Learning while Earning

An Innovative Supported Distance Learning Approach to Motorsport Industry Employee Education and Upskilling

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Strategic partnerships – fundamental to producing and delivering innovative educational solutions to a highly-competitive and demanding industry sector

• The UK motorsport industry – key stats. and a holistic perspective;
• Background to Motorsport Education at Brookes;
• Establishing the HEIF-2 Motorsport Knowledge Exchange project;
• Co-operation (indeed, future agreed strategic alliance) between Oxford Brookes University (motorsport) and the Open University (distance learning) and the industry itself in producing CPD courses;
• Overview of courses thus far developed;
• Summary of project experience and future aims.
House of Commons
Business, Innovation and Skills Committee
The UK Motorsport Industry

• A ‘jewel in the crown of UK manufacturing’ (House of Commons Business, Innovation and Skills Committee Report, March 2010)
• 38,500 full-time employees, of which 25,000 are engineers
• Eight of the 11 F1 teams reside in the UK, six within a 30-mile radius of Oxford, the remainder (generally) within a 50-mile radius
• 60% of the UK motorsport workforce is based in the South-East
• Region is home also to world-class auto/motorsport consultancy companies
• Comprises 4500 companies – 90% are ‘SMEs’, with large majority being ‘small’ (5-50 employees) or ‘micro’ (<5)
• Contributes £4.0bn. to the UK economy (>1% GDP, four times more than the world-class UK music industry)
• Spends circa £1.8 billion p.a. (30% of sales revenue) on R&D (UK average: 2% spend)
• Sales circa £6.0 billion p.a. (with £3.6 billion p.a. exports)
• Unquestionably, the fastest-innovating industry in the world
Full speed ahead: maintaining UK excellence in motorsport and aerospace

Report of session 2009-10, pub. March 2010
The Motorsport Industry – a complex beast

Global Motorsport Environment

UK Motorsport Industry

HEFCE/LSC

International motorsport Industry

SEEDA

OBU School Of Technology

Other ‘Motorsport Valley’ RDAs

MDUK

International (HEI) academia

Energy Efficient Motor Sport project

HEFCE/LSC

Students

Motorsport Academy project

Professional Institutions (IMechE)

International (HEI) academia

UK (HEI) academia

Learning Grid project

UK (FEC) academia

HEIF Motorsport Knowledge Exchange (and Motorsport Engineering Centre) project

UK (HEI) academia

Students

UKMotorsport Industry

Energy EfficientMotor Sportproject

UK (FEC)academiaMotorsport Academyproject

Professional Institutions(IMechE)
Chronology of capacity building…

• 1996 – Pioneered *dedicated* educational provision for the motorsport industry (*via* work of Oxfordshire Motorsports Forum)

• 1999 – First Motorsport BEng students (6!) graduate

• 2002 – Appointment of dedicated Motorsport Projects Officer (ME!)

• 2002 – ‘*Motorsport Academy Feasibility Study*’ consultancy exercise (on behalf of four ‘motorsport’ Regional Development Agencies and the DTI)

• 2003 – *DTI Motorsport Competitiveness Panel* involvement

• 2003-2007 – £2.1m regional SEEDA capital investment in motorsport-related infrastructure (buildings and state-of-the-art plant)
Chronology of capacity building...

- 2003-2008 – £1.6m+ motorsport industry in-kind pledges to the Motorsport Engineering Centre and Motorsport Continuous Professional Development (CPD) programme
- 2004-current day – HEIF Motorsport Knowledge Exchange (MKE) project
- 2006 – £200k internal University investment in CPD programme; Motorsport Masters programme launched (7 students)
- 2007 – First motorsport CPD course goes live
- 2008-2010 – Steady increase in motorsport-related contract testing, research and consultancy opportunities, and further CPD course development
- 2010 – Launch of world’s first distance learning Motorsport Engineering and Management MSc
The situation today...

- Several foundation degree programmes with ‘Associate Colleges’, 8 undergrad. programmes, 4 postgraduate programmes (incl. shiny, brand-new MSc delivered via distance learning), 5 CPD programmes, 6 PhD

- 450 undergraduates - 75 MSc, 6 PhDs (4 with F1), 82 CPD

- Student employability – 17% direct into F1; 43% other motorsport; 10% post-grad motorsport degrees; 20% other (incl. high performance automotive); Remaining 10%?

