

WORKFORCE DEVELOPMENT IN THE FURTHER EDUCATION (FE) SECTOR IN ENGLAND IN RELATION TO SCIENCE, TECHNOLOGY, ENGINEERING AND MATHEMATICS (STEM)

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Workforce development in the Further Education (FE) sector in England in relation to Science, Technology, Engineering and Mathematics (STEM)

Executive summary

This paper sets out the challenges and opportunities in taking forward the STEM agenda in the FE sector in England, specifically in relation to workforce data collection, workforce planning, development and reform. Lifelong Learning UK (LLUK) has responsibility for strategic workforce development across the lifelong learning sector which includes community learning and development¹ (CLD); further education (FE); higher education (HE); work based learning (WBL); and libraries, archives and information services (LAIS).

This purpose of this paper is to provide a perspective on the teaching and learning workforce outside the school workforce but does not cover the workforce of higher education institutions (HEIs) which also come within the LLUK remit.

The paper is divided into three sections:

- 1) current position
- 2) the programme of work currently underway which impact on the STEM agenda
- 3) planned activity which could impact on the STEM agenda and possible areas for development and discussion with STEM agenda colleagues.

LLUK has not to date collected specific information about STEM agenda workforce issues and this paper is the first to capture information and intelligence relevant to this important area of special interest.

We view the presentation of this initial paper as an important opportunity for discussion of the issues and opportunities relating to the FE sector STEM workforce.

Introduction

Section 1 sets out the policy context and profile of the FE sector, and the significance of Sector Skills Councils (SSCs) and LLUK in relation to strategic workforce development.

Section 2 provides information on the current strategic workforce developments being led by LLUK, framed within the first FE Sector Workforce Strategy for England, that are relevant to the STEM agenda.

Section 3 identifies future work being taken forward by LLUK which includes the professionalisation of the teaching workforce and recruitment and retention programmes. This section also proposes additional actions to support capacity building of STEM areas in the FE sector and seeks views on these.

¹ Community learning and development comprises seven discrete strands which are youth work, adult and community learning, community development, development education, community development learning, family learning and working with parents.

Section 1 - Current position

1.1 Profile of the FE sector

The FE sector is diverse and includes colleges; work based learning providers including private training providers; local authorities; and voluntary sector and community providers. Some are small, specialised organisations, employing just a handful of people. Some are large multi-million pound businesses serving over 30,000 learners and employing many hundreds of staff. It is estimated that the FE sector employs over 320,000 people². Almost all FE sector employers will be drawing on a large number of funding streams to deliver a wide variety of services and many are already in partnership with other providers, schools, public services or employers. The sector serves young people, adults both in and out of work, as well as the whole range of employers from accountants to social services.

The FE sector works with young people aged 14 upwards and also delivers an increasing amount of HE within the FE sector. The FE sector works actively with partners to widen participation and access to learning linking with the Aimhigher initiative and Lifelong Learning Networks.

The provision of GCSE, A and AS levels and applied level 3 learning, for example BTEC qualifications³, for young people post 16 is primarily through FE general colleges and independent sixth form colleges within the FE sector. However, it should be emphasised that there is no national curriculum prescribed for the FE sector and the curriculum offered will relate to the level of learner demand, funding available and learner numbers in agreement with the Learning and Skills Council (LSC).

1.2 The FE sector workforce

The known numbers of employers in the FE sector in England include:

- FE sector - 409 FE colleges including incorporated general FE colleges, tertiary, independent sixth form colleges and specialist colleges and incorporated specialist colleges
- WBL - 1,340 contracted with the LSC comprising national, regional and local private training providers

In addition, there are at least 56 local authorities in receipt of LSC funding.

Colleges and work based learning employers employ staff under their own organisation terms and conditions. As a result of the National Joint Council there are, however, agreed scales of pay for staff in sixth form colleges that promote broad parity between themselves and schools. This is not the case though for FE colleges⁴ or work based learning providers who decide their own pay scales - as a consequence, many FE sector staff are paid less than their school counterparts.

Workforce development and planning has to be based on robust, meaningful and reliable labour market intelligence. This is a key priority for LLUK and has been identified as Priority One in the FE Sector Workforce Strategy. Currently FE college staff workforce data is collected through the Staff Individualised Record (SIR) annual return which has been

² This does not include volunteers

³ BTEC is a registered trademark of EdExcel, a major awarding body

⁴ Unions and the Employers body, Association of Colleges agree annual recommendations for pay only

transferred in the last two years from the LSC to LLUK. Now that the definition of the FE sector has expanded to include work based learning providers and community based learning providers⁵ additional data sets will be added in the future including the Skills for Life⁶ teaching workforce.

There are challenges to be overcome in the collection of data, particularly in respect of employers in the work based learning and community based learning parts of the sector. Recent LLUK research indicates that there are still significant numbers of employers using paper based systems to record staff details. In addition, there are no regulatory requirements on employers to complete SIR returns.

SIR data 2005/6 identifies a total FE college workforce of 238,537 of which 52.9% are teaching staff. STEM staff cover 18% of the teaching workforce, a total of 22,710 teachers. Analysis of the STEM⁷ FE college teaching workforce from 2002 to 2006 shows that the percentage of teaching staff delivering STEM subjects has consistently remained between 18% and 19% of the total teaching staff over this four year period.⁸

In terms of gender the majority of non-STEM teachers are female (63.8%) however with STEM teachers as a whole this pattern is reversed with only 37.9% of all STEM teaching staff being female. This appears largely due to the impact of the engineering, technology and manufacturing teaching workforce being male - in excess of 90%. This does raise interesting issues about how women could be encouraged to consider teaching STEM subject areas and it may be helpful to consider how LLUK might work with UKRC in SET⁹

The working patterns of the non-STEM teaching workforce indicate that there are more part-time teachers (63%) than full-time (37%). This pattern is reversed in the STEM teaching workforce with more full-time STEM teachers (52.5%) than part-time (47.5%)

Often teaching in FE colleges is a role that is pursued after gaining experience and knowledge in a professional or vocational setting. It is not the case that many new members of staff join an FE college direct from graduating at university. This does affect the overall age of the teaching workforce which has remained stable at 44 years over the last four years. When comparing the age of STEM teaching staff over the same period of time the average age is slightly higher at 46 years. For both STEM and non-STEM teaching staff there has been a slight decrease in the average age from 2002 to 2006.

