Environment template (REF5)

Institution: Liverpool Hope University

Unit of assessment: C26 - Sport and Exercise Sciences, Leisure and Tourism

a. Overview

Liverpool Hope University was originally founded as an ecumenical higher education institution in the mid-nineteenth century. Having diversified and grown, it was awarded University status in 2005 as part of a strategic repositioning and subsequently was granted Research Degree Awarding Powers in 2009. At the heart of this University is the idea of the Collegium: an academic community of scholars providing a nurturing environment to stimulate and foster the scholarly advancement of all its students, working with and through them to create participants in learning (rather than recipients of learning) and to engender personalised learning (rather than mass teaching). The subject of Sport and Exercise Science sits as a part of the larger School of Health Sciences, in line with its link Human Biology, Physiology, Nutrition and Health. This affords a greater critical mass for collaborative and multi-disciplinary science research. In 2013, the School was re-named School of Sport and Health Sciences.

There are three research teams in the School: this unit of assessment comes from the Sport and Exercise Science Research Group and comprises submissions from six full-time members of staff. In line with the Liverpool Hope University's research strategy to invest in and promote high-quality scientific research, the Sport and Exercise Science Research Group has received a substantial amount of support since the last research assessment exercise. This has affected a research culture with the new group performing strongly and subsequently entering the REF for the first time within Sport and Exercise Sciences. Of particular note has been the targeted investment in high quality staff in this area, and across the school; the recruitment of such staff has complemented and augmented existing experience and expertise and has created a sustainable research environment that ensures the continued development of esteem indicators.

Within this Sport and Exercise Sciences unit, only members from The Sport and Exercise Physiology Research Group have been submitted. This is due, in part, to the University's commitment to science research and emphasis on strategic, applicable research and the strong departmental research strategy within this field. This Sport and Exercise Science Research Group was formed in 2007 under the direction of Professor Vish Unnithan (from Syracuse University, US), a researcher of national and international standing in paediatric exercise physiology. The group has developed strong links with local organisations such as Everton FC, Crewe FC, Wigan Athletic Youth Academy, University Hospital Aintree and Baystate Medical Centre, Massachusetts. Despite the Departure of Prof. Unnithan, the group has continued to evolve through School-based investment in the research infrastructure and environment and has had a substantial and sustained output with national and international impact. Crucially, appointments of both early career researchers and 3 at Professorial level have been made. These include a Professorial appointment in Public Health, Kasturi Sen (from Wolfson College, University of Cambridge), as the Strategic Director of Research and two other Professorial appointments to oversee future Biomedical Sciences and Sport and Exercise Science research. This will enable the continued success and enhancement of the

Sport and Exercise Physiology research group whilst providing an expansion of international and national interactions and collaborations with other institutions and external agencies to ensure research has paramount impact on society and health.

b. Research strategy

Although Sport & Exercise Science has been an active and productive area for research for more than 10 years at Liverpool Hope University, this is the first time that an entry has been submitted to the Sport and Exercise Sciences Unit for assessment in the REF. This is largely the product of the increase over recent years in the research infrastructure generally, and its support to highly committed researchers in particular. This has enabled staff within this unit to publish 51 articles in sport-related peer reviewed journals, 9 book chapters and one authored book since the last RAE in 2008. These publications have been within a variety of sport disciplines including sport development, sport history, exercise physiology and sport psychology. The University research strategy has been instrumental in achieving the evolution of a vibrant research culture and has enabled staff to pursue research in line with the University aims.

Institutionally, research is led by the University Research Committee chaired by the PVC (Professor Newport), which reports directly to Senate. All research at Hope is managed in accordance with the Research and Scholarship Plan, currently undergoing periodic review; each Faculty through Faculty Research Sub-Committees articulates its own strategy within the parameters of this. All members of the Department are expected to adhere to the University's Ethics Policy, managed through the Ethics Committee structure. The ethos is collegial and collaborative; the aim is to offer an excellent, stimulating and supportive research environment and foster the growth and development of individuals at all stages of their career as scholars.

