STEM:
Demand and Supply of Skills in the South West

Summary Report

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1. Introduction

Science, Technology, Engineering and Mathematics (STEM) are of critical importance to the South West region, and are identified as a priority in the *South West Regional Skills, Enterprise and Employment Analysis 2007*[1]. This has led to a proposal, developed by the Regional Employment and Skills Partnership (RESP), and funded by South West Regional Development Agency (SW RDA), to establish STEM South West. The aim of this initiative is to develop an evidence-based, holistic approach to facilitate the progression of young people into STEM-related careers and occupations within the South West economy.

This *Summary Report* presents in brief the key findings and recommendations of a research project, commissioned to gain a greater understanding of the trends in the demand for and supply of STEM skills and qualifications in the region. This research, conducted between April 2008 and January 2009, has produced a substantial body of evidence. The complete findings of the research project are presented in a *Key Findings Report* and a series of four detailed *Evidence Reports*:

Report 1: Policy Context

Report 2: Employer Demand for STEM Skills

Report 3: Supply of STEM Skills in the South West

Report 4: Stakeholder Views.

This research has developed an understanding of:

- regional trends in STEM subject take-up and achievement from Key Stage 2 through to higher level degrees and first graduate occupations;
- key leakages from the education system - whereby young people, either through choice or low levels of achievement, who study or achieve well at a given stage of their education, do not go on to study STEM subjects at subsequent stages;
- the current demand for STEM skills by employers in the region;
- evidence for skills gaps and evidence of unmet demand, particularly as expressed by Sector Skills Councils (SSCs);
- the future needs of employers for STEM skills;
- the barriers faced by those in schools, Further Education (FE) and Higher Education Institutions (HEIs) in delivering STEM qualifications;
- the practical measures that could be taken to improve take-up and achievement in STEM subjects in the future, drawing on the views of key stakeholders.

2. Policy context

STEM skills are high on the Government's agenda, recognising that they play a crucial role in the UK economy. A range of recent government-sponsored reports highlight that over the coming years the

[1] *South West Regional Skills, Enterprise and Employment Analysis,* 2007, SLIM.

importance of STEM is likely to increase. High technology will form the basis of new industries, while an increasingly wide range of economic sectors will depend on high level skills.

In recent years there has been increasing global competition for STEM skills. At the same time, concerns have been raised at the national level about the UK's performance in STEM skills, and its ability to compete internationally. The Roberts Reviews[2] and the Adrian Smith Inquiry[3] in particular contain stark messages for government, business and education providers. In response, government is supporting a plethora of teaching and learning initiatives which are now in place throughout the education system to raise attainment, inspire and enthuse young people and teachers, and improve the quality of teaching.

Most recently the Department for Innovation, Universities and Skills (DIUS) has published the White Paper, *Innovation Nation*[4]. This recognises the need for the UK to, "unlock the talent of all of its people and become an Innovation Nation"[5]. In order to do this, it needs to deal with the longstanding weakness in the skills base. Although this White Paper does not focus specifically on the issue of skills, it raises a number of issues important to the supply and demand for STEM skills.

Finally, in January 2008 Schools Minister, Jim Knight, outlined a £140 million package for STEM, including the following:

- £31 million for recruitment and retention of more Science teachers;
- £50 million for continuing professional development;
- £34 million to boost the number of young people studying STEM subjects post-16, including £9 million so that more pupils can take three GCSEs in Physics, Chemistry and Biology;
- £9 million to improve enhancement and enrichment activities including doubling the number of science and engineering clubs from 250 to 500.

Barriers

Studies have found that a range of factors impact on the participation and achievement of young people in STEM subjects, including:

- the lack of inspirational teachers and a science curriculum irrelevant to modern living[6];
- the perceived difficulty of STEM subjects and pressure from schools on potential under-achievers to not opt for STEM subjects because of the effect on school league tables;
- negative stereotypes, often reinforced by the media, family and peers, regarding those who succeed in STEM subjects and STEM careers; and

[2] *SET for success: the supply of people with science, technology, engineering and mathematics skills*. The report of Sir Gareth Roberts' Review (2002).
[3] Making Mathematics Count, the report of Professor Adrian Smith's Inquiry into Post-14 Mathematics Education (2004).
[4] Department for Innovation, Universities and Skills (2008) Innovation Nation: unlocking talent. March 2008.
[5] Ibid, p4.
[6] The Institution of Engineering and Technology (2008) Studying STEM: What Are The Barriers? A literature review of the choices student make.

