Plymouth Manufacturing Sector Growth Plan:
Skills and recruitment issues

Draft copy for consultation

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The skills and recruitment issues facing the Advanced Manufacturing sector.

Introduction

For those unfamiliar with the firms concerned, it is perhaps all too easy to dismiss the Plymouth sub-regional manufacturing base as being part of a homogenous sector. But in fact, upon closer examination, one can quite quickly detect the diverse and cross-cutting nature of advanced manufacturing in the City. Perhaps this is best illustrated by the fact that it takes at least four different Sector Skills Councils, (the state-sponsored, employer-led organisations that are designed to tackle skills issues) to span the full range of firms that exist.

The Sector Skills Council for Science, Engineering and Manufacturing Technologies (***Semta***[1]) covers the bulk of the PMG membership including firms such as: Invensys; The Barden Corporation and Kawasaki Precision Machinery.

Cogent[2] - the Sector Skills Council for the Chemicals, Pharmaceuticals, Nuclear, Oil and Gas, Petroleum and Polymer Industries. This includes: aspects of both Babcock's nuclear workload and Princess Yachts International's usage of fibreglass resins; Bandvulc rubber tyres; plus Composite Integration (composite plastics industry) and Luminati Waycon (acrylic fabrications).

Proskills[3] covers the process industries including: British Ceramic Tiles, Vi-Spring, Bandvulc (again), Arjo-Wiggins, DS Smith Packaging and Latimer Trend.

Improve[4] covers the food and drink sector including larger firms such as: Tamar Foods and the Wrigley Company and smaller firms including: Langage Farm, Tideford Organics and Westaway Sausages.

What drives demand for Advanced Manufacturing skills?

According to a report by Semta and some other Sector Skills Councils in 2009[5], the demand for skills is a *derived* demand: companies need people to perform functions and roles, some known in advance, others not. Thus the demand for skills for Advanced Manufacturing depends on the work to be done by the companies in this area. It is important with all enterprise support policy, including skills, to recognise that macro-economic perspectives are often not how issues are seen at the level of the company. However, at the macro level, the main drivers are (according to the SEMTA report), reasonably well recognised, as follows:

- ***Globalisation*** **-** This results in markets being opened up, which provides both threats and opportunities for companies across England and the UK.
- ***Economic Growth*** **-** In broad terms, demand for skills, and so recruitment activity, will grow as the economy grows, although there will inevitably be certain variations between different sectors (and, for labour markets, different occupations).
- ***Technology development*** **-** Technological innovation both enables changes to the nature of products and services, as well as the way companies do business, and thus creates new markets with their own growth, for which new skills are needed. In many cases, new approaches result in the decline of related markets, and technology is the major driver for changing the types of skills needed in the labour market.
- ***Demographics*** **-** Workforces are dynamic: the flows into and out of work in particular occupations and sectors arise because people

[1] http://www.semta.org.uk/
[2] http://www.cogent-ssc.com/
[3] http://www.proskills.co.uk/
[4] http://www.improveltd.co.uk/

[5] Skills and the future of Advanced Manufacturing, SEMTA et al, 2009

move on from their jobs, sometimes to other work, sometimes to nonpaid activity. As well as occupational or sectoral mobility, there is also spatial mobility: people often move to where there are greater work opportunities, sometimes in other countries. Ultimately people move out of work for good – mostly to retire. An important relationship (arising largely from age demographic distributions) is that between flows out of work (retirement) and flows into work (mostly from those leaving full-time education). Demand for skills does not just depend on the growth (or otherwise) of a particular workforce ('expansion)' demand, but also on the numbers needed to replace those leaving ('replacement' demand).

- ***Multi-level governance and regulation*** - Markets (both product/service and labour) operate within societies, and there is always an element of constraint/intervention from the state. While this can vary considerably between countries, it involves both fiscal matters – lower tax levels can increase employment levels and demand for skills – and regulation of various kinds. As well as posing certain constraints to employment arrangements, regulation generally creates demand of its own, for work associated with its development, implementation and compliance requirements. As indicated, these factors can come from local, regional, national or (for European countries) EU-level governance.
- ***Environmental change*** - Environmental change stimulates demand for skills in various ways. The normal assumption is that environmental concerns result in regulation, to which companies have to respond as shown above. However, such change can also stimulate secondary skill demand through the need to respond to specific enterprise- or market- level disturbances, and through new opportunities arising from markets created in response to regulation (the low carbon economy is a prime example).
- ***Changing identities and values and consumer demand*** - Consumer preferences have always changed over time, and will continue to do so. However, changing social values can influence economic activity other than through changing consumption patterns. A relevant example of this would be the changing public attitudes to *in vivo* work in animal experimentation.