The Sport and Exercise Physiology Research Group includes six members, three of which have completed their PhD's in the last year and since the departure of Unnithan has been under the directorship of Dr Marwood. The primary research themes that characterise the research strategy are **cardiovascular physiology** and **muscle metabolism**. These themes underpin a broader strategy of research into paediatric exercise physiology, an area so chosen due to a relative deficiency of data for this population, as compared to adults. This has led to collaborations with Wigan Athletic Youth Academy, Everton FC, Crewe Alexandra FC and Baystate Medical Centre, Massachusetts. The outcomes of this research strand have been disseminated by Marwood, Roche and Holloway in peer-review journals and at international conferences such as American College of Sports Medicine and European College of Sport Science.

Within the theme of cardiovascular physiology, another major interest area is in the field of paediatric physical activity with regards is efficacy in preventing or ameliorating endothelial dysfunction. Dr Roche, an established researcher, is a member of the Diabetes and Obesity Research Network (DORN) and is a reviewer for 7 peer-reviewed journals including Diabetes Care, Pediatric Diabetes, Pediatric Exercise Science, Applied Physiology, Nutrition and Metabolism and Journal of Science and Medicine in Sport. Dr Roche is also a reviewer of grant applications for Diabetes UK. Dr Denise Roche was seminal in making Liverpool Hope University a stakeholder for the National Institute of Health and Clinical Excellence (NICE) on

promoting physical activity, active play and sport for pre-school and school-age children and young people in family, pre-school, school and community settings.

In regards to the theme of muscle metabolism, Dr Simon Marwood, a senior researcher and the cluster group lead, conducts research in collaboration with the London South Bank University / University of Exeter investigating the role of the tricarboxylic acid cycle intermediates in facilitating oxidative metabolism; the University of Nottingham investigating the competition between fat and carbohydrate oxidation during exercise; University of California investigating the mechanisms underpinning the slow component of oxygen uptake during exercise and its relationship with fatigue; University Hospital Aintree investigating the interactions between chemotherapy, physical fitness and survival from major surgery in cancer patients. He also acts as a regular reviewer for a number of journals including the Journal of Applied Physiology and has to date conducted one external examination at PhD (University of Leeds) and supervises two Doctoral students.

Although the Departmental Research Strategy has primarily focused on research within the field of Exercise Physiology, other smaller disciplines have also thrived within the research environment in Sport. In line with the units paediatric/youth research focus, Dr Joel Rookwood's work has centered on empirically-rich and policy-relevant social scientific research, focusing primarily on sport development, fandom, identity and performance, with football the central theme, and his primary area of expertise. During the last decade he has been involved in practical and research-based international development programmes across six continents. This work has centred on social involvement and peace promotion, incorporating sport-based initiatives engaging with victims of terrorism, disaster, conflict, poverty and persecution. He has published two monographs and an edited collection, as well as a dozen peer-reviewed articles and seven book chapters, and has presented 30 conference papers across ten countries. He has also served as a reviewer for a number of journals including Sport in Society, The Journal of International Sports Policy and The International Review for the Sociology of Sport.

In conjunction with this research, Dr Liam O'Callaghan has examined historical and contemporary perspectives regarding social identities across a range of political contexts. His research has particularly focussed on Irish Rugby and identity politics and has authored 6 book chapters based on his research. Recently, Dr O'Callaghan published a book entitled Rugby in Munster: A social and cultural history which has been widely esteemed within the academic community. It is important to note that due to limited staffing within these fields, social science research is performed on an individual basis and is not inclusive within a research group.

c. People, including:

i. **Staffing strategy and staff development**

At present, it is University standard practice that all new staff have a PhD and a record of research and publication, or at least demonstrable potential to be research active. The School are dedicated in recruiting both experienced and young researchers who can enhance the research portfolio of the School and take a capacity-building approach to the staffing policy. New members of staff are therefore actively encouraged to engage in research with, and be mentored by, more experienced members of staff within the subject discipline. The School has

explicitly pursued to employ staff members who are research active within the field of exercise physiology. This has resulted in three new appointments of Dr Becky Gobbi, Dr Peter Angel and Dr John Malone, all of whom are returned in this submission.