- 12 annual Motorsport MSc Scholarships sponsored by a local F1 driver;

- ‘Provider of choice’ now to many F1 teams.
Employability…

• **Where they go**
  - RenaultF1, WilliamsF1, SpykerF1, Torro Rosso, MidlandF1, HondaF1, Red Bull F1, BMW F1, Super Aguri F1, Jordan GP, Arrows F1, TWR F1, Lotus, Prodrive, Xtrac, BMW Mini, BMW Motorsport, Ray Mallock, Jaguar, AP Racing, Nissan Motorsport, Delphi, MoTeC, Pilbeam, TWR Race Engines, Ford, Porsche Motorsport, Bridgestone Motorsport, McLaren Performance Cars, MG Rover, Eibach Dampers, Optimum G, Rouse Technology, Slark Race Engines, Millbrook Proving Ground, Caterham, PYW, Ascari, Delphi, Pilbeam, Honda Road Cars, Integral Powertrain, Plenum Motorsport, Zeus Motorsport

• **What they do**
  - Race Engineer, Aerodynamicist, Design Engineer, Rally Engineer, Data Engineer, Test Engineer, Project Engineer, Graduate Engineer, Sales Manager (three of the current F1 Race Engineers – the youngest on the grid – are former Oxford Brookes students)
Our shiny new(ish) building – outside…
...And in
The Motorsport Knowledge Exchange (MKE) project

- 5-year £1m project financed by the second incarnation (HEIF-2) of HEFCE’s Higher Education Innovation Fund
- One of the smallest of the HEIF 22 CKEs (Centres for Knowledge Exchange)
- Longest-running and largest continuously-funded HEIF project at Brookes
- 4/5-person dedicated project team drawn largely from industry
- Other project personnel (consultants and other specialists, internal and external) invoked on an ad-hoc, when-required basis
- Highly-autonomous, agile, rapid-response, multi-disciplinary, business-facing, largely self-contained business unit
- Project nature/constituency helps to circumvent (much!) internal red tape: project and staff are results’ focused and goal-oriented rather than process driven
The HEIF-3 Motorsport CPD programme

• Market-driven and industry-focused – programme inspired by prime findings and subsequent recommendations of the DTI Motorsport Competitiveness Panel Report to the Secretary of State for Trade and Industry in 2003:

‘The [Skills Education and Training] group recommends that a series of supplementary post-graduate level courses be funded to accommodate the needs of individuals wanting to become involved in motorsport.’

‘Surveys found a need for short effective courses delivered flexibly.’

• Prime objective: marry highly-relevant educational material to flexible delivery mechanism/medium to enable employee upskilling… but… whilst employees are still in work

• No limits to student numbers, geographic location, and study timeframe, (within certain reason)
The Open University

Inaugurated in 1970

‘Open’ – for most courses: no previous qualifications needed

‘Distance’ – supported open learning
The Open University

Over 150,000 undergraduate
Over 30,000 postgraduate
Nearly all part-time
Around 70% in full-time employment
25,000 students outside UK
How do the distance learning courses work?

• Employ a ‘roll-on-roll-off’ delivery model - 24/7, 365 days a year

• Delivered ‘at a distance’ (but with optional boot-camp-style intensive practical sessions, at additional cost);

• *Students study at a time, place and pace which suits them – at work, at home, in airports, on Greyhound buses etc.*;

• Allocated tutor support – but students learn largely by undertaking numerous structured exercises;

• Course ‘packs’ include printed workbooks, processing software, supporting articles and papers, DVD, on-line activities and quizzes;

• Course progress achieved by completing sequential online exercises (requires 100% pass at each assignment stage);

• End-of-course assignment in form of project dissertation, based on current industry real-life issues, or *viva voce* or similar style exam
Education (not just training)

- Core philosophy underpinning all courses is *understanding* – providing key knowledge in order to make best safe use of all tools available to improve competitive advantage

‘You don’t do the calculations until you understand what the problem is.’

The late Keith Duckworth, motorsport engineering pioneer and legend, quoted in Motor Sport magazine, June 2000
So what role does industry play in all this?