Regional variations in the distribution of STEM teaching staff across England show the highest number in West Midlands (3081) with the lowest in the North East (1311).

Further data related to the STEM FE college teaching workforce can be found in the attached Appendix.

1.3 The context of post- 14 FE sector learning provision

The importance of the FE sector has now been recognised as pivotal to successful workforce development in all other sectors as identified in the FE White Paper:

⁵ Also known as PCDL (Personal Community Development Learning)

⁶ Smith Report on Mathematics Post 14 identifies need for discrete workforce data on the mathematics workforce not subsumed into Science and Mathematics

⁷ STEM subjects defined as Science and Mathematics, Engineering, Technology and Manufacturing; and Information and Communication Technology

⁸ Further detail can be found in Appendix on STEM FE college staff from SIR data.

⁹ UKRC - UK Resource Centre for Women in SET

"We will only (become world class) if our FE sector system is fit for purpose in meeting the two strategic challenges of transforming 14-19 education and upskilling the adult workforce. This will mean major reform for colleges and training providers, so that the FE sector gains the esteem it deserves as the engine room of a successful economy, with the power to transform lives."¹⁰

The importance of ensuring a good supply of scientists, engineers, technologists and mathematicians has also been recognised by the Government as vital to the success of the economy now and in the future - one of the challenges is to ensure that the FE sector can effectively contribute to this goal.

The post-14 learning sector has seen rapid policy changes in recent years including; *The Government's Five Year Strategy for Children and Young People (July 2004)*; *Realising the Potential – The Foster Report (November 2005)*; and *Further Education: Raising Skills, Improving Life Chances the Further Education Reform White Paper (March 2006)* which sharpened the mission of the Further Education system to focus on economic development to meet the needs of employers and learners by developing a national quality improvement strategy¹¹, new funding and planning systems, and updating the skills of FE teaching and learning staff.¹²

The introduction of the Government flagship initiative Train to Gain which provides employers with independent brokerage services and the planned incremental move to shift the majority of the funding, available to FE sector providers for adult provision, to a demand-led base will also impact upon the learning opportunities and curricula offered to older employees. The Government intends Train to Gain to become a much broader service than operates currently, one that will help employers of all sizes and in all sectors to improve the skills of their employees - to succeed, this requires an FE sector workforce that is flexible, that can offer skills at places and times to suit the employer and tailored to the organisational and individual needs.

Within the last year, this evolving policy agenda has culminated in the release of *Prosperity for All in the Global Economy – world class skills – the Leitch Report (December 2006)*, setting the ambition for increased skills achievement across the UK in order to compete in the global economy; *Further Education: Raising Skills, Improving Life Chances Update, July 2007*, outlining the reform agenda and organisations involved including the strategic workforce development role of LLUK in FE reform. The shift towards demand-led provision has now been cemented with the publication of *World Class Skills: Implementing the Leitch Review of Skills in England, July 2007*, which sets out the mechanisms by which England will achieve its skills ambition to improve economic prosperity, employability, productivity and social justice.

There are also key national partners working with LLUK who have an important role to play in developing the capacity and quality of the FE sector workforce, such as the Quality Improvement Agency (QIA), Centre for Excellence in Leadership (CEL), the Learning and Skills Council (LSC) and others. QIA in particular hosts the Excellence Gateway¹³ website which holds easily accessible teaching and learning resources for teachers and trainers in Construction, Engineering, ICT, Mathematics and Science.

¹⁰ Further Education: Raising Skills, Improving Life Chances - DfES, March 2006

¹¹ led by Quality Improvement Agency (QIA)

¹² FE sector teaching and learning staff definition includes teachers, trainers and tutors across the FE sector together with learning support assistants and technicians

¹³ Website <http://www.teachingandlearning.qia.org.uk>

1.4 Sector Skills Councils

There are 25 Sector Skills Councils (SSCs) which form the Skills for Business network¹⁴ - each one is an employer-led, independent organisation. At present the Sector Skills Development Agency (SSDA) underpins the network and is responsible for funding, supporting and monitoring the SSCs. In addition to working nationally SSCs work in partnership to support economic strategies and priorities with regional stakeholders, eg regional development agencies (RDAs), LSC, and Jobcentre Plus.

There are ten SSCs which are STEM focused - these include SEMTA (science, engineering and manufacturing technologies), COGENT (chemicals, pharmaceuticals, nuclear, oil and gas, petroleum and polymers), Energy & Utility Skills (energy and utility), e-skills UK (IT and telecoms), Financial Services Skills Council (maths), ConstructionSkills (all sector from architects to bricklayers), Summit Skills (building services engineering), Improve Ltd (food and drink manufacturing and processing), Proskills UK (building products, coatings, extractives, glass and printing), and Skillset (audiovisual industries). Each of these SSCs will be setting national occupational standards and agreeing sector qualifications strategies for their employers which impacts upon the FE sector.

1.5 Lifelong Learning UK

Lifelong Learning UK (LLUK) is the independent employer-led Sector Skills Council for community learning and development; further education; higher education; work based learning; and libraries, archives and information services.

LLUK's mission is to ensure that lifelong learning employers can recruit, retain and develop highly skilled and effective staff so that we can access the skills and knowledge needed for a prosperous economy and inclusive society.