In addition to individual mentoring for new/early career appointments, staff development in research is available at both Institutional and Faculty levels. This includes research development programmes (e.g., writing a book proposal; preparing grant applications). The Research Facilitator (see D) offers particular advice on funding applications and opportunities. Individual research activity is managed and monitored through annual staff performance reviews, including review of past activity, the setting of future targets, and the identification of areas for staff development. The University also has well-defined staff promotion guidance and all staff have a yearly opportunity to apply for promotion. The institution's Research and Scholarship Development Plan lays down that promotion from lecturer to senior lecturer is dependent on a number of criteria, including research of international standing and an active track record in applying for external grants. Marwood, for example, was successfully in his application to Senior Lecturer within the period.

ii. **Research students**

The School of Sport and Health Sciences currently has 7 PhD students, one of which is located within the Sport and Exercise Physiology Research Group. This doctoral student is researching the effect of intermittent/stochastic pacing strategies on time-trial performance and has disseminated his results at national (BASES) and international (ECSS) conferences. He has also published a paper recently in Journal of Sport Sciences entitled Effects of magnitude and frequency of variations in external power output on simulated cycling time trial performance.

Students with suitable qualifications are recruited on the basis of research capacity and potential, viability of proposal, and match with research strengths. Students' continuing registration for PhD undergoes formal interim evaluation through a 'confirmation of registration event', at which a panel scrutinizes work and explores this with the student. Research students are monitored and supported through personal supervision and a dedicated Postgraduate Research Skills university-wide programme of seminars based on the Research Council endorsed *Vitae* programme of competencies. Each postgraduate research student is required to document evidence for the meeting of a number of targets relating to the research process during their annual monitoring. The Postgraduate Research Skills Moodle provides a virtual learning environment; additionally, there is a second e-resource for research students through external subscription – Research Skills Online. All students present their work annually at PGR/staff research seminar series. Research supervisors work in small teams; one will be a subject specialist with the requisite knowledge to support the research project and one of the team must have experience of doctoral supervision to completion. The supervisory team also includes a Chair, well-versed in university regulations and with multiple completions.

There is a dedicated Postgraduate area in The Sheppard-Worlock Library. Facilities include bookable study rooms and a drop in computer lab. With the support of their Dean, students who are at a writing intense stage of their studies can request a bookable study room for up to a month.

The faculty research committee also provides funding for conferences and student development.

c. Income, infrastructure and facilities

Substantial tasks such as the co-ordination of conferences can be undertaken by arrangement with the University's Conference Office. Institutionally, the Research Facilitator works in partnership with academics to secure, manage and increase funding from external organisations both nationally and internationally. This is achieved through: one-to-one support; staff development workshops on topics such as proposal writing, costing and pricing and the support of early career researchers; and the provision and analysis of management information statistics. Research funding is held centrally within the University and also by Faculty Research Sub-Committee and opportunities for research bids are accepted at any point through the year. More specifically, within the department, successful bids for income have been gained for biological modelling software (£1200), the hiring of physiology equipment (£1000) and nutritional supplementation (£1500). The department has also successfully housed two internships, funded by the University, in the field of nutrition and sport and exercise science. This has increased to 4 internships which are due to start in January 2014.

The research undertaken within the School of Sport and Health Sciences has, to date, largely been funded by internal grants from the University Research Fund. Since 2008, the University has increased its investment in research, in particular science research. This has supported the attendance at in particular sport international conferences such as American College of Sports Medicine, European College of Sport Science and British Association of Sport and Exercise Sciences Annual Conference.

Applications for external funding have increased over the last 5 years, due to a University-wide emphasis on increasing submissions. The School was awarded £24,500 from HIEF to establish a company called Good Health 4 Good Business. This involved sharing knowledge and skills with local employers (e.g. Merseytravel) to enhance health and well-being in the workplace. Grants have also been gained from national governing bodies such as £20,000 from Blackburn and Darwen PCT to review the effectiveness of the cardiac screening programme. Recently, a £49,000 grant was awarded from Pfizer to test the effect of the drug Pegnisarant in ameliorating obesity.