From these 'drivers for change', four particular core issues emerge.

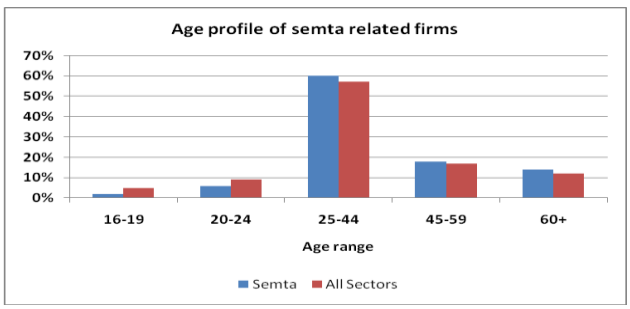
Overcoming Recruitment Difficulties

Professor John Bryson, Chair of Enterprise and Economic Geography at the University of Birmingham said at the Royal Geographical Society's 2010 annual conference that, *'British manufacturing is now about hybrid products, products that contain embedded services, products that require a constant dialogue with the customer, design-intensive products that have attachments with designated geographic locations and convey positive connotations of reputation and quality. It is therefore extremely worrying that the UK has so many success stories in manufacturing and has such a solid base in modern manufacturing, but that there is a huge threat to the continued survival and competitiveness of British manufacturing. This threat involves hard-to-fill vacancies and skill shortages that will make it extremely difficult for firms to grow and in some cases even continue to survive as companies find it increasingly difficult to recruit commercially aware engineers and other forms of skilled labour.'*

These recruitment difficulties are further exacerbated by, amongst other things, the age profile of the workforce; the forecasted level of replacement demand (if not expansion demand) for employees and the perceived peripherality of the far south west.

Age Profile of the Workforce

According to Semta's research, 14% of their workforce in England is aged 60 plus compared to 12% of the workforce in all sectors in England. The number of young people entering Semta's sectors has been an issue for a number of years. Only 8% of Semta's workforce in England is aged 16-24 compared with 14% in all sectors in England.



Future Employment Forecasts

The SLIM report[6] which examined skill levels in Plymouth drew from Working Futures for its sector forecast figures. According to the report, *'Determining future jobs and skills priorities requires an examination of predicted changes in the occupations and sectors. Forecasts provide some indication about likely developments in employment structure and patterns. Working Futures III, 2007-2017, develops its predictions based on past trends and provides the forecasting data used by Government and other national agencies to predict future employment and thus trends in skills. The baseline macroeconomic forecast, on which the data projections were based, were from early 2008.*

At this time economic conditions were predicted to deteriorate, but the depth and intensity of the recession was unclear. The data is thus not generally reliable in estimating employment change over the short term, which is likely to underestimate the impact of the recession. However, medium to long-term trends are more reliable'.

'When looking at future employment, it is important to note that two distinct features are in play:

- *expansion demand - where new jobs are anticipated;*
- *replacement demand – which provides a more accurate picture of skills demand because it looks at that demand which arises due to retirement and thus which requires jobs and skills need to be replaced (because of retirement), even where the sector is not in expansion.'*

Working Futures III data suggests that whilst employment growth in the South West is above the projected national increase of 6.5% between 2007 and 2017, employment growth in Devon (inc. Plymouth) and Cornwall is forecast to lag slightly behind the region as a whole over this period, with employment expected to increase by 0.6% per annum (50,000 jobs in total), compared to 0.7% for the South West. Specifically, employment in manufacturing across the two Counties is forecasted to contract over this period by approximately 12,000 jobs – that is, the equivalent of a 1.8% fall per annum.

[6] *Sub-Regional Employment and Skills Analysis 2010, Plymouth, Produced by SLIM, Marchmont Observatory, University of Exeter, February 2010*

Closing Skills Gaps and Upskilling Staff

Secondly, we shall see that there are significant issues related to closing skills gaps and upskilling the workforce. According to Semta[7], for example, the priorities of the sector are as follows: - bite-size delivery within a framework of progression and transferability.

Management and Leadership

- Development of frontline Managers.

Productivity and Competitiveness

- Supply Chain Development.
- Continuous Process Improvement.
- Reduction in New Product and Process Implementation (NPPDI) Time.

Technical Workforce Development

- Upskilling from Level 2 to Level 3.
- Improve craft supply at Level 3 through recruitment and upskilling of current workforce.
- Improve supply of technicians at Level 4 (Technician Engineers).
- Tackling graduate skills deficits and increase the graduate population within the workforce to meet high value added requirements.