LLUK provides the strategic perspective for workforce planning and development for the lifelong learning sector across the four countries of the UK, working closely with government representatives from England, Wales, Scotland and Northern Ireland to support a four nations approach to workforce development.

We are responsible for defining and developing the Sector Skills Agreement (for a summary of the Sector Skills Agreement (SSA) process see Appendix 1) and Sector Qualifications Strategy (SQS) for the lifelong learning sector. We are also licensed by the UK governments to set standards for occupational competence in the delivery and support of learning. These standards are used to inform the recruitment and professional development of our employers' staff.

LLUK leads stakeholders in the collection and collation of workforce data and provides analysis on workforce characteristics and trends to better inform future workforce planning. We also work with partners and other key stakeholders to improve the dialogue between our employers and those who look to the lifelong learning sector to meet their own skills needs.

Lifelong Learning UK works closely with UK wide partner organisations on a wide range of programmes and policy initiatives which support building an excellent workforce for the sector. LLUK is a national partner in the National Improvement Strategy working to ensure world class provision of learning in the FE system for both learners and employers.

¹⁴ The Skills for Business network aims to boost the productivity and profitability of the UK through identifying and tackling skills gaps and shortages on a sector by sector basis.

1.6 The Impact Review - supply and demand

LLUK occupies a unique position in the Skills for Business Network as the only sector skills council that represents the providers of education and training for all the other sectors. Recruitment difficulties in skills shortage areas in the FE sector will significantly affect the ability of other SSCs to develop their workforces. As a result LLUK is undertaking a unique strand of activity called an Impact Review which focuses on reviewing the SSAs of the other 24 SSCs in order to understand their potential impact on future workforce planning and implications for the lifelong learning sector workforce across the UK.

Following the initial review of SSAs, LLUK will be working collaboratively with other SSCs and partners to ensure that the skills base of the FE sector meets the current and future needs of employers. Emerging themes from the SSA analysis to date, drawing on discussions with ConstructionSkills, SEMTA and SummitSkills include developing the capability of the workforce to deliver new qualifications, new forms of delivery of learning, quality and flexibility of delivery and the need to build the capacity of the sector in line with the forecasted increase in learners and the rapidly developing knowledge base of STEM subjects. One of the recommendations of the Impact Review work in respect of the STEM agenda was the importance of undertaking collaborative work with the National Skills Academies.

National Skills Academies have already, and are being developed, by SSCs and the first tranche of these are in STEM subject areas such as Construction¹⁵, Manufacturing, Food and Drink Manufacturing, and Financial Services. One aspect of LLUK's work is to identify the impact that these will have on the LLUK FE sector workforce.

In every regional economic strategy (RES) there is at least one STEM area identified as a priority - part of LLUK's SSA Stage 1 work was to review these and the final SSA Action Plan will include sections relating to regional strategic partnerships and plans. Technical and Industrial updating is a significant factor for both employees and teachers to ensure economic growth across the regions. LLUK works in the regions with strategic partners to support the development of planned continuing professional development (CPD) opportunities and is currently in discussions with SEEDA¹⁶ regarding a regional STEM Education and Skills Framework for CPD.

Section 2 - Programme of work underway

2.1 A Sector Skills Agreement for the lifelong learning sector (SSA)

LLUK is in the process of completing each of the five stages of the SSA process to produce a UK wide SSA. This means that LLUK has undertaken an assessment of current and future skills needs within the lifelong learning sector, together with an assessment of the current supply of skills provision. This work has been market tested with all of LLUK's employer groups across the UK and is currently undergoing further consultation with employers, partners and stakeholders to help shape possible solutions.

¹⁵ ConstructionSkills, SEMTA, Improve and Financial Services - planned academies include the Nuclear Industries

¹⁶ South East England Development Agency

2.2 Current skills issues

A 2006 report in England Incentive Shortage Subject Funding (Pye Tait, 2006) identified the following STEM related subject areas as facing difficulties in recruiting and retaining teaching staff:

- Construction (advanced plumbing, joinery, carpentry)
- Engineering (electrical, mechanical, refrigeration)
- ICT (specialised areas rather than basic/general ICT)
- Science (pure and applied)

These findings were supported by an earlier study carried out by York Consulting in 2005 in England Recruitment and Retention in the Post-16 Learning and Skills Sector which found that surveyed colleges experienced hard to fill vacancies in the following areas:

- Construction (15% of colleges)
- Engineering (6%)
- Health and social care (5%)
- ICT (4%).

A shortage of fully qualified Skills for Life teachers and trainers was also identified through the SSA research which has implications for mathematics.

According to the survey participants, the most important reasons for hard to fill vacancies were poor terms and conditions (reported by 43% of affected institutions) and a low number of applicants with the required skills (42%). Other factors included competition from other employers and lack of relevant qualifications.

One of the most significant barriers to recruitment has been highlighted as the inability of the FE sector to match the salaries offered by schools, HE and industry. This then makes it difficult for FE institutions to compete for the higher paid and higher qualified people in the labour market. It will be important to consider this alongside the increased demands from the school sector for vocational teachers.

2.4 Future skills issues - the ageing workforce and increased demand for professional staff

Future demographic changes including the ageing of the labour force will have an impact on recruitment across the UK Further Education workforce. Information on the age profile of the college teaching staff shows that 52% of staff in England were aged 45 and over in 2004/05.

The 2002 Skills Foresight Survey noted that the current age profile of teachers and the dependency of colleges on part-time and casual teaching staff will have major implications on the sector's ability to respond to increasing learning demands. In terms of future skills shortages, significant proportions of employers in England, Scotland and Wales indicated that they expect the demand for professional staff to increase over the next five to ten years.

With an increasing demand for professional staff it will be important to develop career pathways and opportunities for the wider workforce and widen participation. SSA research did not identify a shortage of technicians in the FE sector - however our research into the HE

sector did reveal that there are shortages and CPD needs related to the technician role. It is likely that this would also apply to the FE sector and will be a subject for further exploration.