- negative perceptions of STEM careers and occupation whereby STEM subjects are not seen as a passport to lucrative and interesting jobs and careers.
- gender, socioeconomic status and ethnicity which also play a role[7];
- prior attainment - progression is linked to students' attitudes and perceptions of their own ability and the extent to which their choices are constrained by their schools' provision and their grades;
- the study of separate Sciences prior to 16 which results in an increased likelihood of progressing in those subjects taken;
- whilst the range of qualifications on the education market is growing, the availability of these qualifications is dependent on whether schools and colleges choose to embrace them.

3. Demand for STEM skills

Employment in STEM sectors

For the purposes of this research we have had to draw reasonably tight boundaries around the definitions. This research has used the definition of STEM sectors, identified by SETNET, in their business plan proposal for the South West Regional STEM Support Centre Project. This identified 10 SSCs which they considered to represent STEM sectors: Cogent (*chemicals and pharmaceuticals, nuclear, oil and gas, petroleum and polymers*); Construction Skills; Energy and Utility Skills; E-Skills (*information technology and telecommunications*); Financial Services Skills; Improve Ltd (*food and drink manufacturing and processing);* Proskills (*process and manufacturing in the building products, coatings, glass, printing, extractive and mineral processing industries*); SEMTA (*science, engineering and manufacturing technologies*); Skillfast (*fashion and textiles*); Skills for Health.

This definition was used largely because the 10 Sector Skills Councils (SSCs) also cover the majority of the priority sectors[8] identified in the current Regional Economic Strategy for the South West. Looking at employment in these sectors, we see that the demand for STEM skills can be considered to be relatively high in the South West region. STEM sectors account for approximately 35% of all employment in the region. The majority occurs in Construction, Health, SEMTA and Financial Services.

Current demand for skills

The current demand for STEM skills can be assessed in two ways:

- the returns to those with STEM skills;
- the presence of skills shortages and gaps.

[7] Science and mathematics education, 14 –19: A 'state of the nation' report on the participation and attainment of 14–19 year olds in science and mathematics in the UK, 1996–2007, The Royal Society (2008).
[8] Advanced engineering; ICT; Marine; Food and Drink; Tourism; Creative Industries; Environmental technologies; Bio-medical; Health and social care; Engineering; Construction; Finance and business services.

Evidence nationally[9] suggests that there is a high return on subjects like Maths, Engineering, Computing and the Physical Sciences. This suggests there is high (and for Engineering, increasing) demand for graduates with these skills. Returns and estimated earnings for those with Biological Science qualifications are lower, and maybe the demand for these skills is not so high[10]. STEM occupations in the South West are similarly well paid compared to the average for all occupations, but lag behind the national average in all STEM occupations. STEM occupations include health professionals, ICT professionals, architects, town planners, surveyors, engineers and science professionals.

Prior to the recession most STEM sectors were finding it increasingly hard to recruit suitably-qualified staff. Hard-to-fill vacancies were most prevalent in ConstructionSkills, Proskills, SEMTA, Skillfast and Skills for Health. All STEM sectors, with the exception of Improve and Skills for Health, showed a higher proportion of skills shortage vacancies than the all-industry total for the region. Skills gaps (where an employer identifies a gap between the skills they require for a job and the skills possessed by the employee) are prevalent in STEM sectors at all levels, but this is not unique to them. Six STEM sectors reported a proportion of employers with skills gaps above the regional all-industry average of 16%. A number of SSCs reported that migrant workers were increasingly used to fill these skills gaps, or lower skilled occupations were being off-shored to locations where labour costs were lower. It was recognised, however, that the dependence on migrant workers is not a long-term solution.

Future demand for skills

Forecasts from a variety of sources predict an increase in the number of STEM-related jobs and thus the demand for STEM skills. Future demand for STEM skills will be driven by structural and occupational change with future skills needs more likely to be focused on higher-level skills and professional/managerial occupations. Among professional STEM occupations, the emphasis will move strongly towards Level 4 and Level 5 qualifications, particularly among teaching and research professionals. Science and Technology professionals will still be more dependent on Level 4 skills, but this dependence is growing; 55.3% of the workforce is expected to have a Level 4 qualification by 2014. There will be relatively fewer opportunities for individuals with lower level skills in professional occupations, with no opportunities for those with no formal qualifications by 2014.

