

The Advanced Manufacturing & Engineering Hub

Project Evaluation Report - November 2018

1. Background

The Advanced Manufacturing & Engineering (AME) Hub is a network of colleges, private training providers and sector bodies under the umbrella of the Stoke-on-Trent and Staffordshire Local Enterprise Partnership.

The Hub provides world-class vocational environments in the manufacturing & engineering sector. It has been developed over two phases through £13.3m of LEP and private investment in facilities at six spokes. Each spoke has a lead specialism, has world class equipment and trains to the latest industry standards that enables the delivery of high quality and high level training programmes to support growth in the sector.

The Hub is a centre of good practice and acts as a mechanism for sharing industry standard training and technologies to improve the capacity and capability of the sector to respond to employer needs.

The Hub increases the LEPs operational capacity to deliver the talent pipeline of skills required by local industry across its delivery centres. The Hub will deliver the following key activities:

- Promote the AME Hub as a centre of good practice and a mechanism for sharing industry standard training to improve the capacity and capability of the sector to respond to employer needs.
- Provide growth in advanced manufacturing and engineering apprenticeships and traineeships.
- Upskill/reskill the current workforce in the sector to improve productivity.
- Upskill and retrain the unemployed and NEET young people in order to gain employment in the sector
- Provide specialist facilities and training to meet employer needs
- Promote AME career pathways in schools through careers events and open days at AME spokes

A cost benefit analysis has been completed as per the New Economy Manchester Cost Benefit Tool, using the projects actual learner growth figures for the AME Hub phase 2 projects. **It identified that over the next 15 years the projects would collectively provide an economic benefit of £44m and a fiscal benefit of £13m. The analysis reflects that the £6.9m SSLEP grant was practicably repaid after 2 years.**

Source: New Economy Manchester Cost Benefit Analysis tool <http://neweconomymanchester.com/our-work/research-evaluation-cost-benefit-analysis/cost-benefit-analysis/cost-benefit-analysis-guidance-and-model>

Economic value-The net increase in earnings or growth in the local economy

Fiscal value- The costs or savings to the public sector as more individuals are likely to be in work i.e. reductions in government expenditure where payments for Jobseeker's Allowance are reduced or reductions in demand for a service which means less of that service needs to be commissioned or provided.

2. The Advanced Manufacturing & Engineering Hub Partnership

An AME Hub partnership group has been established that has recently merged with the Entrust STEM Employers group. Members include the city and county council, colleges, schools, representatives from Staffordshire Providers Association, industry bodies and local employers. The group has developed a terms of reference and a STEM strategy document.

The terms of reference of the group is to promote the priorities of the Stoke-on-Trent & Staffordshire LEP STEM Strategy 2016-2021:

- **STEM Inspiration** – to inspire, attract and raise the aspirations of children, young people and adults in regard to STEM subjects and skills, for example through STEM ambassadors and local champions.
- **STEM Pathways** – to offer sound guidance and information on qualifications, career choices and options that support STEM, for example through careers IAG, work experience and progression planning.
- **STEM Infrastructure and Curriculum** – to secure the right assets to support specialist delivery and support shared local access to assets and infrastructure in order that the right curriculum can be delivered to align with industry need, for example through skill centre investment.
- **STEM Teaching and Learning** – to ensure high quality materials for teaching and industry -appropriate learning experiences for student, providing relevant context and purposeful learning to enable progression into work or higher level study.

Projects funded by the current LGF Skills Equipment Fund also feature in the AME hub partnership group.

3. Phase 1 AME Hub spokes

The Phase 1 spokes received £1.5m LEP city deal funding supported by £1.5 match in 2014 and offer specialist provision in: automotive and hybrid technologies in Newcastle-under-Lyme delivered by Martec Training, renewable pneumatics and hydraulics in Stoke-on-Trent delivered by Stoke-on-Trent College and in Tamworth, construction, electrical installation, motor vehicle and engineering provision delivered by South Staffordshire College. The phase 1 projects have collectively supported 4,500 learners over the last 3 years and have collectively grown learner numbers by 400 during this period.

