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| Institution: Bangor University and Cardiff Metropolitan University |
| Unit of Assessment: 26 – Sport and Exercise Sciences, Leisure and Tourism |
| a. Context |

Researchers within the Institute for Research Excellence in Sport and Exercise (IRESE) combine international excellence with innovation and communication to ensure that research drives economic, social and cultural advancements. Processes for embedding impact in research activities and for recording impact have been designed to optimise resources and to exploit the potential for cross-disciplinary synergy. There are three main types of impact that characterise the work by IRESE, each type is reflected in an impact case Study. The first is linked to impacts on practitioners and professional services, where beneficiaries include those involved in the delivery of sports coaching, reflective practice and sports science support – for instance, sports governing bodies, subject/professional associations and practitioners. The second is concerned with the health and performance of different populations, where beneficiaries include the Ministry of Defence, FIFA, the NHS and other health care professionals – for instance, those with illness, disease and injury, targeted groups for enhanced sport and physical activity provision, and military personnel. The third relates to public policy, specifically through national strategic initiatives for sport, health and tourism in Wales that affect local communities, Welsh regions and the Welsh economy as a whole. The main beneficiaries are those who design and implement policy within Welsh Government, local authorities and non-departmental public bodies. For each set of beneficiaries there are also indirect beneficiaries – those who benefit from service provision, those for whom health and performance is enhanced, and those for whom particular policies add value.

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| b. Approach to impact |
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The two constituent parts of IRESE (Bangor University and Cardiff Metropolitan University) have developed symmetrical approaches to the development of impact – only the institutional nomenclature differs. Responsibility for fostering and assessing research with impact resides at pan-University corporate level (the University Research Strategy Task Group at Bangor University, the Research and Enterprise Board at Cardiff Met). Key individuals (Impact Champions at Bangor University, REF Coordinators at Cardiff Met) are supported by each University's Research and Enterprise Office/Services unit and by respective Communications and Marketing teams to ensure a co-ordinated approach. Research impact is integrated into College/School planning processes through the annual planning round and individual staff performance reviews. Registers/audits of impact cases have been established so that emerging cases can be identified at an early stage of their development and can then be managed effectively to optimise their potential. At Bangor University the Annual Impact Awards provide an opportunity for staff to showcase examples of excellence in Public Policy and/or Public Services, Culture and Society, and Business Performance and/or Outstanding Innovation. At Cardiff Met the Research and Enterprise Annual Review Update publication fulfils a similar function.

As well as internal arrangements reflecting the IRESE approach to impact, there have been two externally-facing imperatives linked to collaboration/partnership and communication/dissemination.

Collaboration / partnership: Existing research partnerships have been consolidated to enhance and extend impact. Some were in health (e.g., Betsi Cadwaladr University Health Board, SPIRE Hospital in Cardiff) and include a study on the effectiveness of ACE inhibitors in scleroderma patients which led to changes in treatment policy and indiscriminate use of these agents is now discouraged (**Maddison**), recovery from sport injury (**Evans, Hardy L**), muscle wasting in chronic conditions (especially rheumatoid arthritis and kidney disease) and the benefits of exercise in these conditions (**Lemmey, Macdonald, Thom**), and exercise motivation scales (translated into over 10 different languages) that have been applied to overweight, sedentary and elderly populations to increase physical activity (**Markland**). Others were in the broadly defined sports industry linked to the commercial sector. For example, the 'One Turf' concept and project funded by the International Rugby Board led by **Irwin** and **Mitchell** has influenced the manufacture of artificial playing surfaces for major team games in collaboration with Charnwood Dynamics.