2.5 What is the demand for skills?

The results from the 2006 LLUK Employers survey show that more than half of FE employers (52%), indicated that they had experienced difficulties in recruiting professional staff at Level 4 and above. They reported that:

- Applicants were most likely to lack specialist professional, technical and practical skills, with 44% of employers reporting skills shortages in this area. This includes subject specific skills and knowledge as well as teaching and pedagogical skills;
- Employers also reported internal skills gaps in their existing workforce with 40% indicating that their professional staff lacked specialist professional, technical and practical skills, in addition to lack of relevant experience;
- More than half of employers expected the demand for professional staff in FE colleges to increase over the next five to ten years (52%).

In 2005, the Department for Education and Skills were concerned to explore with LLUK new approaches to resolving key recruitment shortage areas to attempt to alleviate the possible impact of colleges carrying large numbers of vacancies at a time when they are attempting to increase capacity in the sector. This was particularly relevant with the imminent launch of new vocational specialist schools and the introduction of the 14-19 specialised diplomas in 2008. The LLUK national project "Trade up to teaching and pass on your skills" was the resulting pilot in 2007 and this will now inform the planning and delivery of one of four recruitment and retention programmes entitled Give Something Back.

The Construction project had three distinct phases:

- 1) A national advertising campaign
- 2) Two day introductory workshops into the college and construction and building engineering services departments
- 3) Three pilot programmes Preparing to teach in the Lifelong Learning Sector contextualised for construction and building engineering services.

Information Advice and Guidance is available at each stage of the project.

The project was successful in generating a high level of responses (over 4,000) to the advertising campaign and participants took part in either an introductory workshop or contextualised PTLLS¹⁷. The project has provided valuable direction to the future programmes.

2.6 FE Sector Workforce Strategy

The FE Sector Workforce Strategy frames current and planned activity in relation to the professionalisation of the workforce and programmes to support recruitment and retention across the Sector. The Strategy will encompass all staff in the FE sector.

The SSA for the lifelong learning sector has provided the foundations for the Workforce Strategy which has a key role in framing the solutions to the skills priorities and needs for the FE sector in England.

¹⁷ The new initial award for teaching in the FE sector called Preparing to teach in the Lifelong Learning Sector

The Strategy will also consider issues of equality and diversity within the workforce as LLUK has already collected data which highlights areas for further investigation and possible positive action. Whilst this data has not been analysed to date in respect of the STEM agenda this may be another aspect to the work that might be considered, resources permitting.

2.7 Training and developing the modern professionalised workforce

September 2007 sees the introduction of new professional qualifications framework for teachers in the FE sector which will lead to Qualified Teacher Learning and Skills (QTLS) status and Associate Teacher Learning and Skills (ATLS) status together with a requirement for at least 30 hours of CPD each year. Teachers will be required to register with the Institute for Learning (IfL).

Work is underway with key national employers such as the MOD in promoting qualifications and professional status for their teachers in STEM areas with the development of specific modules within the qualification framework to encourage formal recognition of teacher skills in STEM areas.

Progress to date

Success for All (2002): Workforce Qualifications strand outlined a target for having a fully qualified FE teaching workforce by 2010. An interim target was set that by July 2006, 60% of part-time and 90% of full-time FE teaching staff would either hold or be working towards a qualification.

Progress against this target has been reported annually since 2003 by, in the first instance, the LSC, then latterly since 2005 by LLUK using the Staff Individualised Record (SIR) data. More recently further analysis of the SIR data in conjunction with DIUS suggests that 82% of part-time and 89% of full-time staff are qualified or enrolled on an appropriate qualification in July 2006.¹⁸

Based on the methodology used to set the target, the 60% interim target for part-time teaching staff was exceeded, whilst the interim target for full-time teaching staff was missed by 1%. A detailed report with analysis of SIR data for 2005/06 was published by LLUK in July 2007.

2.8 Recruitment and Retention Initiatives

LLUK works with DIUS to promote the take up of two schemes designed to encourage recruitment and retention into teaching in FE sector colleges through a dedicated Information

¹⁸ In analysing SIR data for 2005/06 it was found that due to the incomplete data from around 10% (full-time) and 30% (part-time) records previous reporting on progress towards the 2010 qualification target has underestimated the potential qualifications of FE teaching staff. In order to report on the Success for All interim target more accurately statisticians in DIUS and LLUK have worked together to develop a methodology for estimating how many of the 10,300 with incomplete data are qualified or enrolled on appropriate courses taking into consideration the qualification rates of those with complete data and other relevant data which is available for all FE teaching staff.

and Advice Service for prospective and existing FE sector teachers. These two schemes are called the FE Sector Bursaries and FE Sector Golden Hellos schemes.

FE Bursaries are paid to teachers coming into shortage subjects and Science, ICT, Engineering and Mathematics are all included on this list. For the academic year 2005/06 STEM subjects were awarded 10% of bursaries (around 200 out of 2000 bursaries awarded). Bursaries are only paid to those doing pre-service initial teacher training. The budget is fixed, with institutions delivering pre-service ITT courses bidding for places. The budget currently meets just over 90% of those bids.

Golden Hellos are paid to teachers in their second year of teaching. The programme is demand led (ie all eligible claims are paid) and over recent years total payments have ranged from around £5m to around £6.5m). For the year 2006/07 STEM subjects were awarded around 29% of the 1300 payments made under the scheme.

2.9 Skills for Life

LLUK has responsibility for ensuring that an appropriate standards and qualifications framework is in place for the initial training of specialist subject teachers of literacy, numeracy and English for Speakers of Other Languages (ESOL) within the FE sector. LLUK will also ensure that CPD opportunities are available.