The Hybrid Technology Centre – Martec Training – 2014 Total project £36k (£18k grant, £18k match)

Martec Training, leading on the spoke at Newcastle-under-Lyme, has set up a dedicated area within its existing training facilities to deliver hybrid and electrical training. Its new equipment includes an electric car and a hybrid car, specialised tools and interactive white boards. Some of the key developments are listed below:

- Developed a specialised course 'Introduction to Alternative Energy Cars' Courses, delivers the IMI Level 2 and 3 in electric and hybrid technology programmes and now delivers basic hybrid awareness training programmes as standard to all of its employers.
- Promotes motor vehicle and hybrid technology programmes to local schools

- Approximately 20 further companies have been engaged and successfully completed training following the launch of the centre and approximately 500 training courses have been delivered to date.
- Share best practice on hybrid technology training with a number of local training providers and colleges

The Technology Hub - Stoke-on-Trent Spoke – 2014 Total project £625k (£520k grant, £105k match)

Stoke-on-Trent College leads on the Stoke-on-Trent spoke of the Hub. The college has re-equipped its existing facility at the Burslem campus. The equipment includes hydraulics and pneumatics rigs, MIG welding plants, welding simulators, paint booth and mixing room and a vehicle body repair rig. The college is also providing a specialised teaching system for renewable technologies which features a solar power laboratory, heat pump, solar water heating and photovoltaic panels, along with electricity generator bikes. Some of the key developments are listed below:

- The project supports the engagement and transition of 60 learners each week who attend through the school links provision and the Bridge Project. The AME hub also provides opportunities for learners under the age of 16 to develop skills and knowledge within the Advanced Manufacturing Engineering sector through the colleges Prepare for Vocation (P4V) programmes.
- 2018/19 has seen the start of new Engineering offer in Level 2 Engineering and Level 3 BTEC qualifications developing skills for Computer Aided Design (CAD), Mechatronics, Application of Electronics, Programmable Logic Control (PLC) and Robotics to support the electrification and digitalisation initiatives within engineering manufacturing.
- The AME Hub has supported new programs and apprenticeships standards to meet the demand of the construction industry, these programmes include;
 - Welding Skills
 - Construction Technical
 - Construction Operations – Civils
 - Highways Maintenance
 - Advanced Engineering/ Manufacturing - CAD, CAM
- The development of these programmes will focus on Building pathology, waste management, EfW and energy efficiency in buildings. The concept, which will include theoretical master classes as well as Vocational Training.
- the AME Hub supports the delivery of bespoke engineering programmes for the following employers:
 - Ornuva Foods
 - MGS Precision Engineering
 - NSEGAT
 - JCB
 - RJ Lifts
 - Momentum
 - Unilathe
 - Olympus
 - Staffordshire Hydraulics
 - Johnson Tiles

The Tamworth Automotive & Engineering Hub – 2014 Total project £2.2m (£900k grant, £1.3m match)

The Tamworth spoke has been set up by South Staffordshire College at the Torc Professional & Technical Centre (the former Torc Vocational Centre) and at the college's campus in the town. The College received a £2m investment for equipment and refurbishment works and offers provision in construction, electrical engineering and other sectors. The Tamworth campus at South Staffordshire College offers provision in motor vehicle (petrol and diesel), welding, welding simulators, robotics, CNC milling, 3D printing/rapid prototyping and mechanical engineering. The new equipment includes hydraulics and pneumatics rigs, MIG welding plants, welding simulators, paint booth and mixing room and a vehicle body repair rig.

South Staffordshire College has revised its study programmes in Engineering and delivers EAL in Engineering Technology levels 1-3 alongside a BTEC level 3 route. It introduced a new Electrical Installation Apprenticeship standard delivered at Torc and an entry level 3 study programmes to provide progression opportunities in motor vehicle and construction.

4. Phase 2 AME Hub spokes

The phase two spokes offer specialist provision in: agricultural engineering & technology in Penkridge delivered by South Staffordshire College, advanced manufacturing, technical design and scientific engineering in Stafford delivered by Newcastle & Stafford Colleges Group, and in Rocester, Uttoxeter engineering, mechatronics, computer aided design and metrology delivered by the JCB Academy.

The phase 2 projects collectively were targeted to support 2,898 learners in September 18 which represented a growth of 1,432 learners against the volumes before the projects commenced. As at September 18 the projects supported 2,931 learners which demonstrated a growth of 1,465 against the learner volumes before the project. The project also supported 1009 employers as at September against a baseline of 797.