Manpower Planning and Recruitment

- Lack of adequate supply to meet industry requirements due to demography and attractiveness of the sector.

PMG members have said for some time that there should be less emphasis on the drive for qualifications for the individual and a greater focus on meeting the skills needs of business.

The results from a survey of firms[8] experiencing sustained growth identified five areas as significantly greater obstacles to their success than firms which are not achieving sustained growth. Of these, three were either skills or recruitment related.

- *Recruiting staff* – this was seen as a key problem for growing firms, but not for others. 57 per cent of firms experiencing sustained growth saw this as a significant obstacle compared to 35 per cent of other firms;
- *Shortage of skills generally* – almost half (48 per cent) of firms experiencing sustained growth saw this as a significant obstacle to the success of their business compared to less than a third of other firms (32 per cent);

[7] SEMTA Sector Skills Agreement

[8] *Ready, Steady, Grow?* How the government can support the development of more high growth firms, A joint Cities 2020 and Knowledge Economy Programme Report, Prepared by Charles Levy, Neil Lee and Annie Peate, March 2011.

- *Shortage of managerial skills/experience* – 34 per cent of firms experiencing sustained growth saw this as a significant obstacle compared to 19 per cent of other firms.

It remains to be seen what impact the public sector expenditure cuts and in particular the funding of training will have on the skills gap and upskilling issue.

Changes in the funding of Skills Training

From the 2013/14 academic year, Government will provide and subsidise a system of loans to support continued participation in training where Government grant funding is no longer available for intermediate or higher-level qualifications[9]. As with the graduate contribution to the costs of higher education, individuals will only start to contribute when they realise the benefits of their training and are earning a decent wage. Their training will therefore be free at the point of access with repayment of the loans contingent on the borrower earning above a certain threshold.

There is a concern that employers have become too used to government subsidies, through the *Train to Gain* programme in particular[10]. What impact its withdrawal will have remains to be seen.

Entitlements for 2013/14

Learning Level	*Priority population groups and Government subsidy for learning they can expect*		
	Individuals aged from 19 up to 24	**Individuals aged 24+**	**Individuals who are unemployed and on active benefits**
Basic Skills	Fully funded	Fully funded	Fully funded
Level 2 (first)	Fully funded	Co-funded	Fully funded targeted provision for learners with skills barriers to employment aged 23 and under and/or training below Level 3. Loans for those aged 24+ on courses at Level 3 and above.
Level 2 (retraining)	Co-funded	Co-funded	
Level 3 (first)	Fully funded	Loans	
Level 3 (retraining)	Co-funded	Loans	
Level 4 (any)	Co-funded	Loans	

Notes: – This table shows the expected position from 2012/13 onwards (following the introduction of loans).
– Loans will apply equally to Apprenticeships, replacing the contribution formerly provided by Government. 19+ Apprenticeships at Level 2 will remain co-funded at 50%.
– Co-funding at Level 2 for workplace learning outside of Apprenticeships will only apply to SMEs, and applies at a level of 50%.
– Learning at Level 3 and above for workplace learning outside of Apprenticeships and entitlements will not receive Government funding.

Growing the Number of Apprentices

Thirdly, by the end of the current Parliament, the Government is committed to supporting an additional 250,000 apprenticeships, compared to the previous Government's plans. The Coalition has apparently got off to a good start and exceeded its targets for the first year[11]. However, much remains to be done. As we shall see, it is the view of the vast majority of employers that significant barriers to hiring apprentices still remain.

Nearly half of employers (45%) have not employed apprentices in the last three years, with two thirds (68%) of these saying that they consider apprenticeships inappropriate for their organisation[12].

The STEM Skills Challenge

Fourthly and finally, STEM skills are increasingly necessary to engage in a knowledge-based economy and in daily decision-making. There is solid evidence to suggest that the fastest-growing and highest-wage jobs in future years will be in STEM fields. Workers in these fields must use STEM skills for problem solving in a wide range of industries. However, as the need for solid STEM skills is growing, the achievement gap is also growing.

Additionally, there is a gender dimension to the STEM skills challenge. There were about half a million women of working age living in the UK in 2008 who were qualified in science, engineering and technology, but only 185,000 of them were working in the STEM occupational sectors[13].

Each of these four issues will now be examined in turn commencing with *'Overcoming Recruitment Difficulties'*.

[9] *BIS Skills for sustainable growth 2010*

[10] *Engaging employers to drive up skills - The realities of effective employer engagement – current opportunities and challenges, LSN 2010*

[11] Government exceeds apprenticeship ambition Department for Business, Innovation and Skills press release 23 June 2011.

[12] Chartered Institute of Personnel and Development's (CIPD) 2011 Learning and talent development survey.