All teachers undertaking initial training study a minimum core of literacy, language and numeracy. The minimum core was introduced in 2004 and revised to ensure that all FE sector teachers have knowledge and personal skills in literacy, numeracy and ICT. LLUK is working with DIUS to find the most appropriate way of assessing the personal skills of teachers in English, mathematics and ICT. CPD opportunities will also be developed for existing teachers.

LLUK is also responsible for ensuring the training needs of vocational and other subject teachers and learning support in respect of Skills for Life are met and is developing a qualifications framework for learning support

In order to develop the workforce strategy in relation to Skills for Life, LLUK has undertaken a survey of the Skills for Life workforce which identified the number of practising teachers who are not qualified and the characteristic of the unqualified workforce to inform future work.

LLUK has developed the application of the new professional standards for specialist teachers of literacy, numeracy and ESOL and is also developing standards for those in a learning support role with a Skills for Life specialism.

National Reference Point (NRP)

The National Reference Point Skills for Life professional development (NRP) is hosted by LLUK and has been established to offer specialist information and advice to those intending to join the Skills for Life profession, existing teachers and learning support staff, as well as those with an interest in their development. The NRP will ensure that up-to-date information on current developments is available from a single source, which will include information on standards, qualifications and broader professional development opportunities. Information and guidance materials are available for those in an advisory and signposting role through the LLUK website and dedicated advisors providing a telephone information and advice service. NRP works closely with the Quality Improvement Agency (QIA) to ensure that information, advice and guidance (IAG) training is targeted at areas of need.

LLUK works in partnership with the National Centre of Excellence for Teaching Mathematics (NCETM), meeting regularly with them and has membership of the NCETM Advisory Group. The remit of the NCETM includes the interpretation of both the Training and Development Agency (TDA) and LLUK professional standards in respect of mathematics and CPD and highlighting available learning opportunities. NECTM is developing a sustainable national infrastructure for subject specific professional development for teachers of mathematics. This is a vital part of strengthening the teaching and learning of mathematics; it will realise the mathematical potential of learners and raise the status of the profession (includes Post-16). LLUK is also a member of the Advisory group for Functional Mathematics and working with QCA on the development of function skills in mathematics at Level 3.

2.10 14-19 CPD

LLUK has worked in partnership with the TDA to develop an online Training Needs Analysis tool to inform the generic CPD needs of teachers who work for organisations delivering the new Diplomas. A report on excellence in applied learning has also been published¹⁹. LLUK has not been involved to date with the subject specific professional development on the lines of learning relating to the 14 broad economic sectors - this work is being taken forward by QIA

There are FE sector STEM specialists who will work in partnership with School STEM specialists in the delivery of Diploma lines from September 2008/09/10 as part of successful gateway consortia. (The primary STEM specialists are indicated, this is not to suggest exclusivity)

- Creative and Media (Technology)
- Construction and the Built Environment (Engineering)
- Engineering (Engineering)
- Information Technology (Technology)
- Society, Health and Development (Science)

From September 2009:

- Business Administration and Finance (Technology)
- Environmental and Land based Studies (Science)
- Hair and Beauty (Science)
- Hospitality and Catering
- Manufacturing and Product Design (Engineering, Technology)

From September 2010

- Public Services (Technology)
- Retail (Technology)
- Sports and Leisure (Science)
- Travel and Tourism (Technology)

¹⁹ Excellence in Applied Learning (LLUK, TDA 2007)

LLUK is working in partnership with other SSCs and together with the Childrens Workforce Development Council nationally and regionally to provide support, as appropriate, to the gateway consortia planning to implement the new Diplomas.

2.11 Foundation Degrees and delivery by FE colleges

A significant proportion of Foundation Degrees are taught and delivered by FE colleges (and sometimes by other training providers). As they are designed in partnership with employers in collaboration with other SSCs LLUK is also interested in the specific workforce needs required to deliver these qualifications. Many of these courses have flexible teaching arrangements including part-time or evening attendance at college, distance learning or learning via the internet. As they are validated by a named university, there are additional workforce implications.

Section 3 - Planned activity and ways forward

3.1 FE Recruitment and Retention Programmes (The Catalyst Programme)

This FE Recruitment and Retention Programmes seek to develop world class management across the FE Sector, and ensure that we have teachers, tutors and trainers with the right levels of vocational skill and expertise to deliver effectively to the sectors they serve. These represent the overall objectives of the programme, which will be achieved through enabling the FE system to:

- Recruit talented graduates
- Encourage highly effective managers from other sectors to come in to FE
- Provide opportunities for skilled specialists to teach in FE
- Provide opportunities for FE staff to update their skills in industry.

These four programmes are:

- 'Make a Difference', a programme to encourage high-flying graduates to make a career in the sector.
- 'Business Talent', a management recruitment programme as suggested by Sir Andrew Foster, to help colleges and providers attract exceptional talent from business and the public sector into senior management roles.
- 'Business Interchange' to offer teachers and trainers structured experience and training in relevant business sectors and create parallel opportunities for industry experts to give time to local colleges and providers.
- The 'Give Something Back' programme, to be run in collaboration with the Skills for Business network, will give technical and vocational specialists opportunities to teach in colleges and providers to fill key vacancies and to prepare the next generation for their industry. This programme will have a rolling plan of work with priority sectors and will provide colleges with an additional channel of development to support the new Diplomas. The first sector is anticipated to be engineering.

The latter two programmes will be particularly relevant in supporting the STEM agenda and there are potentially opportunities for collaboration between the STEM ambassador scheme and Business Interchange.