Recruitment of young people (16 year old school leavers, 17 to 18 year olds and young graduates) is low in many STEM sectors, and especially so for young graduates. This suggests some STEM sectors hold little attraction for young people and/or that young people may not have the skills suitable for the jobs available.

One area of concern is the dependence of some of these sectors on migrant workers. As the economic conditions within the UK are predicted to worsen, it is likely that the flow of migrant workers to the South West will cease and may reverse, leaving skills shortages in these sectors.

[9] *The Demand for Science, Technology, Engineering and Mathematics (STEM) Skills*, DIUS, January 2009.
[10] See *Evidence Report 2,* p 26.

STEM-related SSCs are reporting skills gaps among higher skilled occupations:

- Cogent are reporting gaps in practical skills and the need to retain staff with Level 3 qualifications to combat employee turnover.
- SEMTA has stated that technical and engineering skills at Levels 3 and 4 are lacking.
- ConstructionSkills reports an acute shortage of construction engineers and a prevalence of skills shortages among skilled mechanical and electrical occupations.
- Energy and Utility Skills suggest that demand is highest for various engineering skills, mainly at Level 4.
- Improve has identified skills shortages at the technical level, including food scientists and technologists, engineers, electricians and skilled workers (butchers, bakers, fishmongers, cheese makers etc).

4. Supply of STEM skills

STEM baselines

Overall the news is good for the region, with increased levels of participation and achievement across most of the key stages of the education system.

In general the region performs fairly well at both Key Stages 2 and 3 (pre-GCSE) in Maths and Science, with increasing levels of achievement in both subjects. The region has a higher level of achievement of five or more GCSEs at grades A*-C including both English and Maths compared to England as a whole, and has seen year-on-year improvement on this measure since its introduction. Unfortunately, the number of students taking a Double Award in Science has fallen significantly across the region, down by more than 3,100 (6.8%) in just two years, albeit less than the decline nationally (10.6%). However, the pass rate in Double Science is improving. The number of GCSE entries in all three Sciences (Chemistry, Physics and Biology) separately has been increasing year on year since 2004.

The number of A level entries in STEM subjects in schools in the region increased by 3.8% between 2001 and 2007. Entries in STEM subjects accounted for 26.8% of all A level entries in schools in 2007, almost exactly the same proportion as in 2001, suggesting that STEM subjects have not declined in popularity among the region's young people. In terms of A level results, the general trend over the last five years has been one of increasing numbers of 'good' achievements across all STEM subjects. The number of good achievements in Maths has actually increased by more than 25% between 2002 and 2007.

In FE, between 2004/05 and 2006/07, the number of enrolments on courses in STEM subjects declined significantly year on year, down by 36% (mirroring declines nationally). The greatest decline was in Information and Communication Technology (ICT) down by over 40%. Compared to England as a whole, Engineering and Manufacturing Technologies was the only subject area in the region to experience a greater level of decline than is the case nationally. This is as a result of changes in the funding of learning with government no longer funding non-priority learning. By level, the most significant declines are at the higher level and Level 2. Entry levels have increased significantly and Level 3 enrolments have held reasonably steadily.

Around two-thirds (19,400) of Level 3 STEM entries in FE across the region in 2006/07 were A levels. With students normally studying more than one A Level, this accounted for just over 11,100 learners. This represents a very significant proportion (almost half) of the total STEM A level entries in the region. The majority (9,800) of these A level students in FE were aged 16-18. Colleges providing a significant proportion of STEM students in the region include: Swindon College, South Devon College, Norton Radstock College, Filton College, Somerset College of Arts and Technology, Richard Huish College, Taunton, Gloucestershire College and North Devon College.

In work-based learning (WBL), which covers Apprenticeships and Advanced Apprenticeships, the number of starts in STEM subjects (Engineering and ICT, numbers in the more theoretical subject area of Science & Mathematics), has dropped slightly in the South West in recent years, down to just under 3,500 in 2006/07, a slightly greater fall than nationally. However, the decline in starts in STEM subjects is less than for all subjects combined. Within the region, Engineering & Manufacturing Technologies – which accounts for over 85% of WBL starts in STEM subjects – has maintained its level of take-up in recent years, while the number of starts in ICT has fallen by almost 20%. There has been an increase of around 7% in Advanced Apprenticeship starts in STEM subjects between 2004/05 and 2006/07, with a 5.6% decline in Apprenticeship starts (Level 2).