[13] Briefing paper from UK Resource Centre for Women in SET

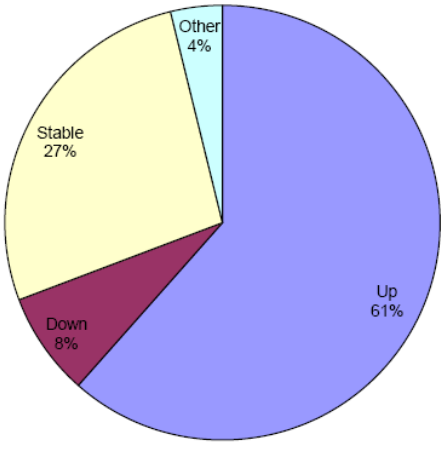
Overcoming recruitment difficulties

According to the CBI's latest survey[14] 43% of employers currently have difficulty generally recruiting staff, rising to more than half of employers (52%) expecting difficulty in the next three years.

Specifically, within the engineering sector, with the rise in demand for engineers and technicians in 2010, many employers were once again struggling to find suitable candidates to recruit. In 2010, 37% of employers were finding it hard to recruit suitable senior engineers, 22% difficulties in recruiting engineering management and 21% were finding it hard to recruit suitable graduate engineers. In contrast, only 13% of respondents reported difficulties recruiting technicians and 6% reported difficulties recruiting apprentices[15].

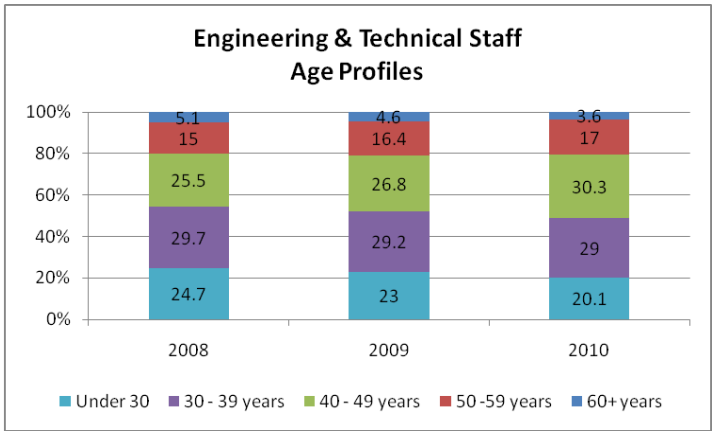
Context - Headcount Forecast

The headcount forecast amongst PMG members for 2011 was much more bullish than the survey results from the previous year[16]. Approximately 61% of firms forecasted – perhaps optimistically - an increase in staffing levels; with only 8% predicting further falls. So recruitment is likely to be a significant exercise over the forthcoming period.



Age Profile

The Institution of Engineering & Technology's Annual Survey of Skills & Demand in Industry 2010 suggests an aging workforce. Between 2008 and 2010 there was a reduction in the proportion of engineering and technical staff under the age of 30 from 25% to 20% (see chart below).



Local Research

SERIO, at the University of Plymouth published a report titled *'Plymouth Priority Sector Skills Audit'* in June 2010. The audit was commissioned by the Plymouth Employment and Skills Board (PESB) to meet the existing evidence gap around current and future skills requirements within the Plymouth area. The research aimed to build on a preliminary review of the evidence base regarding skills supply and demand carried out by SERIO on behalf of PESB in 2009. This original review sought to establish whether an exercise could be undertaken locally that replicated the 2008 Greater Manchester Skills Analysis and Priorities report (Manchester Enterprises, 2008) which was designed to help employers plan for current and future skills required by the economy. The report analysed *'advanced engineering'* firms separately from *'marine industries'*. More details are shown below.

The proportion of employers experiencing *'Hard to fill vacancies'* was particularly acute within the local marine industries (20%). More so than any of Plymouth's other priority sectors. Within those responding from the marine sector, 75% attribute

[14] Building for Growth: business priorities for education and skills 2011, CBI.
[15] Institution of Engineering & Technology's Annual Survey of Skills & Demand in Industry 2010
[16] PMG Annual 'Health of the Sector' Survey 2010.

that to 'a low number of applicants with the required attitude, motivation or personality'.

A real-life local example of a *'hard to fill position'*
We have a skilled machinist retiring later this year and a toolmaker – a former apprentice - who was off on long term sick leave and has now returned to take an alternative job within our company. This left us with the need for at least one full time toolmaker.

Due to the apprentice system being effectively stopped in the late 1970's and 80's together with cut backs in manufacturing at that time it is now extremely difficult to find that kind of skillset in the labour market.