3.2 Future areas for exploration

Subject to the availability of resources and guidance in terms of broad direction in respect of the STEM agenda, other potential areas for exploration could include the following:

- SSA Solutions - around developing the capacity and capability of the Sector; developing partnerships across the lifelong learning sector with partners and employers; and addressing recruitment and retention issues
- Further partnership work with the TDA on shared workforce priorities related to STEM such as equality and diversity initiatives related to gender and ethnicity.
- Raising the profile of STEM workforce development with FE sector employers and partners by including this in the FE Sector Workforce Strategy and Implementation Plan for England
- Regional partnerships with RDAs to develop the links between economic priorities, align strategic plans across stakeholders and partners to support FE sector workforce development
- Exploring how HE can support STEM in the FE sector, for instance links with Lifelong Learning Networks (LLNs) who are providing CPD opportunities to lecturers, teachers and trainers to support regional sector priorities
- Exploration of cross sector SSC STEM alliance through LLUK's pivotal role within the Skills for Business network in order to achieve coherence and alignment of SSC activities.

LLUK would welcome feedback and discussion on the information and issues in this paper and also on the following questions:

1. What information about the FE sector workforce in England would be helpful in going forward?
2. What information/data and resources might be available through the STEM group to help support and develop LLUK's understanding of the FE sector workforce?

For further information contact Lifelong Learning UK:

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1.1 STEM Teaching Workforce in the FE Sector Colleges (source: the Staff Individualised Record (SIR) Data)

This is a brief statistical analysis on those teachers identified in the SIR as teaching in either of the following subject areas:

- Science and Mathematics
- Engineering, Technology and Manufacturing
- Information and Communication Technology

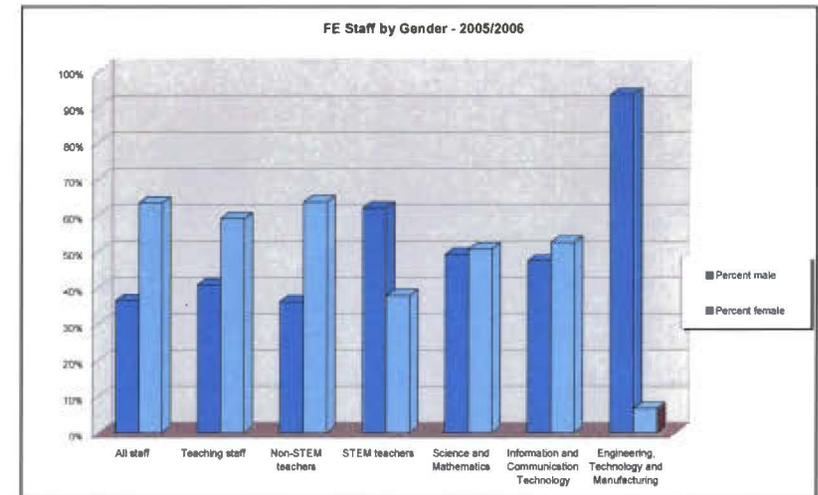
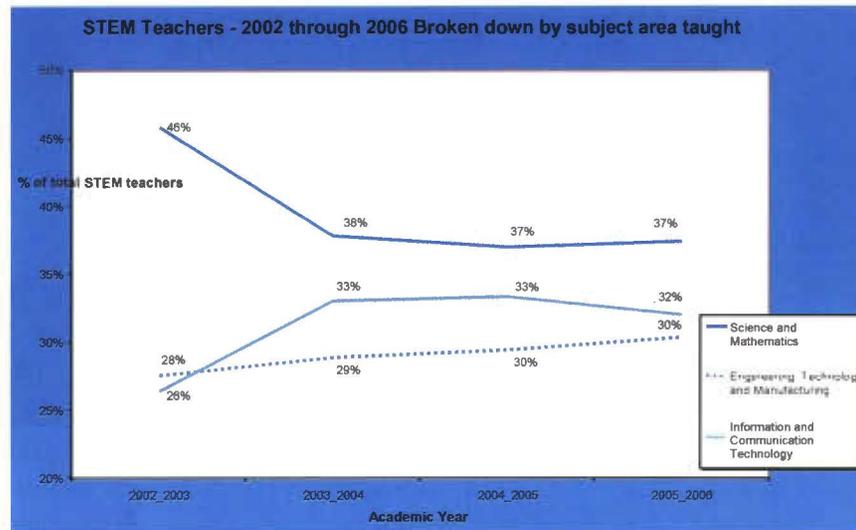
Future analyses will focus on learning support assistants and technicians supporting STEM subjects.

1.1.1. STEM staff as a percentage of all teaching staff – 2002 through 2006

2002/2003		%	
All staff	238525		
Teaching staff	126784	53.2%	
STEM staff	23780	18.8%	
		% STEM	% All Teaching
Science and Mathematics	10912	45.9%	8.6%
Engineering, Technology and Manufacturing	6572	27.6%	5.2%
Information and Communication Technology	6296	26.5%	5.0%
2003/2004		%	
All staff	248246		
Teaching staff	134145	54.0%	
STEM staff	24840	18.5%	
		% STEM	% All Teaching
Science and Mathematics	9419	37.9%	7.0%
Engineering, Technology and Manufacturing	7192	29.0%	5.4%
Information and Communication Technology	8229	33.1%	6.1%

2004/2005		%	
All staff	246005		
Teaching staff	131284	53.4%	
STEM staff	23715	18.1%	
		% STEM	% All Teaching
Science and Mathematics	8791	37.1%	6.7%
Engineering, Technology and Manufacturing	6998	29.5%	5.3%
Information and Communication Technology	7928	33.4%	6.0%
2005/2006		%	
All staff	238537		
Teaching staff	126199	52.9%	
STEM staff	22710	18.0%	
		% STEM	% All Teaching
Science and Mathematics	8512	37.6%	6.7%
Engineering, Technology and Manufacturing	6912	30.4%	5.5%
Information and Communication Technology	7286	32.1%	5.8%

These figures show that the % of teaching staff delivering STEM has consistently remained between 18% and 19% over the 4-year period. This information can be seen in the graph below.