- A four stage process:
  - Suggests topic areas for development (or perhaps further development)
  - Informs high-level curriculum content
  - Provides strategic steer, plus case studies, new material, data, access to key relevant personnel for interviews (filmed or otherwise) etc.
  - Critiques the final material and suggests improvements etc.
- A successful relationship adhering to the above methodology should yield four key benefits:
  - Strengthened academia:industry relationship
  - Powerful and valuable endorsement for the material from an objective, respected, high-level third party
  - Candidates put forward for enrolment because you’ve worked with industry for industry to create a solution to a market-driven problem situation
  - Enhanced credibility and an awareness by industry of academia’s core capability, which provides a key opportunity for second-selling (research, contract testing, consultancy, KTPs etc.)
Motorsport Chassis Dynamics

- 2-off 40 CATS points post-graduate level courses
- Developed with key input from very senior staff at RenaultF1, Williams F1, Avon Tyres, Dunlop Motorsport, and ChassisSIM, amongst others
- Six Course Workbooks, with comprehensive and well-researched ‘Tyres’ module, (included specifically at F1’s behest), as well as a professionally-filmed DVD/wide selection of contemporary industry Case Studies
- Extensive ADAMs and ChassisSIM simulation exercises
- Optional practical sessions using fully-instrumented Formula Renault race car, on-track and using the School’s Multimatic 4-post rig
- Various course options available to appeal to different student aspirations/industry markets/study timeframes
Your correspondent in action
Real-life case studies
Real-life case studies

SILVERSTONE: THE ULTIMATE LAP
1m 18.965

Driver: Nigel Mansell
Car: Williams FW14B
Engine: Renault RS04
Event: British Grand Prix 1992
Circuit: Silverstone GP
Date: Friday 10th July 1992
New course – ‘Business for Motorsport’

- *Business for Motorsport* – 20 CATS points (initially), then (hopefully) full Post-Grad. Cert. (and ultimately, Executive MBA, *via* the Business School)

- Majors on *business, innovation, entrepreneurship, and management* in the motorsport industry – decision making, visualisation, project management, entrepreneurship, understanding the business context, interpersonal and communication skills. *‘The cluster will benefit’.* [Govt. report].

- Predominantly online, but three seminars moderated by industry experts, providing critique/contemporary relevance

- Intention is to:
  - Facilitate fast-track transition from *Engineer* to industry-ready *Business Development Manager*
  - Provide budding entrepreneurs with the tools necessary to start up (and hopefully grow!) a successful small motorsport business
Business for Motorsport - cont.

• Assignment – Business Plan Proposal
  (individual project)

• Management Concepts
  (systems, processes within organisations, managing people)

• Finance and Accounting
  (company financial state, different accounting types, managing cash flow)

• Marketing and Sponsorship
  (customers’ needs, motorsport value chain, PR)
Business for Motorsport – cont.

• R & D Management and Regulation
  (Engineering, safety, stakeholder groups)

and finally –

• The Business Plan!
  (Final course presentation to a panel of assessors –
   Turn business plan into reality?
   Will financiers back it?)

*written submission for assessment after oral feedback – would we be
prepared to invest? – ‘Distinction / Pass / Fail’*
Future - overall

• A complete industry-focused, market-driven Motorsport Race Engineering and Management MSc achievable solely through distance/blended learning (subject to validation, this programme will launch in Sept. 2010)

• Expanded course portfolio to include ‘Advanced Data Acquisition’ ‘Composites and Material Science for Motorsport’, ‘Motorsport Aerodynamics’, ‘Data Analysis’, and ‘Racing Engine Design’

• ‘Salami-slicing’ of existing courses/modules to provide further ‘bite-sized’ chunks of knowledge, for enhanced engagement with employers

• Franchising of courses to other institutions, particularly in the US (initially, Indiana State University) and Japan (initially, Kanagawa Institute) and through companies in Australia and Belgium

• Further enhancement of motorsport teaching and research environment from investment of course revenue streams into infrastructure

• Impact of ‘green’ motorsport issues: i.e. Energy Efficient Motorsport etc.
Reviews - Motorsport Chassis Dynamics