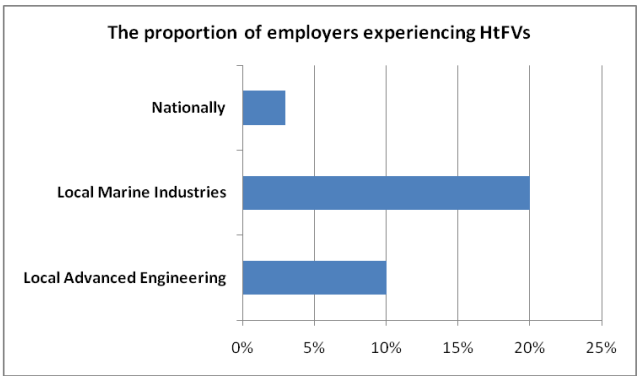
We advertised via *This is Plymouth* (Herald Online) and had a good number of replies, many of which were totally irrelevant – people applying to keep up their "quota" of job applications perhaps? We then considered advertising in the Midlands.

We had only one real match whom we tried to employ. However, he accepted another position shortly before starting with us and 3 weeks after accepting our offer! He had just returned from abroad and just moved into the South West.

We have now taken a toolmaker on this week – he was a mould toolmaker but we will re-train him in press toolmaking. The position was filled via word of mouth; we find that this normally gives us the best success rate.

We are looking at training another one or two young internal candidates to fill the machinist's roll.

Without this position filled we are technically vulnerable to breakdowns and limited in our development.

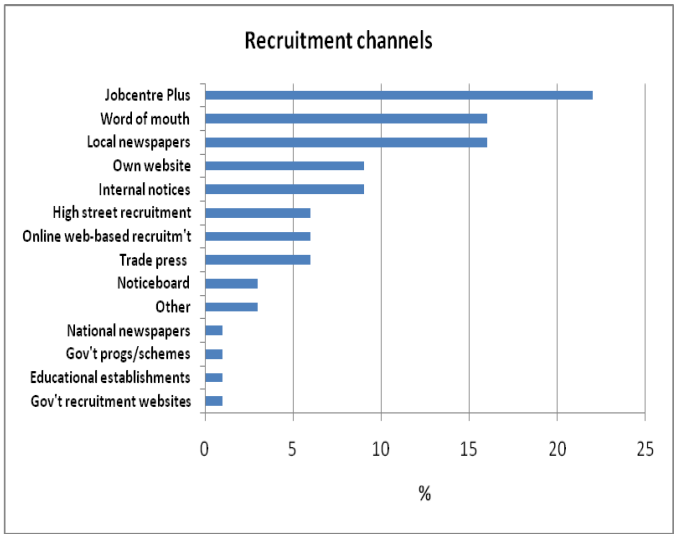


Positions quoted by PMG members as being recently 'hard to fill'

- CNC/Setters
- Process engineers (semiconductor)
- Lean engineers electronic design
- Technical Manager
- Manufacturing Manager
- Purchasing Manager
- Plant engineers
- Carpenters
- Industrial Engineer post in assembly with Lean.
- Electro-Mechanical Design Engineer
- Middle management grades are a problem area – particularly project management.

It is recommended that further research should be undertaken to identify the posts that are most difficult to fill.

Countering the Problems
Actions being taken to counter the problems faced in the Advanced Engineering sector include: Increasing training and using new recruitment methods/channels was particularly popular in this sector (used by 50% of employers, compared to 26% across the priority sectors).



Whilst within the Marine sector, three businesses mentioned steps taken to address recruitment difficulties while one indicated it was doing nothing. Steps taken included: using new recruitment methods or channels; recruiting workers who are non-UK nationals; increasing advertising /recruitment spend and increasing the training given to their existing workforce.

According to the UK Commission for Employment and Skills (UKCES)[17] the most popular recruitment channels as shown above.

Local solutions to overcoming 'Hard to fill positions'. The following are quotes from PMG members:

Polish workers have proven to be successful – some are now in their fourth year.

We took on international KTPs students from India and China through the University.

We went to the Midlands in search of automotive sector staff with necessary transferable skills. You have to offer sizeable re-location/disturbance allowances to cover removal costs etc.

The SW Talent Retention scheme was good in theory plus it was free but the database wasn't extensive enough and the funding for it has now gone and the service has been withdrawn.

Apprentices can be a very good long term solution – We sourced 5/6 from within.

The introduction of robotics brought with it a challenging change process. The role didn't always suit our best line operators. We created the post of 'Line Technician' to support engineering personnel with the aid of the local College. All sourced internally. Two or three 'star performers' have emerged.