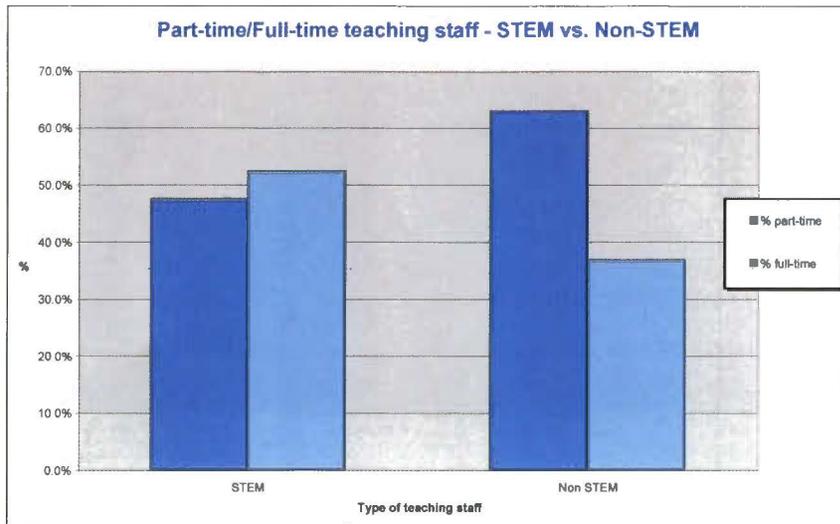
1.1.2. 2. Part-time/Full-time and Gender of STEM teaching staff against Non-STEM teaching staff – 2005/2006

STEM staff - By Gender 2005/2006	Gender			
	M		F	
	n	%	n	%
All staff	87097	36.5%	151440	63.5%
Teaching staff	51578	40.9%	74621	59.1%
STEM teaching staff	14099	62.1%	8611	37.9%
Non-STEM teachers	37479	36.2%	66010	63.8%
Science and Mathematics	4195	48.3%	4317	50.7%
Engineering, Technology and Manufacturing	6448	93.3%	464	6.7%
Information and Communication Technology	3456	47.4%	3830	52.6%

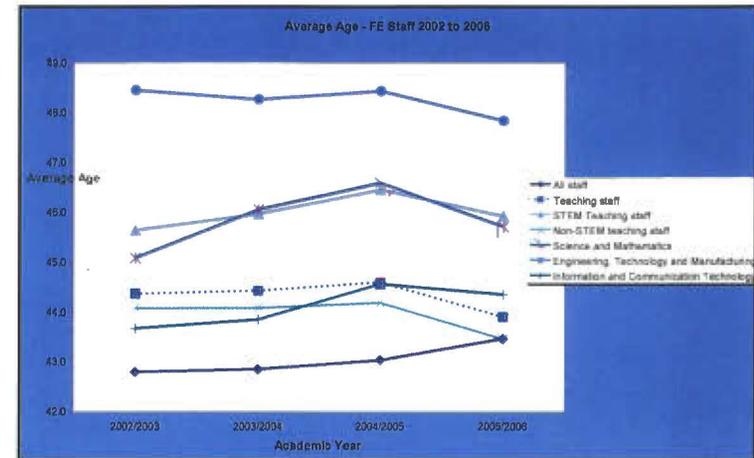
These figures highlight the gender differences between STEM teaching staff and teaching staff (and all FE staff as a whole). The majority of non-STEM teachers are female with a female to male ratio of around 60:40. With STEM teachers as a whole, this is reversed. However, this seems mainly due to the >90% male proportion of Engineering, Tech and Manufacturing teachers, as the other STEM subjects have more female than male staff.

Part-time/Full-time – STEM v Non-STEM teachers 2005/2006

Mode	n	%n
Part-time STEM	10798	47.5%
Full-time STEM	11912	52.5%
Part-time Non-STEM	65244	63.0%
Full-time Non-STEM	38245	37.0%



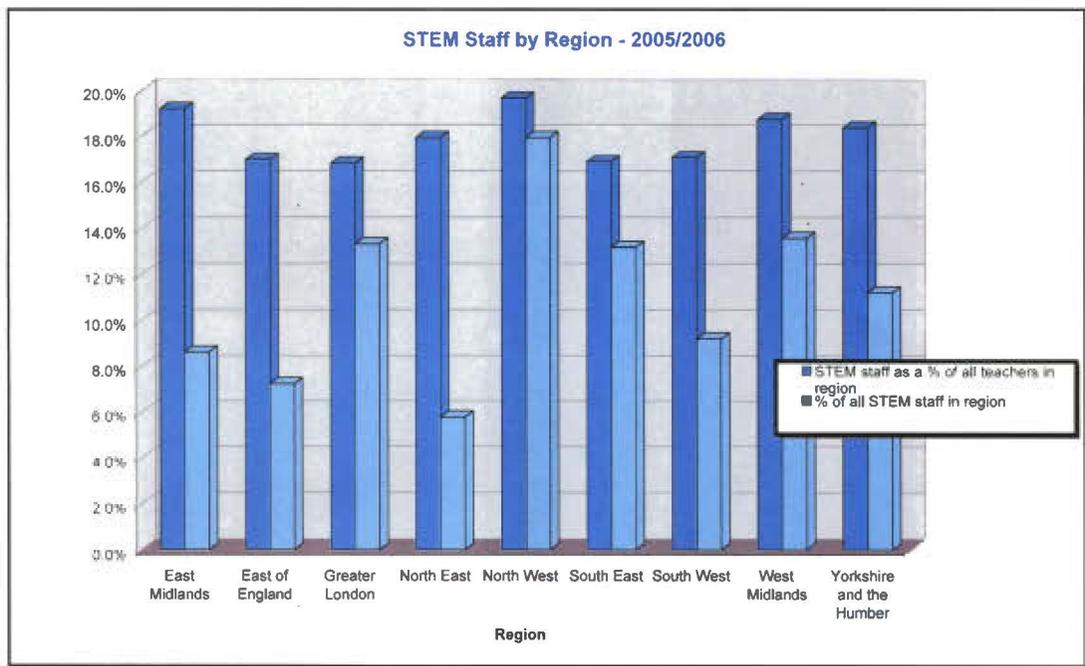
Again – this shows the difference between the STEM and Non-STEM teaching workforce with the majority of STEM teachers being full-time.