The overall number of applications for STEM subject places in South West HEIs has risen by over 20% between 2002 and 2007, higher than the 17% increase in the total number of HE applications over the same period. However, there are some big differences between subjects, with some sciences having seen falling numbers of applications, particularly in Mathematical & Computer Sciences, where applications are down by almost 20%. The total number of first year STEM students at HEIs in the region has increased by just 2.2% since 2002/03, much slower than the national rate of growth of 8.3%. When expressed as a proportion of the total student population, the two biggest STEM providers in HE are the University of Bath and UWE Bristol, where STEM students account for more than half of all students. The number of HE STEM achievements in the region has increased by 14% between 2002/03 and 2006/07, slower than the national average.

The number of UK-domiciled PhD completers in STEM subjects has fluctuated slightly from year to year, with around 400 achievements per year in the South West. By subject, the largest numbers of PhDs awarded are in Physical and Biological Sciences, with Engineering and Technology a distant third. There have been relatively few achievements in Mathematical and Computer Science, although there have been increasing numbers in the latter over the last two years. The Universities of Bristol and Bath accounted for nearly three-quarters of all STEM PhDs awarded in 2006/07.

Significant gender imbalances occur across a range of STEM subjects. Despite the fact that girls outperform boys in STEM subjects at GCSE, boys are slightly more likely to take all three Sciences at GCSE than girls (a potentially important factor in progression to STEM A level subjects). A clear gender divides emerges in the selection of STEM subjects at A level. These are particularly extreme in relation to Physics, Maths, Computer Science and Computing, Information Technology and Design Technology and Food Technology, where boys significantly out number girls. Whilst female participation is lower, girls out perform boys at STEM A level. However girls are significantly less likely to apply for STEM subjects at HE (presumably as a result of A level choices). The majority of applications in STEM subjects come from males (Medicine and Veterinary Sciences excepted), with female participation particularly low in Computer Sciences, Engineering and Technologies. This flows through to the participation of females in STEM HE courses. The main problem in terms of the significant gender imbalance in A level and HE is due to choices made by female students at GCSE and A level.

Evidence from stakeholder interviews suggest that girls are 'turned off' by the traditional teaching methods and the presentation of the curriculum.

Leaky Pipeline

If the UK education system is seen as a pipeline for producing skilled STEM graduates at its end, to what extent are there leakages from the pipeline and what factors lie behind them? It was not possible to look at FE provision in this analysis as the key data source (Individual Learner Records) does not contain information on prior attainment or destination and is thus too limited for the our purposes.

Data from the National Pupil Database strongly supports the CBI's assertion that "studying each science separately at GCSE hugely increases the chance of studying science at A Level". Around 55% of those who took Triple Science GSCE went on to study at least one Science at A Level at school, compared with just 25% of those taking the Double Science Award.

Taking all three Sciences separately at GCSE also seems to have a significant effect on performance in Science A levels in school. Those taking Triple Science achieved the equivalent of half a grade higher per Science entry than their contemporaries who had taken the Double Science Award at GCSE.

Given that the likelihood of studying Sciences at A Level is strongly linked to an individual's Science choices at GCSE, it may be seen as desirable to maximise the opportunities for pupils to study all three Sciences as separate GCSEs. However, there is currently a clear divide between the maintained and independent sectors. While just 16% of higher achievers at Key Stage 3 in the maintained sector took the Triple Science route, in the independent sector, pupils were much more likely to go down the Triple Science route (40.6% of higher achievers), even if they had not achieved level 6 or above at Key Stage 3.

Just under half (47.3%) of all the region's applicants to HE had applied for a STEM subject, with just over a third of the total applying for STEM subjects exclusively. As would be expected, the likelihood of applying for STEM subjects at HE increases with the number of STEM A levels studied.

However, even among those who studied four or more STEM subjects at A level at school, almost a third chose to pursue non-STEM options in HE. In terms of absolute numbers, over 9,100 individuals from the South West who have studied three or more STEM A levels at school have opted not to pursue STEM options at a higher level.

There is evidence to suggest significant additional numeracy and mathematical skills needs among HE students in STEM courses. However, this does not translate into higher drop-out rates from STEM subjects in the South West, other than in Computer Science, where almost 10% of students drop out each year.