We introduced a new grade – 'Mates Programme'. Enables them to leave the top engineers and carpenters with the more 'sexy jobs'.

We use: KTPs; graduate programme lean skills. Tend to spread the net wide. We also use work placements; Year in Industry (with EDT) and take on pre-university A Level students who are paid while in work and are then part sponsored while they are away (up to £1,500). Also ran a carpentry course that yielded benefits.

We take on undergraduates during the summer months.
Graduate management trainees – ex-Plymouth University. We identified two good engineers amongst recruits.

We use short term temporary contracts. Lots of agency workers – tend to cherry pick from amongst the white collar workers; less successful in doing so with the blue collar ones who find that they can often go elsewhere due to demand.

We took on two international students free of charge for 12 weeks which was a success.

Optimising the recruitment process through the use of a 'Neutral Vendor' solution.

Although it may not be suitable for all but the largest and most complex of firms, the *neutral vendor solution* is one means of streamlining the recruitment process and is currently being adopted by Babcock International plc – the City's largest private sector employer.

Neutral vendor recruitment providers are independent consultants who are not linked to any recruitment agency. Their primary function is to put together an agreed panel or panels (depending on skills sets used) in order to meet an organisation's specific business requirements. By doing this they are able to effectively streamline and control supply chains on behalf of their clients.

Neutral vendor recruitment providers are ideal for organisations with large and complex staffing needs, who wish to increase efficiency and process control, through technology as well as management.

Companies with a fragmented supplier base using multiple suppliers, with a wide range of fees and terms and conditions and no centralised control or mandate on operations will see the most benefit of working with neutral vendor recruitment providers.

Primarily, neutral vendor recruitment providers will ensure that a companies' use of agencies is both strategic and cost efficient. By maintaining existing client and agency relationships, they allow Line Managers to continue to communicate their soft skill requirements to agencies, whilst at the same time ensuring that they do not have to negotiate terms or fees. By not mandating the use of one supplier, compliance to the panel and the approach is greatly improved.

Neutral vendor recruitment providers ensure that agencies are motivated to work to the maximum for their clients, through enhanced communication and pre-agreed terms and conditions, helping both parties to develop a more strategic, long-term partnership.

Additionally, through data capture, they are able to provide a high level of management information on spend, candidates, equal opportunities and a multitude of other reports for their clients.

[17] UKCES Review of Employment & Skills April 2011

It is recommended that: (1) PMG members should spend more time together sharing their strategies for circumventing the problems of filling vacant positions.
(2) The PMG should advertise vacancies on its website.

Although subject to changes in the law later this year, agency staffing is likely to remain as a useful means of providing flexible capacity in the workforce. However, enquiries across the PMG membership revealed a wide variation in fee rates. It is recommended that PMG members should explore the possibility of negotiating a 'pan-PMG recruitment agency contract'.

'Positively Plymouth'

One of the reasons why Plymouth finds it particularly difficult to recruit staff, to either the public or private sectors, is due in part to poor perceptions of the City. The general population of the Country do not have an accurate impression what it has to offer. Confusion abounds as to where it lies – many mix it up with Portsmouth and consider it further along the south coast. Most people would never guess that it had a population of a quarter of a million people and that it ranks 14th largest city in England. It continues to be misconstrued as a 'garrison town', painted a dull battleship grey. Few would imagine that it is host to a number of world class manufacturers that contribute over half a billion to the local economy every year.

Generally, the SW is viewed as an industrial backwater; a 'career graveyard'; salaries are lower and the scenery is viewed as 'part of the package'.

During 2010 brand communications consultancy Lloyd Northover created a marketing system underpinned by a dynamic and flexible brand: *'Positively Plymouth'* that was designed to capture the identity of the City. Positively Plymouth provides an optimistic message for the city that encourages the city to embrace its strengths and its quirks. The visual identity is based on community reflections, by using imagery that is contributed entirely from the city. The approach reflects the very best of Plymouth back to itself, while asking everyone to own and support the vision, giving everyone a part to play in promoting the city.

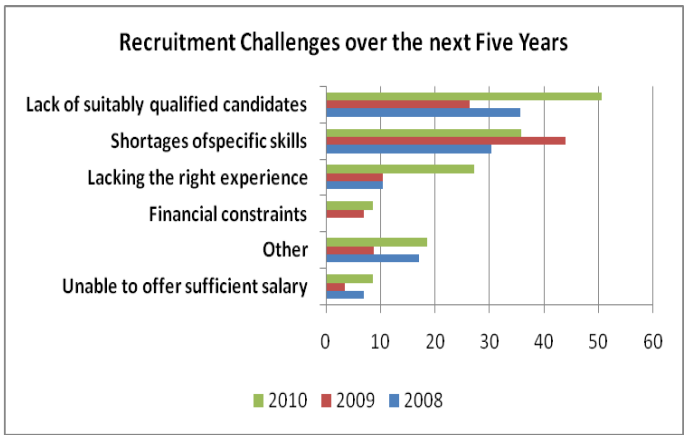
Unfortunately, the project suffered a stuttering start following the collapse of the City Development Company that originally commissioned Lloyd Northover. Brand management now lies with the Head of City Marketing who is employed by Plymouth City Council.