1.1 3. STEM Teachers by Age/Region

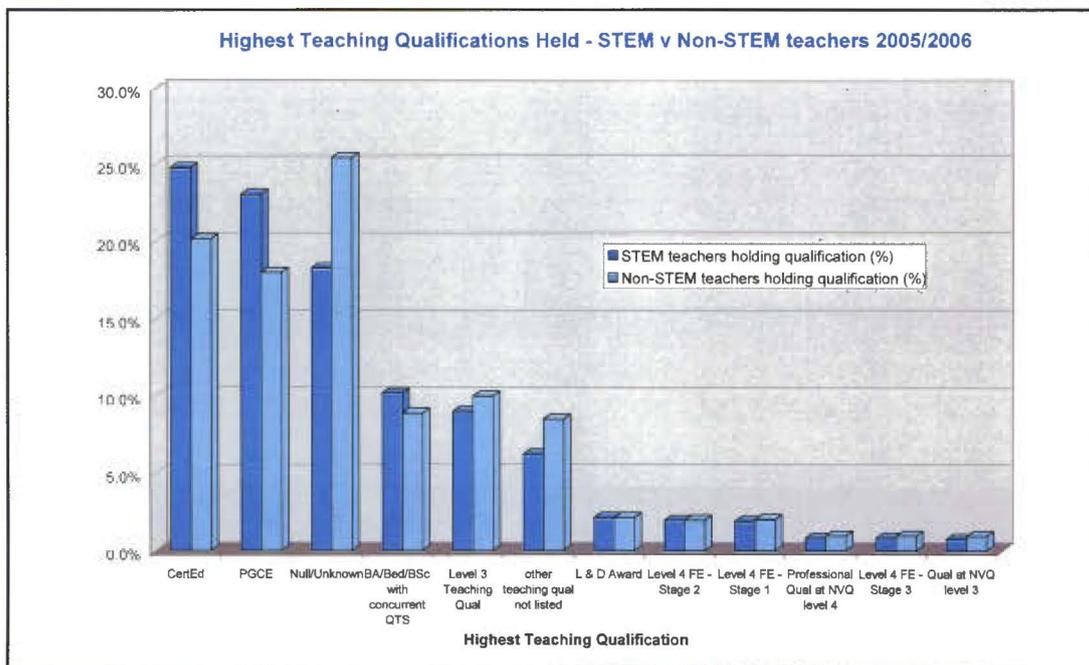
Average Age	2002/2003	2003/2004	2004/2005	2005/2006
All staff	42.8	42.9	43.0	43.5
Teaching staff	44.4	44.4	44.6	43.9
STEM teaching staff	45.6	46.0	46.5	45.9
Non-STEM teaching staff	44.1	44.1	44.2	43.5
Science and Mathematics	45.1	46.1	46.6	45.7
Engineering, Technology and Manufacturing	48.5	48.3	48.4	47.8
Information and Communication Technology	43.7	43.9	44.6	44.4

Regional Distribution of STEM teachers									
	Region								
	East Midlands	East of England	Greater London	North East	North West	South East	South West	West Midlands	Yorkshire and the Humber
STEM staff (n)	1956	1641	3026	1311	4072	2991	2088	3081	2544
STEM staff as a % of all teachers in region	19.2%	17.0%	16.8%	17.9%	19.6%	16.9%	17.1%	16.7%	18.9%
% of all STEM staff in region	8.6%	7.2%	13.3%	5.8%	17.9%	13.2%	9.2%	13.6%	11.2%



1.1. 4. Qualifications and Subject Areas Taught – STEM v Non-STEM teachers 2005/2006

Teaching Qualification	STEM teachers holding qualification (n)	STEM teachers holding qualification (%)	Non-STEM teachers holding qualification (%)
CertEd	5637	24.8%	20.2%
PGCE	5241	23.1%	18.0%
Null/Unknown	4152	18.3%	25.5%
BA/Bed/BSc with concurrent QTS	2511	10.2%	8.9%
Level 3 Teaching Qual	2042	9.0%	10.0%
other teaching qual not listed	1420	6.3%	8.5%
L & D Award	488	2.1%	2.1%
Level 4 FE - Stage 2	448	2.0%	2.0%
Level 4 FE - Stage 1	435	1.9%	2.0%
Professional Qual at NVQ level 4	188	0.8%	1.0%
Level 4 FE - Stage 3	185	0.8%	1.0%
Qual at NVQ level 3	170	0.7%	0.9%



Taught subject area v subject area of highest teaching qualification	n	% of all STEM teachers)
STEM teachers whose highest teaching qualification is not in a STEM subject	8219	36.2%
STEM teachers whose highest teaching qualification is in a different STEM subject area to the one they teach in	802	3.5%
	n	% of all Non-STEM teachers
Non-STEM teachers whose highest teaching qualification is in a STEM subject	2854	2.8%
Non-STEM teachers whose highest teaching qualification is in a different subject area to the one they teach in	45807	44.3%

1.1. 5. Annual Pay: Full-time STEM teachers vs. full-time non-STEM teachers

Annual Pay	STEM (n)	Non-STEM (n)	STEM (%)	Non-STEM (%)
<£10k	1206	5359	10.1%	14.0%
£10k - £20k	1239	4958	10.4%	13.0%
£20k - £30k	5584	17605	46.9%	46.0%
£30k - £40k	3500	8257	29.4%	24.2%
£40k - £50k	318	856	2.7%	2.2%
£50k - £60k	33	89	0.3%	0.2%
£60k - £70k	12	47	0.1%	0.1%
> £70k	20	74	0.2%	0.2%