The AgriSTEM Academy – South Staffordshire College – 2017 Total project £5.5m (£3.8m grant, £1.7m match)

The £5.4m AgriSTEM Academy at the college's Rodbaston Campus, located 5 miles from the i54 Enterprise Zone and adjacent to the M6 motorway, delivers industry relevant training for the Advanced Manufacturing & Engineering and Agricultural Engineering & Technology sectors in the region. This state-of-the-art facility was created at the heart of the existing freehold college campus by repurposing a derelict farm building and transforming existing not fit for purpose workspaces. The facility comprises of:

- An advanced mechatronic lab
- Agricultural Engineering & Automotive/Hybrid Engineering workshops
- AgriTech/precision farming simulation Lab
- Performing Manufacturing Operations(PMO) training/assessment area
- CAD/CAM classrooms
- Multi-occupation construction area
- Renewables workshop for Solar Thermal, Solar PV, Air & Ground Source heat pump technologies.
- Gas heating & unvented hot water assessment areas
- Inspiring digitally connected classrooms
- Digitally connected independent study/collaboration areas
- Energy dashboard linked to solar panels and wind energy scheme completing 2015

The Academy supported 826 learners at September 18 which demonstrated a growth of 493 learners before the project. During this period, it has engaged an additional 108 employers and now works with over 700.

Some of the key developments are listed below:

- SSC delivers open events to schools to promote the AgriSTEM academy.
- The Soroptimists group provided the opportunity for 136 14-year-old female learners to attend an open event at the AgriSTEM during early this term. All took part in practical activities around the STEM agenda.
- The reviewed curriculum is now embedded with renewed focus on careers not courses. Apprentice Standards are being introduced across all areas where they are available and have EPAs in place.
- The gas centre is due to open in November 18 with BPEC registration in place. The new Gas Level three standard will be offered. Two new engineering staff members have been recruited with expertise in FESTO equipment, level 4 / 5 qualifications and apprentice standards. MDR plumbing, Blueflame and city & guilds has been integral to developing the centre.
- The college is currently working with new employers including Wolverhampton Homes and BASC. The employers are helping the college to develop new curriculum and commercial courses based around the AgriSTEM agenda.
- During October SSC is meeting with Stoke College to share best practice in Land Based engineering, and is working with Dudley College via the SKIF bid to improve T&L within AgriSTEM courses and has shared best practice with Plymouth College.
- The college has employed an Employability Manager to work exclusively with 16-24 unemployed. It has designed "Get Ahead" programmes for 16-24-year-old unemployed adults. The courses offer a qualification at levels 1 & 2 and are directly linked to existing curriculum to encourage progression onto an apprenticeship or traineeship. The programmes support learners to reengage in learning, build confidence and enhance wellbeing.
- Building contractors provided work experience to 153 students during the project construction phase.
- Commercial provision increased by £80k after the first year of operation.

The Science & Technology Centre - Stafford College – 2017 Total project £3.4m (£2m grant, £1.4m match)

The LEP has part funded the creation of a £3.4m STEM Centre based on the Stafford Campus of the Newcastle & Staffordshire Colleges Group. The Science & Technology Centre (STC) has the primary focus of developing STEM-related curriculum primarily at levels 3, 4 and 5. The Centre opened in September 2017 and boasts fantastic science and engineering facilities alongside a Lego innovation hub which focuses on the technical aspects of learning through the medium of Lego. The Centre also has its own robot – Pepper as she is fondly known – which has been acquired to help computing students develop their programming skills and incorporate the emerging technology of artificial intelligence.

The primary curriculum offered within the Centre is focussed on level 3 with the delivery of A Level Sciences, Engineering and Computing. The Centre also hosts level 4 full time, part time and apprenticeship programmes along with the College's level 2 and level 3 engineering apprenticeship activity. The College offers a series of primary and secondary taster activities focussed at key stage 3 and 4 where pupils from local schools visit the Centre for a day and experience on a carousel basis the Sciences, Lego and

Computing. The plan is to inspire the students of the future to consider STEM related activity when making their career choices.

The college's specialisms are in the following areas:

- Computer Aided Design/Manufacturing (CAD/M)
- 3D Design, scanning and printing
- Robotics, mechatronics and programmable logic controls (PLC's)
- Building Information Modelling (BIM)
- Design for Manufacturing (DFM)
- Building Energy Management Systems (BMS/BEMS)
- Construction design, architecture, surveying and civil engineering
- Technical construction management
- Mechanical, electrical and electronic (M&E) design, implementation & servicing
- Applied Maths

The Science & Technology Centre supported 1746 learners at September 18 which demonstrated a growth of 823 learners before the project. Employers engaged had grown from 165 before the project to 279 at September 18.

The STC at Stafford is now offering and running many STEM based workshops that target both primary and secondary schools. The LEGO Education Innovation Studio has school groups in every Thursday and delivers sessions based on robotics/engineering/green-technologies whilst introducing some Science and Math's principles and concepts. The hub also offer bespoke STEM days where schools can visit the centre and have a carousel day having tasters from different subject areas including physics, biology, chemistry, maths, LEGO robotics, engineering, computing etc.