'Work, rest and Plymouth' is one of the themes identified by Lloyd Northover that could potentially be used to attract people to re-locate to the City. As yet, this is an undeveloped idea which requires the support of key employers across the City.

It is recommended that the PMG should work with the Head of City Marketing and other major employers in the City to take forward the '*Work, rest and Plymouth'* theme and develop materials that would entice people to re-locate to the City and convince them that to do so would be a sensible and desirable move.

The future: more of the same.

According to firms within the sector nationally, the situation isn't about to change[18].



[18] Institution of Engineering & Technology's Annual Survey of Skills & Demand in Industry 2010

Summary of Recommendations:

1. Further research should be undertaken to identify the posts that are most difficult to fill.
2. PMG members should spend more time together sharing their strategies for circumventing the problems of filling vacant positions.
3. The PMG should advertise vacancies on its website.
4. The PMG members should explore the possibility of negotiating a 'pan-PMG recruitment agency contract'.
5. The PMG should work with the Head of City Marketing and other major employers in the City to take forward the '*Work, rest and Plymouth'* theme and develop materials that would entice people to re-locate to the City and convince them that to do so would be a sensible and desirable move.

Closing Skills Gaps and Upskilling staff

A skilled workforce is essential for UK manufacturing to compete globally. Investment in skills is amongst the most important that manufacturers can make. Modern manufacturing requires highly skilled people in both specialist and technical areas, as well as in the multi-disciplinary skills required in areas such managing and leading complex operations.

Semta have published a framework of competencies for the advanced manufacturing industry which is composed of:

- Personal effectiveness competencies;
- Academic competencies;
- Workplace competencies;
- Industry-wide technical competencies;
- Industry-sector technical competencies;
- Occupation specific knowledge areas;
- Occupation specific technical competencies;
- Occupation-specific requirements and
- Management competencies.

It is recommended that members of the PMG's Skills Group should assess this framework and discuss its potential usage with providers.

Today, many advanced manufacturing businesses rely on highly skilled individuals, from engineers, scientists and technicians, to product designers. OECD evidence shows that almost 25% of employees in manufacturing have a first degree in science or engineering. This is lower than China (over 45%) but ahead of the United States (around 15%)[19].

Generic and specialist skills also play an important role in promoting productivity. A skilled workforce enables firms to respond innovatively and flexibly to increasing international competition, developing and applying new ideas and knowledge which result in new higher value products and more efficient processes, business models and organisational structures.

This section discusses internal skills gaps among the existing workforce – cases where staff are not felt to be fully proficient at their jobs. It also addresses the vexed question of employability skills and suggests that the need for '*upskilling*' commences even before school leavers and graduates first arrive at the workplace. (Upskilling refers to the process of increasing an individual's skills or knowledge).

The upskilling of individuals across all occupational groups coupled with a shift in employment towards the more highly skilled occupations has resulted in an overall rise in educational attainment in UK manufacturing[20].

But first, we must assess the cards we have been dealt with: the existing skills of the local labour market.

Workforce skills - in the Plymouth Labour Market.
The stock of qualifications across the working age population is said to be the best proxy for skill levels.
An analysis undertaken by SLIM at the University of Exeter[21] reveals that the general pool of labour within Plymouth is relatively poor.
To at least Level 4 - At 22.1% in 2008 - Plymouth had the lowest percentage of its working age population qualified to at least Level 4 in the South West. This is considerably worse than both the regional and national averages (28.3% and 28.7% respectively).
To at least Level 3 - Similarly, 45.6% of Plymouth's working age population were qualified to at least Level 3 in 2008, this is again among the lowest levels in the region, and is below the South West average (49.5%) and that for England as a whole (47.4%).
Qualifications below Level 2 - A third (33.4%) of Plymouth's working age population does not hold at least a Level 2 qualification, generally considered to be the minimum for employability. This is the second largest proportion in the South West.

[19] Growth Review Framework for Advanced Manufacturing, BIS, December 2010.

