

Issue 1  
October 2014



# DUDLEY Insight

## THE STEM CHALLENGE



This is one of a series of papers aimed at providing our stakeholders, both internal and external, with up-to-the-minute information on how we are strategically responding to local and national challenges. The papers may be of interest to many relevant stakeholders including parents, employers and the Local Enterprise Partnership.

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# 1 INTRODUCTION

Dudley College was founded over 150 years ago for the purpose of delivering technical education to the local community. Even in those days, technical education included science, engineering and maths; technology is a subject that has been added in more recent times and leads to the current STEM (science, technology, engineering and maths) provision. This document summarises briefly the more recent cross-college STEM activity undertaken and the strategies going forward for ensuring the continued development and success of this important area of the curriculum.

## 2 CONTEXT

**2.1** STEM curriculum has always been a cornerstone of the college's provision and there is a wide range of programmes across the following subject areas:

- A-level programmes in Sciences, Maths, Computing
- Graphic Design and Media
- Animal Care/Management
- Applied Sciences
- Construction
- Electrical Installation
- Engineering & Manufacturing
- Environmental Technologies
- Health & Social Care/Sports/Early Years Sciences
- Information Technology & Computer Games Design
- Mathematics (Functional up to higher)
- Media, Photography & Design
- Music Technology

**2.2** Programmes range from entry level right up to Higher National Diplomas (HND) offered through full time, part time, apprenticeship, NVQ and bespoke provision (often through employer led initiatives). The college has invested significantly in facilities to support the delivery of this curriculum through new buildings including *Dudley Evolve* and *Dudley Sixth* (with dedicated STEM facilities), as well as refurbishment of existing premises.



**2.3** This is significant provision. Even ignoring maths qualifications studied as part of a wider programme of study, over 4,900 people studied qualifications in STEM areas last year at the college, representing almost 60% of the total provision. Over 40% of A-level courses completed are in STEM subjects. We are also aware of the significant STEM skills shortage identified in the Black Country Local Enterprise Partnership (LEP) priority areas and are responding to this: 60% of apprentices are currently studying programmes in priority STEM areas (based on independent data supplied by the Responsive College Unit [RCU June 2014]). Much of the curriculum has been developed through effective engagement with employers in both the design and the delivery of programmes.

**2.4** The college's STEM provision is effectively managed with students achieving good levels of success: all of the provision identified above was graded good or outstanding at the most recent Ofsted inspection (March 2013).





**“It is clear that the college is committed to developing its ability to meet the educational and skills needs of the local community through creative partnerships and new models of interaction with employers and local education providers.”**

STEM Assured Validation Report Advisory Panel comment.

### **3 THE CURRENT CHALLENGE**

**3.1** Whilst the college has much to be proud of in regard to its STEM offer, by its very nature this is a curriculum that needs to be kept up to date and also reflect the needs of local industry. The Black Country LEP has identified that certain industries still face skills shortages, notably engineering / manufacturing and construction. Whilst some of this can be attributed to the challenges these sectors have faced in recent years, we need to ensure that our curriculum offer and facilities continue to develop to help provide local industry with the skilled people it needs to ensure the future prosperity of the region.

**3.2** We also need to ensure that we are maintaining high standards across all of our STEM provision and that best practice is being adopted college-wide. We have a role in creating more multi-disciplinary skills within our students by looking at opportunities for STEM curriculum that crosses subject boundaries as well as core skills for all of our students that will make them effective in their chosen industry.

## 4 OUR RESPONSE

**4.1** In Spring 2013 the college adopted the National Engineering Federation (NEF) 'STEM Assured' kite mark as a mechanism for recognising the work done in the college in relation to STEM and also kick-start new ideas for the continued development of this important area. Led by Neil Thomas, Director of *Dudley Advance* and cross college STEM lead, the college undertook a 'STEM in Development' programme which helped to crystallise some of the areas for development which would form part of the college operational development plan going forward. Full 'STEM Assured' accreditation was achieved in September 2013.



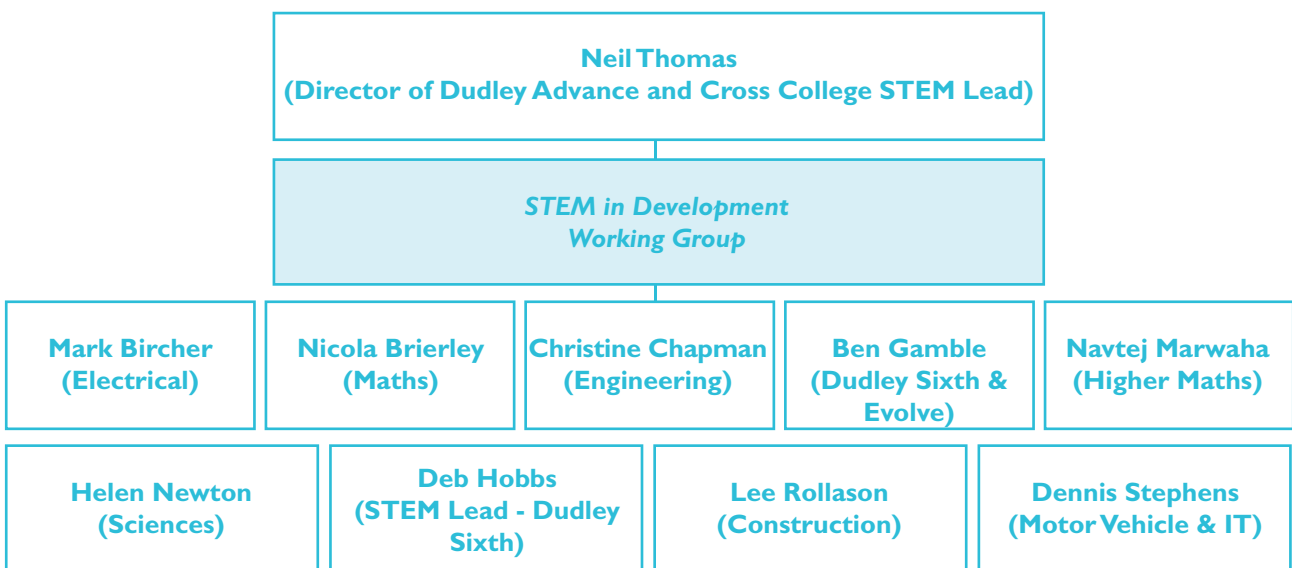
**4.2** In parallel to this activity the college continued with the development of its STEM curriculum. The most significant development has been starting the construction of a new Centre for Advanced Manufacturing and Engineering Technology – *Dudley Advance*. With an investment of over £9m, this new centre will be the flagship building for STEM curriculum in the college and provide state-of-the-art facilities for engineering and manufacturing as well as being the mechanism for improved employer engagement and partnership. Built through consultation with employers and led by a steering group from the local engineering industry, this building