The clearest illustration of the 'spin out' effect of research leading to impact is the extension of the scope of one Impact Case Study (see section d. below). The work by **Hardy L** on the Bangor Leadership Training model for the Ministry of Defence has also been applied to educational and sports contexts. Further research by **Walsh's** team showed the benefits of a fourth meal each day

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for optimising immune function and physical performance in military personnel. This project paved the way for IRESE researchers (**Walsh, Oliver** and **Fortes**) to secure £1.35 million of research funding from the Ministry of Defence (2013) to investigate the influence of Vitamin D on health and performance in military personnel. Further collaborations have been established with outdoor activity providers and the mountain rescue service with research about expeditions at altitude (**Macdonald**) leading to a strong link with Blizzard™ Clothing (**Oliver, Walsh**). These led to position statements with industrial partners on hydration markers (e.g., Saliva diagnostics – HydraDX, **Walsh**) and for clinical populations (e.g., tear osmolarity for the detection of dry eye disease – which has led to **Walsh** and **Fortes** being invited to co-author a prestigious Cochrane Review on dehydration signs in older people in 2014). **Hardy L, Roberts** (with Downing) have also secured £168k of funding for a PhD studentship from the Defence Science Technology Laboratory (also in 2013). In turn, this overall programme of research has led to new collaborations with the Canadian and US Armed Services.

Existing collaborations yielding research impact have also been extended to new end-users (e.g., Zoological Society of London). Our collaboration with zoological collections and sanctuaries in the UK, Europe and Africa led to the International Primate Heart Project (**Shave** and **Drane**). This research has extended the application of measurement and monitoring techniques from sporting populations to better understand cardiac health in great apes, and led to specific training and education of veterinarians. Furthermore, as part of a strategic commitment to enterprise, entrepreneurship and ‘third mission’ activity, on-going relationships have been consolidated and enhanced through proactive support for researchers to engage with existing external partners (e.g., UK Sport, English Institute for Sport, England and Wales Cricket Board, Sport Wales) and for new ones to have been established (e.g., England Rugby, British Cycling, Mencap).

Communication / dissemination: The final aspect of the overall approach to research impact has been through effective communication. The core principle has been to provide evidence-based research to inform organisations linked to health and sport (including the people in them), government agencies, charities, the commercial sector and the general public. We engage key stakeholders in dialogue, policy reports, relationship building, presentations and other reports. Specific media training has been provided to IRESE researchers and contributions include BBC and ITV Television News (**Markland, Neil, Oliver, Shave**) and BBC Radio Wales (**Cropley, Hardy L, Roberts, Walsh, Woodman**), Channel 4 Television (**Macdonald, Woodman**), S4C TV (**Bryant, Rees**), the North Wales Public Lecture Series (**Hardy L, Lawrence, Lemmey, Woodman**), Welsh Arthritis Research Network-2012 Patient and Public Involvement seminars (**Lemmey**), Public Health Wales (**Kubis**), and NHS lectures (**Backx, Kubis, Lemmey, Macdonald, Shave**). These add to engagement with the print media to offer commentary on topical research-related issues (**Fleming, Jones C, Neil**).

Linked to the quality of the work has been the external independent recognition of it. The success of a project conducted with the Lane 4 Management Group is notable and set a standard for excellence that pre-dates the current REF cycle. Entitled ‘A psychological model of high performance environments’, this project won one of the eight UK wide awards for Knowledge Transfer Partnership (KTP) in 2006. More recently in 2012 **Markland** and **Thom** led another KTP project with Anglesey County Council that was rated ‘outstanding’.

c. Strategy and plans

The imperative that has driven the planning for impact is ‘to establish a structure that assures recognition for the best applied research in sport and exercise sciences, leisure and tourism’. The corporate cornerstone of achieving this is an explicit commitment to performance management that characterises the implementation of the respective Strategic Plans for each University and includes annual review at College/School, research group and individual levels. In this sense, operational management of IRESE is set apart from local management arrangements of the constituent parts.

Led by pan-University strategic research infrastructure and outward-facing communications and marketing support, the approach taken by IRESE to the cultivation and exploitation of research impact has been predicated on different but complementary research governance arrangements at Bangor University and Cardiff Met. In summary these include the following six sets of activities:

- (i) IRESE members have been strongly embedded in the Universities’ impact planning and decision-making processes (**Fleming, Hanton, Thom, Woodman**).
- (ii) Cross-disciplinary research and impact has been nurtured through the Pontio Arts and Innovation Centre at Bangor University (a £46 million project set to open in 2014 with a £9

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million innovation/engagement space where interdisciplinary research will be applied to strengthen the regional economy), and a commitment to a medium-term project for 'start up' of new projects (£10.5 million secured so far for development of the Menai Science Park), as well as a series of University Research Open Days at Cardiff Met.