Following the opening of the STC the college has introduced a new collection of level 3 courses to focus specifically on science and maths as well as enhancing the pathways through the different levels for engineering/health science courses. The development of level 4 and 5 courses at the new centre will help to fill the gap on future skills and the focus on advanced manufacturing, robotics and renewable energy will ensure the priorities are met. Further improvements have been made by the College/LEP in engineering equipment for September 2018 which will further enhance its offerings.

The STC at Stafford has become involved in various employer based STEM challenges and act as a sponsor for local schools. The two biggest projects are the KMF Young Engineer of The Year competition for which it has engaged with over 20 local employers from the North of Staffordshire; and the MNA STEM challenge organised by the Express and Star for which it engaged with many educational establishments and employers around the south of the county. The STC has also enabled work with large local employers such as higher level apprenticeships with Bostik and the NHS, and a range of courses with GE.

The model of introducing new level 3 courses has extended beyond the reach of STEM based courses. The structure and set-up of the provision has been shared across the areas with focus on creating more options for learners to continue to study post 16. External events have also been mirrored following their success and are used to promote pathways and careers in specific areas.

Local schools have also mirrored practice around the LEIS using resources to enhance and promote AME courses at secondary level. This has been fully supported by NSCG and has helped with the launch of the Staffordshire regional FLL.

Building contractors provided work experience to 62 students during project construction. 15 new posts were created post project completion.

The Dove Engineering Centre – The JCB Academy – Total project £1.5m (£1.1m grant, £400k match)

The JCB Academy has refurbished the former DOVE School and equipped it with state of the art specialist equipment. The centre has the capability to develop technical skills across a variety of engineering disciplines. The Academy has also developed an apprenticeship matching service to increase the number of starts in small businesses.

The centre includes:

- Engineering Science Lab – equipped to teach learners the science related to mechanical and electronic principles with the technology to allow learners to carry out experiments relating to structures, statics and electrical theory.
- Mechatronics Training Room– equipment will include festo units that include Siemens PLCs that require the integration of electronic control and mechanical systems. Each unit will be stand alone and can be bought together to replicate a manufacturing cell.
- Computer Aided Design Training Room– equipment to enable learners to model and test engineering solutions through both virtual realisation, element analysis and also mathematically through MATLAB. The equipment will also include a laser scanner to enable parts to be scanned, imported into software, adapted dimensionally and then prepared for modelling.
- Metrology Lab – to aid learners in the analysis of the properties of materials. The room will have a tensometer, hardness tester, impact tester, microscopes and sectioning machine that will be used to destructively test and examine materials

The Dove Engineering Centre has grown its Apprenticeship numbers by 149 from the point before the project and supported 359 at September 18.

The JCB Academy has worked with the JCB Technical and Professional Development Apprenticeship manager to create a partnership board to develop a new standard programme. The programme has a pathway of core skills, alternative pathways and gateway assessment points leading to an end point assessment. The programme is to be used as a “standard” for other often smaller firms to sign up for through its Apprenticeship matching service.

Best practice is shared with KS4, KS5 and the new Year 9 Engineering GCSE courses within the Academy.

10 additional teaching posts were created post project completion.

5. Project Performance

AME Hub Phase 1 projects

AME Hub phase 1 projects	Learner numbers before the project 2013/14	Learner numbers 2014/15	Learner numbers 2015/16	Learner numbers 2016/17	Total learners supported post project completion

The Hybrid Technology Centre	34	84	41	88	213
The Technology Hub	607	610	679	961	2,250
The Tamworth Automotive & Engineering Hub	557	789	620	534	1,943
Total	1,198	1,483	1,340	1,583	4,406

AME Hub phase 2 projects

AME Hub phase 2 projects	Learner numbers before the project 2016/17	Learner numbers post project completion 2017/18	Total learner growth
The AgriSTEM Academy	333	826	493
The Science & Technology Centre	923	1746	823
The Dove Engineering centre	210	359	149
Total	1,466	2,931	1,465

6. Project Capital Spend

AME Hub phase 1&2 projects

AME Hub Phase 1	South Staffordshire College	Martec Training	Stoke-on-Trent College	Total
City Deal	£900k	£18k	£519k	£1.437m
Match	£1,300k	£18k	£105k	£1.423m
Total	£2.2m	£0.036m	£0.624m	£2.860m
AME Hub Phase 2	South Staffordshire College	Newcastle & Stafford Colleges Group	JCB Academy	Total
Growth Deal	£3.8m	£2m	£1.1m	£6.9m
Match	£1.7m	£1.4m	£0.4m	£3.5m
Total	£5.5m	£3.4m	£1.5m	£10.4m

Appendices

Project Case Studies

The Technology Hub - Stoke-on-Trent College

Chris Banks – Level 3 Apprenticeship Engineering & Manufacturing

“Joining the college at 14 gave me the skills in time management, working with different age groups and working independently, as well as enjoying college life. My tutors helped me make an informed decision about my options!”