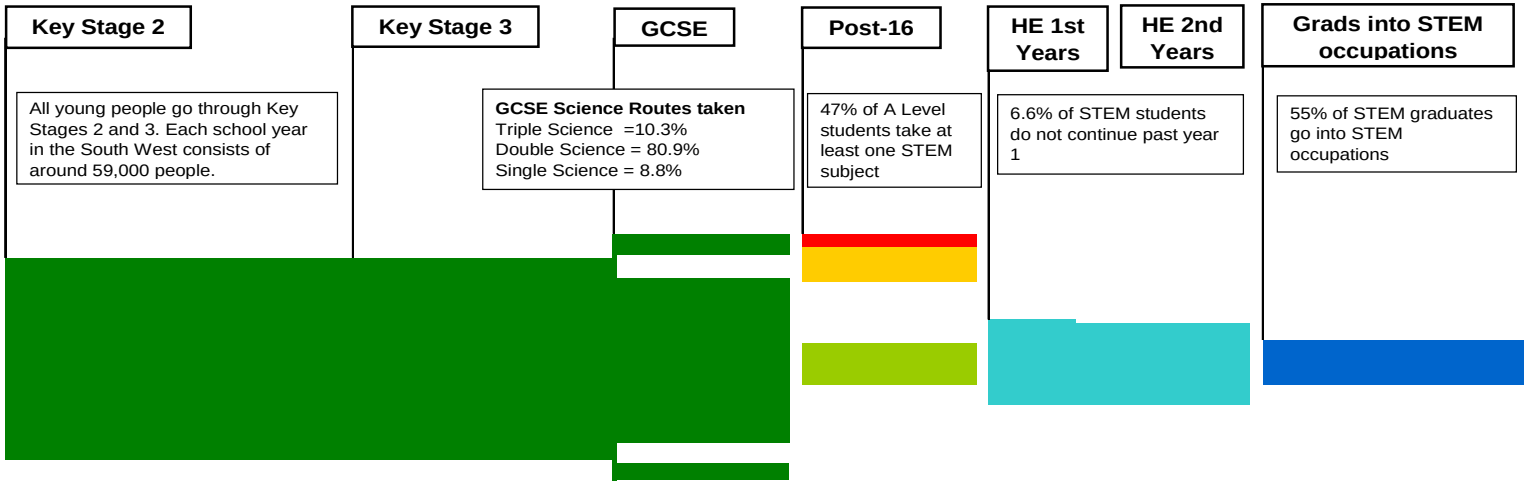
When examining progression from STEM subjects into STEM occupations, some subject areas (those with more clearly related occupational outcomes) 'perform' better than others. For Science graduates, higher than average proportions of graduates go into teaching occupations and also into non-STEM work, although it is not possible to tell whether this is through choice or because they are having difficulties finding appropriate employment relevant to their studies.

One objective of the research was to identify geographical areas or institutions that stand out in terms of STEM. Significant variations exist at all levels. At a local authority level, no part of the region performed better in STEM relative to all subjects. Just two areas (Poole and South Gloucestershire) had STEM performance equal to that of all subjects.

In terms of A level results in STEM subjects, relatively few schools (89 out of the 242 schools for which data was available) achieve better results in STEM subjects compared to all subjects. There does appear to be a concentration of independent schools among the highest performing institutions.

The STEM Skills Pipeline in the South West

School Year	3	4	5	6	7	8	9	10	11	12	13
Age	8	9	10	11	12	13	14	15	16	17	18



Key Leaks	No leaks as such, as all go through Key Stages 2 and 3	No individual taking single science GCSE, went on to do STEM A Levels.	Only 40% of those taking triple science go on to take any STEM A Levels	Over 9,000 STEM A level students going into HE do not apply for STEM subjects	Over 4,100 of 7,500 STEM graduates surveyed went into employment in STEM occupations
Notes	Achievement levels in maths and science are higher than the national average at Key Stage 2 and Key Stage 3	The proportion of young people taking single science is increasing in some areas	Just over 12,300 STEM A level students, approx 10,000 FE Students and 3,500 Apprentices in STEM subjects	Rates of non-continuation in STEM subjects are lower than for all subjects, but are highest in Computer Science, where 10% do not preogress past year one	

Key

- Schools - compulsory education
- Schools - STEM A Levels
- Work-based Learning (STEM Apprenticeships)
- Further Education STEM Students *
- Higher Education - STEM Undergraduates
- STEM Graduates moving into employment

* The number of FE students has been estimated by dividing the total number of enrolments by three, on the assumption that the majority of students are taking three A Levels

5. Stakeholder views

Interviews took place with staff within a wide range of schools, FE colleges and universities in the region. Whilst many of the issues are unique to the sector concerned, there are also striking similarities between the providers. Common issues included:

- Problems with recruiting STEM teaching staff in schools, FE colleges and some HEIs as well as a lack of opportunities for ongoing staff development.
- Low levels of cross-curriculum working, and lack of innovation in curriculum development.
- The need for more and better industry links.
- The need for better careers advice.
- Lack of awareness of enrichment activities.
- Continuing gender imbalances at a range of stages.