- (iii) Specific roles have been identified to support the development of research impact at School/ College level (**Fleming, Hanton, Thom, Woodman**), and each School has a senior academic lead for Innovation and Engagement (**Thom** – a Deputy Head of School since 2007) and Enterprise (**Miles** – a School Director).
- (iv) Strategic appointments to emphasise initiating new and/or capitalising on existing research impact partnerships have been made. Some were full-time (e.g., **Cook, Drane, Cropley, Fortes, Stöhr, Williams**), or honorary/visiting (e.g., **Cockcroft, Maddison, Parker, Yusef**).
- (v) Staff have been engaged and included in research impact planning. From an initial register of 24 impact case studies, nine were identified and developed to evidence current or immediate impact (led by **Bolton, Evans/Roberts, Hardy L, Lemmey/Maddison/Thom**, Morgan N, **Shave, Walsh**), others have been targeted for medium-term impact exploitation.
- (vi) The Research infrastructure has been enhanced and continues to be developed through the Bangor Rehabilitation Centre to focus on NHS physiotherapy out-patient related research, and through the Cardiff Sport and Exercise Medicine Centre – the first FIFA Centre of Medical Excellence in the UK.

Where appropriate, alongside time allocated for strategic impact planning, all of these have been supported and acknowledged in workload calculations, nurtured through the introduction of a Third Mission Committee, and 'show-cased' and developed through staff biannual Away-Day events. Links with industry have been consolidated through the Knowledge Economy Skills Scholarships – for which there is an outstanding record of achievement, and through the destinations of graduating doctoral candidates.

There are six shared strategic drivers for finding, establishing, nurturing, delivering and exploiting research impact. They are:

- (a) Consolidating our commitment to applied research with targeted end-use and end-users.
- (b) Ensuring that our commitment to the theory-practice interface results in our research meeting end-user needs.
- (c) Identifying programmes of research with the potential for significant 'reach'.
- (d) Differentiating between, and providing appropriate support to programmes of research that have potential for 'immediate', medium term and longer term impact – recognising that these are not mutually exclusive.
- (e) Supporting the targeted exploitation of impact through deployment of explicit resources and bespoke marketing initiatives.
- (f) Rewarding (and incentivising) excellence in the development of impactful research.

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| d. Relationship to case studies |
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The case studies being submitted are the most compelling illustrations of the contribution made by research conducted by IRESE outside academia. They highlight the positive outcomes of the collaborative impact. The first case study reflects the most significant and developed collaboration before the existence of IRESE, and contributed to its emergence and existence. It is based on the work of leading researchers (**Hanton, Hardy L, Jones R**), as well as others (**Callow, Cropley, Kingston, Roberts** – and previously Parfitt) and is concerned with professional development, training and service delivery of sports coaches and sport science practitioners. As a result, IRESE has underpinned the content and provision of professional training and development programmes in the UK and globally. The second case study is based on a 12 year programme of high quality research (by **Arthur, Hardy L** – and previously Jones G) embedded within the Ministry of Defence. Transformational leadership (via the Bangor model) continues to be applied to benefit the delivery of all coaching and leadership training across the three Armed Services in the UK. This case study won the inaugural Bangor University Annual Impact Award for Business Performance and/or Outstanding Innovation. The final case study reflects IRESE's strength in policy evaluation research. Anchored by empirical studies funded by the Welsh Government (by **Bolton** with **Anderson, Fleming** and others), the two public health initiatives that form the Welsh Government's '*Climbing Higher*' strategy were evaluated. The recommendations from the Secondary School Sport Pilot informed the 'roll out' of the 5x60 programme, and the evaluation of the Free Swimming Initiative informed its continuation and extension.