All staff engage with professional bodies relevant to their field. The School of Sport & Health Sciences organise a monthly Research Seminar for all staff and students in order to foster internal and external collaborations, to encourage the development of ideas and to acquire advice and critical input. External speakers from a wide range of institutions, including University of Salford and Bradford University have presented their research. The research seminars, in addition to developing a research culture, also provide an opportunity for research students to present their work, thus providing a structured training environment for postgraduates in the discipline.

The research culture is further maintained by the hosting of conferences. In 2012, the School

hosted a Research Symposium on Nutrition, Health and Exercise. This conference attracted numerous national and international scholars and research students from a variety of institutions, with key note speeches from highly established researchers in the field of exercise science. This conference was funded by the University at a cost of £5000. Undergraduate students from Liverpool Hope University also showcased their own research through oral presentations, and were provided an opportunity to meet with researchers and potential employers. In May 2012, academics convened at Liverpool Hope University for the RIO conference, hosted by Sport Psychology. RIO is a special interest group concerned with research in imagery and observation. The event centred on the presentations of delegates and discussion of recent research findings and ideas. The event was attended by 42 academic staff from 16 institutions across 6 countries.

In recent years, funding has been significantly increased in order to improve and update the sport science research facilities. Large investments in capital equipment have been made including bodpod (£30,000), laser Doppler (£25,000), lode excaliber sport (£25,000) and near infra-red spectrometer (£40,000). More recently, investment in PA monitoring (accelerometers costing £10,000), cardiac screening (echo machine and ECG costing £48,000) and TMS neuronavigation system with integrated EMG (£28,000) has been given precedence to encourage research within these fields. This continual investment in equipment has resulted in a well-equipped body composition laboratory, exercise performance laboratory, sport psychology laboratory and human performance laboratory, serviced by two full-time technicians. Within these dedicated laboratories, there is the equipment necessary to obtain breath-by breath measurements of pulmonary gas exchange, muscle oxygenation (near infrared spectrometry), ECG and body composition (air displacement plethesmography and bioelectrical impedance). It is possible to undertake exercise testing on electromagnetically controlled cycle ergometers, treadmills rowing ergometer or an isokinetic dynamometer. Adjacent laboratories allow the measure of blood and muscle biochemistry. On-site playing fields and sports hall permit field-based measures in conjunction with relevant equipment such as accelerometers, light-gates and short range heart-rate telemetry.

With the increased, continual investment in Sport and Exercise Science, a new £10 million facility is due to be erected by 2016. The facility will include dedicated sport and exercise science research and teaching laboratories (physiology, biomechanics, psychology), biology and biochemistry laboratories, a lecture theatre complex and community sports facilities. This new facility is expected to exponentially enhance the profile of Sport and Exercise Science at Liverpool Hope University and will enable Sport and Exercise Physiology Research to be internationally competitive.

Further infrastructure support comes through the departmental library, including extensive electronic databases such as Sport Discus. A separate budget is available for the purchase of materials needed for individual research projects. These are supplemented by interlibrary loans and by access to the other national libraries through SCONUL Research Extra. Each Faculty has 2 designated full time Faculty Librarians who work closely with all academic colleagues to provide support and advice on all areas of Library provision. The University has set up an institutional repository for staff research outputs. Research outputs for the REF2014 are being entered on to the repository and it will then go live.

d. Collaboration and contribution to the discipline or research base

Members of the research group have been instrumental in establishing collaborative research initiatives with other higher education institutions and community organisations. These have included numerous premiership football clubs (e.g. Everton FC, Wigan FC), local schools and NHS establishments (e.g. Aintree Hostial). The group also have good collaborative links with Dr Thomas Rowland at Baystate Medical Centre in Springfield, Massachusetts who has been involved in numerous pediatric projects.

Dr Simon Marwood maintains a number of collaborations including research relating to the role of aerobic fitness on survival in patients undergoing major surgery (University Hospital Aintree), the limitations to fat oxidation during exercise (University of Nottingham, University of Exeter) and the dynamics of muscle oxygen uptake and phosphocreatine dynamics during high intensity exercise (University of Leeds, University of California, Los Angeles).