In addition the following issues were raised:

- The importance of building links with primary schools to ensure that early interest is engendered in STEM subjects.
- Improved resources required for schools and colleges that sometimes lack proper equipment and facilities.
- The need to raise awareness of Apprenticeships.

6. Recommendations

- **Raise the profile of STEM with Sectors, Employer Groups and Intermediaries**

The region should act, through the Sector Operations Group[11] (SOG) and other SSC and employer structures, to raise the profile of STEM and encourage SSCs to provide more explicit analyses of the STEM skills needed by their sector. Sectors should be asked to comment upon their STEM requirements as part of the SOG process.

- **Tackle skill shortages and skill gaps**

STEM sectors continue to experience problems with recruitment due to lack of skills and these problems would appear to be increasing. The SOG should continue to address this issue, focusing on

[11] The SOG enables the South West region to interpret and support the Sector Skills Agreements produced by SSCs as maps of exactly what skills are needed by employers for their workforce and how these can best be supplied. The SOG is organised by the RESP.

areas of significant skill shortage and STEM supply, particularly at Levels 2 and 3. Adequate opportunities need to be made available for CPD in STEM subjects to ensure that the existing workforce can upgrade its skills.

- **Take action to deal with future demand**

A number of STEM sectors with ageing workforces will be hit hard by replacement demand over the next 10-15 years, unless they are able to recruit young people and upskill the existing workforce. Action needs to be taken in conjunction with these sectors and Information Advice and Guidance (IAG) services to improve the understanding of opportunities for employment, career progression and rewards from work within these sectors. There may be scope for specific campaigns, including those targeting young women, to raise awareness and tackle the poor image of these sectors among young people.

There is already some evidence from the National Employer Skills Survey (NESS) 2007 survey that the degree of skills shortage vacancies is increasing. This will need to be monitored carefully by the Migrant Workers Task Group and the new migrant workers project based within Equality South West.

- **STEM skills are required at all levels**

STEM occupations are often associated with higher level skills. Whilst higher level skills are often essential and qualification requirements are rising, many STEM sectors employ large numbers of people who have qualifications at Level 2 and below. This is particularly true for construction and manufacturing. It is critical that any initiatives directed towards improving STEM skills recognise that many of the skill needs are at the lower levels.

- **Improve take up of Triple Science at GCSE**

Efforts need to be targeted at encouraging pupils, particularly girls, to take three STEM subjects at GCSE.

- **A levels in schools**

Additional support may be required to encourage take-up of Physics at A level, linked to better advice to students on possible future careers.

- **Apprenticeships**

Whilst the involvement of employers relating to STEM sectors is generally good, there is significant scope for improvement in the case of some STEM sectors. This needs to be explored with the sectors concerned though the SOG of the RESP.

- **Increase take-up of STEM at HE Level**

A major leak occurs at the choice of subjects at HE where almost a third of those studying four or more STEM subjects at A level at school decide against STEM subjects at HE. The region should invest in a

campaign to encourage young people to take up STEM subjects at University. This needs to be supported with effective careers advice and intelligence on future career paths.

- **Address performance differences**

There is a wide variation in performance in STEM across schools and geographical areas. Variations in performance need to continue to be monitored and local authorities encouraged to understand better these differences in performance.

- **Develop links with primary schools**

The need to build strong liaison between primary and secondary schools to ensure primary schools have access to STEM specialists has been highlighted during the school interviews. The research shows that these links are presently highly variable. Secondary schools should seek to identify a STEM specialist to act as a mentor for primary teachers.

- **Improve teacher recruitment**

A number of schools have highlighted problems with recruiting well-qualified STEM staff, particularly in rural areas. Maths, Physics and Heads of Department in Science are particular gaps. Initiatives are needed to encourage STEM teacher training in the region.

