fast bowling cricket research on coaching practice: Impact was facilitated: first, by King's membership of the ECB's fast bowling group (6); second, by an established consultancy relationship with the ECB (4); and third, dissemination via the ECB annual coaches conferences and internal publications (3).

Techniques used in twisting somersaults: The Unit, with British Gymnastics, funded the National Gymnastics Performance and Research Centre in 2004 which comprises a fully equipped gymnasium together with research hardware comprising an 18 camera motion analysis system, high speed video, instrumented high bar and rings, together with force platform for vaulting. Strategic funds have been made available for dissemination of the findings of this research to national and international audiences. This research and its impact has been supported by the Unit providing a computer graphics/simulation platform, movement acquisition hardware allowing real time interactive twisting simulations, head mounted display allowing real time learning of head movements for viewing during a simulated twisting somersault, and eye tracking hardware (2).

In summary, the Unit's pre-eminent position as the leading institution for sport research means that we continue to strengthen our established relationships with key stakeholders and broaden our reach into non-academic user groups and organisations. We enjoy a symbiotic relationship with these user groups which act as natural conduits to ensure both the reach and significance of our work, as well as informing our research agendas.