• ‘Well written and very informative. The basic ‘philosophy’ of Pat [Symonds] shows through which I think is really important and one of the best values you have. He adds practicality to the courses which counts for a lot.’ Mark Preston, Technical Director, Formtech Composites, former Technical Director, Super Aguri F1

• ‘I was very impressed by the quality of the courses. I liked the layout and it is very easy for the reader as there was a good balance of equations, physical explanations, and useful figures. The amount of work is very impressive.’ Thomas Wissart, Senior Engineer, Performance Analysis Simulation and Performance Analysis, Toyota Motorsport GmbH, former R&D Engineer in charge of tyre data analysis, Super Aguri F1

• ‘These courses will probably become the reference for many people’. Ben Michell, Senior Design Engineer-Car, Dunlop Motorsport

• ‘Well laid out with a sensible progression of topics.’ Dr. Nick Treverrow, Senior Vehicle Dynamics Engineer, Australian Road Research Board, former Honda F1

• ‘The best description of derivatives I’ve ever seen’. Dr. Pat Symonds
Reviews – Data Acquisition

• ‘My personal view is that this looks fantastic and that it could be very useful for those guys who fringe on the racing ends of things, especially with the boot camp!’ Steve Nevey, Business Development Manager, Red Bull Technology

• ‘I think that it is a well put-together course. Easy to follow and instructive at the same time’. Dr. Peter Van Manen, CEO, McLaren Electronics

• ‘I am really enjoying this course so far and want to commend you guys on your efforts’. Wayne Gross, US-based Race Support Engineer

• ‘When can I sign up’! Prof. Tad Foster, former Dean of the Faculty of Engineering, Indiana State University

• ‘The overall coursework material is excellent and well prepared’. Peter Jackson, General Manager, MoTeC (Europe)

• ‘I studied this course because I wanted to gain employment in motorsport – and it worked’! Darren Shepherd, former student
Reviews – Business for Motorsport

• **Dr. Pat Symonds**: ‘*This course is a unique opportunity for young engineers to enhance their technical skills with business acumen, a need which is growing in this competitive world*.’

• **Martin Whitaker, CEO, Bahrain International Circuits (BIC)**: ‘*I think [this course] is incredibly important. For us, it has special meaning because in the development of BIC of our own business park, we see a role for education, particularly a university faculty. I applaud what are you doing and with any luck, we will be part of it in the not too distant future.*’

• **Simon Berger, Founder and Chief Executive, IM2 Events GmbH**, responsible for organising the various Motorsport Business Forums around the world: ‘*I believe this project needs to be warmly welcomed by the industry. The material is very valid and I can testify to the key input from industry.*’
The MKE project overall

‘Initiatives such as… the Government-funded Motorsport Knowledge Exchange provide an example of projects in which students are able to engage with people involved in the industry, showcase what they are capable of, and present research.’

House of Commons, Business, Innovation and Skills Select Committee Report, ‘Full speed ahead: maintaining UK excellence in motorsport and aerospace’, March 2010

‘The Panel commends the MKE on the very high quality of the distance-learning material developed already as part of the new programme.
‘The Panel commends the MKE on the degree of employer engagement and external support for the programme.
‘Finally, the Panel commends the MKE on the innovative approach of the programme as a distance learning venture.’

Validation Panel ‘commendation’ points on the proposal for a new MSc Motorsport Race Engineering and Management (by distance learning)
The MKE project overall

- ‘This CKE has clearly had significant success in raising funds and using CKE funds for leverage. It is likely that the approach to opportunity assessment and bid writing represents good practice and would certainly be of interest to other CKEs.

- ‘A strength of this CKE is with regard to its relationship with the RDA. The ability to understand and respond to particular regional interests and strategies is another example of good practice.

- ‘The design and development of industry focused course material and delivery mechanisms are another area where this CKE has had success and impacted on the educational community as well as (presumably) the target market. The processes behind co-development of new innovative course material would be an opportunity for a case study.’

Moore Networking, consultants working (on behalf of HEFCE) to evaluate the MKE on its effectiveness, at the end of its HEIF funding period
Thank you for your attention: Q & A

赛車冠軍真棒！
(It was awesome!)

Thank you for your attention – any questions?