- **Encourage greater cross-curriculum working**

The curriculum is regarded as a barrier to further take-up of STEM subjects, particularly by girls. Cross-curriculum working is largely underdeveloped. Initiatives exist to promote cross-curriculum working. These need to be given more support with measures taken to raise awareness further. There needs to be a forum for sharing best practice. Further support is required for STEMNET and STEMPOINT activities in the region.

- **Encourage collaborative working**

There is increasing evidence of schools working in consortia or partnerships to enhance the choice of subjects for pupils and improve curriculum design and delivery. Practice needs to be more effectively shared and replicated.

- **Developing schools/college/HEI/industry links**

Links between schools and STEM-based industry are still underdeveloped. Regional and local events to promote successful industrial links may help to raise awareness. Whilst industrial links do exist with FE, time limitations act as a significant barrier to employer engagement. Employer engagement should be recognised as an important investment and appropriate time made available to engender such links.

Nearly all HEIs interviewed suggested activities to bring together universities and local SME employers would be a real potential area for regional support. Activities could include forums where SMEs can come together and develop links with HEIs to support the employability and innovation agendas.

- **School resources**

Some schools are reporting shortages of resources in some areas. Examples include laser cutters and a lack of CAD CAM equipment. A full review of equipment and resources needs to take place so that investments can be appropriately targeted. Projects which allow schools and colleges to share equipment should be encouraged, so that locally-based resources can be shared.

- **Support and good practice**

There is a range of initiatives directed at schools; however these are not always well understood or accessed by schools. Innovative practice exists from which others could benefit. A forum for exchange of practice would be beneficial.

- **Information, Advice and Guidance**

The need for better information, advice and guidance (IAG) for teachers, students and their parents has been highlighted extensively throughout the research. The need to link STEM subjects to potential careers is seen as critical in encouraging greater take-up and progression of STEM skills.

- More information is needed on potential careers which can be made available to students, their parents, teachers and advisers.
- Connexions staff and careers advisers can do more to promote STEM careers.
- More joint training in STEM awareness for Connexions staff, careers advisers and teachers is needed.
- Better information from HE careers services about the nature of employment that graduates go into is needed.
- Awareness needs to be raised about the vocational and work-based routes such as Apprenticeships.

- **Addressing gender imbalances**

Gender imbalances persist in the take-up of STEM subjects across all sectors. Specific initiatives need to target girls to break down barriers. Support should be given for sharing best practice on measures to support more women entering STEM provision.

- **FE staff recruitment**

Barriers to success in the delivery of STEM courses were related to staffing and resources. Recruitment of high-quality staff in STEM areas was often difficult, particularly in Engineering and Science subjects, and there was a tension between wanting staff with a wealth of experience and those

with recent subject-knowledge. A campaign to support staff recruitment into STEM subjects should be developed, particularly in the light of redundancies in STEM occupations.

- **FE staff development**

Staff in colleges reported the need for more opportunities for staff development and to update their knowledge and skills, particularly in relation to the needs of employers and latest technological development. Staff CPD opportunities should be reviewed and enhanced.

- **FE resources**

In terms of resources, suitable accommodation, such as laboratories or workshops, was not always available, and this was increasingly the case as numbers of students in some STEM subject areas rose. Similarly, the need for constant updating of equipment and software could not always be met.

- **Enrichment activities for students**

There is more scope for enrichment activities for students across all sectors. Better information is also needed on what is available.

- **Developing a regional STEM agenda**

One of the key issues raised by the majority of HEIs interviewed was the difficulty they had around the regional agenda. HEIs felt that they are seen by regional agencies as research institutions and not really as skills providers. Regional agencies need to become better aware of the knowledge and skills provision amongst the region's HEIs. HEIs need to be better represented on regional boards.

- **Knowledge Transfer Partnership (KTP)**

Continued support of the KTP programme and formal feedback from industry on the GWR programme is required. Funding is needed for Science parks to create a head of steam around Science and to enable graduates to stay in the South West.

- **Outreach and engagement in HE**

Supporting outreach and engagement programmes in HE was another potential activity that HEIs felt could be beneficial. Small amounts of money can go a long way in outreach programmes but these types of programme have to be delivered in the right way.

All of the reports can be downloaded from the STEM SW website: http://www.stemsw.co.uk/ and the SLIM website: http://www.swslim.org.uk/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SOUTH WEST OBSERVATORY
Skills and Learning Intelligence Module


South West RDA


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