is more than just a new training facility, it aims to be the centre for engineering development in the region, with facilities and services open directly to the engineering industry. Its inception also marked the start of a new partnership between the college and Aston University for more joined-up progression to Engineering degree programmes.



**4.3** To ensure the continued development of STEM provision, the college has a dedicated STEM working group. This group is made up of representatives from across the main STEM provision as detailed in the diagram below.

As well as the STEM curriculum managers, the group includes staff within the college who have been given responsibility (and remission from teaching as appropriate) to lead on cross college STEM initiatives. This includes the STEM lead for *Dudley Sixth* and the maths lead lecturer responsible for higher level maths development across college.



## 5 PROGRESS TO DATE

**5.1** Some of the key developments since the 'STEM in Development' programme include successfully achieving STEM Assured status in September 2013. Dudley is the only college in the West Midlands to achieve this and one of a small number nationally. In the STEM Assured Validation Report, the Advisory Panel commented:

"It was clear from the site visit that Dudley College is committed to the development of an excellent environment and good facilities for the delivery of STEM-related courses at all levels. This was evident in terms of strong leadership at management level and in the enthusiasm and commitment of the teaching staff".

"The college has a clear strategy for development that involves significant investment. The level of investment demonstrates an ambition for transformational change and a willingness to take managed risks in order to achieve this".

"It is clear that the college is committed to developing its ability to meet the educational and skills needs of the local community through creative partnerships and new models of interaction with employers and local education providers".

The Advisory Panel also commended the following example of good practice:

- The establishment and effective operation of specialist centres for the delivery of STEM education and training (*Dudley Aspire*, *Dudley Evolve* and the *Energy Training Hub*) that enable access to state of the art facilities for specific student and employee groups.
- The college's engagement with local employers in STEM-related initiatives and in the planned development of *Dudley Advance*.
- The college's strategic partnership with Aston University's Engineering Academy that aims to facilitate access to Higher Education in STEM related subjects for students in the local community.
- The college's encouragement and support for the Spectrum Project initiative that engages local employers directly in developing student awareness of the links between education and potential career paths.



**5.2** Following on from 'STEM Assured' accreditation, the college was nominated for a NEF 'Innovation in STEM' Award for the work around *Dudley Advance*. Competing against some of the country's industry leaders, the college was awarded 'highly commended' runner up prize.

**5.3** A range of new STEM subjects have been developed and introduced for academic year 2014/15 including programmes in Building Information Modelling (BIM) designed in collaboration with industry experts and a new A-level in Product Design.

**5.4** We have successfully won a bid to pilot a new level 3 core maths programme aimed at BTEC students looking for higher maths skills. This will be a cross-college project with students from business, science and engineering programmes as a trial of a qualification to support higher level maths development and as part of future technical baccalaureate programmes.

**5.5** *Dudley Advance* is on target to open in November 2014 and has gained significant interest from local industry, with pilot programmes for employer engagement in curriculum delivery (such as industrial mentor schemes) already in place.

**5.6** The second phase of *Aspire Works* opened September 2014 with STEM vocational training facilities aimed at students with severe learning difficulties.

## 6 NEXT STEPS

**6.1** For this coming year the STEM working group will be focussing its attention on maximising the impact of the good practice already in place and planning how to develop wider opportunities for promotion and development of STEM (particularly with inter-discipline or cross-curricula activities). The main focus will be:

- Sharing best practice in STEM delivery and opportunities for staff development (including industrial updating).
- Further development of STEM curriculum offer.
- Promotion and engagement in STEM by under-represented groups (for example, women into engineering).
- Wider opportunities for cross-curricula STEM delivery.
- Expansion of *Dudley Advance* model for employer engagement in STEM curriculum design and delivery.

This work will be monitored through the working group and through the college operational development plan.

**6.2** As well as the opening of *Dudley Advance* this year, the college has already gained approval and funding for the next phase in the Dudley Learning Quarter development – a new Centre for Advanced Building Technology (CABTech). Replacing the existing out-dated construction facilities, this new centre will have a focus on higher level skills to help meet the shortages in the industry. It will also use a similar employer engagement model to ensure the design of the building and its curriculum are fit for the needs of local and regional industry. Clearly the design and development of this (leading up to start of build project in 2015) will be a big focus this academic year.



**If you are interested in learning more about STEM, or would like to receive a copy of the STEM Assured Validation Report, please contact:**

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