Chris joined the college at the age of 14 on a 2-year school link course as a young apprentice in Construction. The course gave Chris the opportunity to work with employers in various aspects of the construction industry. As well as gaining valuable life skills Chris's tutors put him forward for an apprenticeship opportunity which he successfully achieved with Morgan Sindall.

Since joining the company in 2014 Chris's enthusiasm and appetite to learn has shone through. He works within a small manufacturing team and has shown great perseverance and patience when introducing new equipment into the company. This has made a significant impact on the company's production effectiveness and costs. Chris's interest in the job and passion for learning have rubbed off on colleagues, and he is now involved in training senior staff members on modern work methods using the new technology. Despite a football injury set-back in his first year, Chris's determination has enabled him to catch back up and achieve his apprenticeship units with distinction. He is now well on his way to becoming a great engineer.

Greg Pickering - Faculty Student of the Year 2018 – Construction, Engineering and Motor Vehicle

As expected from an outstanding student, Greg's attendance and punctuality is excellent. What sets Greg apart is his participation throughout lessons; he actively engages and even acts as a peer mentor to some students who are struggling with the material.

Greg is an Apprentice and employed by Mec Com. Throughout his 18 months with the company he has developed considerably and is a valued member of the Engineering Team. His employer praises him stating, “Greg's ability to learn and pick up new skills is second to none even under the day-to-day pressures of a sub contract manufacturer. He works well in the team environment and can also work alone with very little supervision. He completes tasks swiftly to a very high standard demonstrating self-motivation and independence”.

Mec Com are confident that Greg will play a significant role in the business's future success at a high level.

Andrew Burgess – Apprentice of the Year 2018 – Maintenance Engineer at Ornu Food UK

Andrew is an Apprentice at Ornu Foods and he has made an exceptional start to his Advanced Apprenticeship.

He has excelled in his training and assessment tasks, producing work to a very high standard.

Feedback from Assessors in college and his employers has been extremely positive, identifying that Andrew possesses the skills, attitude and drive to succeed. Graham Darch,

from Ornuva Foods comments “I am confident that Andrew understands and is embracing the aspirations of our Apprentice programme ...Andrew should be aspiring to senior leadership positions before he is 30”.

The Science & Technology Centre - Newcastle & Stafford Colleges Group

Aston Martin come to NSCG

On Wednesday 10th October 2018 students from NSCG Engineering and Motor vehicle programmes, which included Apprentices, were invited by the IMechE [Institute of Mechanical Engineers] to participate in an Evening Lecture on the lightweight aluminium bonded body and new design structure of the Aston Martin DB11. To aide this fantastic master class, two Aston Martins were brought into the Stafford campus in order for students to see first-hand these engineering achievements and the key challenges met by the body engineering team during the development of this high performance vehicle. This exciting event is one of many planned in conjunction with the IMechE at the college and supports the development of higher level technical knowledge and skills for a broad range of Engineering students, as well as a highly valued, wider industry relevant enrichment programme. The students were so impressed with the event and in particular to meet the key engineers and to see the vehicles they have been inspired to include some of these ideas into their own college based projects.

The AgriSTEM Academy - South Staffordshire College

A number of learners have returned for their second year in Land Based Engineering, George works with his father in a dairy equipment company. He has undertaken his first year at level 3 and has returned to the second. His ambition is to manage his father's business but before that wishes to attend University using his Btec for the required UCAS points

“**Ranjit** came to the college with his parents looking for learning to help improve his employment opportunities. Ranjit enrolled onto the Get Ahead Programme (GAP) to improve his confidence and self-esteem. Following the success of GAP, Ranjit then progressed onto a Traineeship programme with a horticultural placement at a local community centre. Ranjit is hopeful in securing an apprenticeship with Wolverhampton City Council. Ranjit said – “The experience has been so beneficial for me and I am delighted with my Apprenticeship opportunity with the Council. I am thoroughly enjoying my work and hope to be moving onto Level 3 soon”.

The AME Hub brochure

A brochure has been completed featuring the AME Hub and is published on the Stoke-on-Trent & Staffordshire LEP website.

<https://www.stokestaffslep.org.uk/app/uploads/2018/04/SSLEP-AME-booklet.pdf>