[20] Manufacturing in the UK: an economic analysis of the sector, BIS, Dec 2010

[21] *Sub-Regional Employment and Skills Analysis 2010, Plymouth, Produced by SLIM, Marchmont Observatory, University of Exeter, February 2010*

Participation and attainment of young people

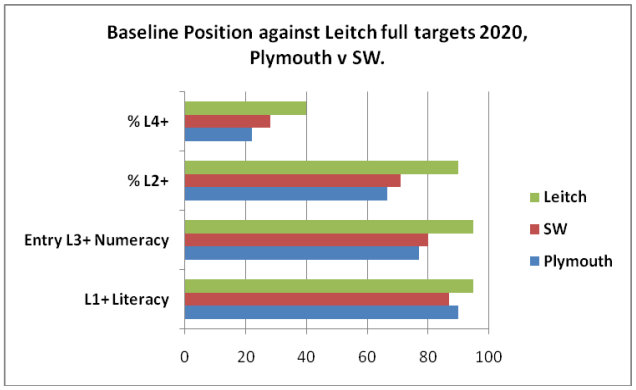
In 2009, 48.7% of pupils in Plymouth schools achieved five or more GCSEs at grades A* - C, including Maths and English. This is below the regional (51.6%) and national average (49.7%). Plymouth is placed joint fourth from last out of the South West local authorities. Plymouth is also again below average for the A Level achievements of its young people. In terms of the average points score per A Level entry, Plymouth is the third lowest in the South West, with an average score 4.5 points (per entry) below the national average.

It is worth remembering that approximately 80% of the people who will be in the workforce in 2020 have already left compulsory education. If we are to achieve a world-class skills base we need to increase their skills and enable them to gain new skills as these are demanded by our dynamic economy[22].

The proportion of 19 year olds achieving a Level 2 qualification has increased in recent years, with 71% reaching this level in Plymouth in 2007/08. This level has increased since 2003/04, but a slower than average rate of increase means that Plymouth's position is currently below both the regional (77%) and national averages (76.7%).

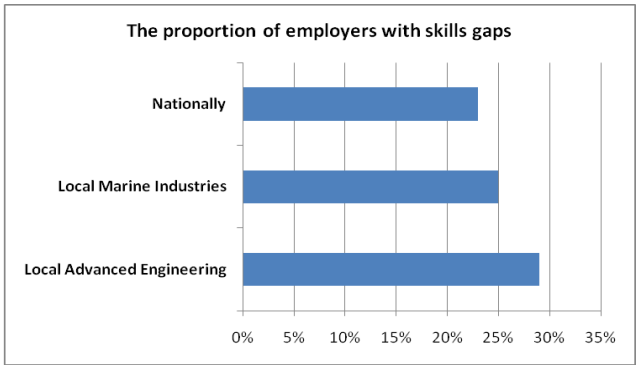
The proportion of 19 year olds achieving a Level 3 qualification has plateaued over the same period with an increase of only 2 percentage points from 37% in 2003/04 to 39% in 2007/08. This is below both the South West average (51%), and that for England (49.8%). There has been no increase in Level 3 attainment at 19 since 2004/05. Plymouth's rate of progress does not follow the same increase of Level 3 attainment seen by the wider regional and national trend.

The chart below (again taken from the SLIM report) summarises Plymouth's position against the Leitch[23] Report's full targets, and shows that none of the four targets have yet been reached. It shows that, in Plymouth, the target that is closest to being achieved is in relation to Level 1 Literacy, where the shortfall is five percentage points (around 7,038 adults). The biggest shortfall is in relation to Level 2 qualifications (23 percentage points, or nearly 36,823 adults).



Countering the problems faced

According to the SERIO report[24], skills gaps are more acute locally than nationally, especially in the Advanced Engineering sector (see chart below).



The main cause of skills gaps reported in the Advanced Engineering (AE) sector locally in the Plymouth TTWA is said to be: *'Insufficient training and staff development'*. Within the Marine Industries sector, five firms reported *'insufficient training /staff development, lack of experience or their being recently recruited and staff lacking motivation' as* being identified as the main causes.

The main impact of the skills gaps for the AE sector was said to be both: an increased workload for other staff and losing business or orders to competitors. Whilst for the Marine Industries sector it was an increased workload for other staff and increased operating costs.

The main action being taken to address these issues (within the AE sector) was said to be increasing training (quoted by half the respondents) and using new recruitment methods/channels, however, 17% of employers were reportedly doing nothing in response to the skills gaps. Within the Marine Industries sector the key remedy was said to be 'Increased training'.

[22] Skills for Sustainable Growth, BIS, 2010

[23] The Leitch Review (2006) sets out a vision of the UK becoming a world leader in skills, benchmarked against the upper quartile of the OECD.

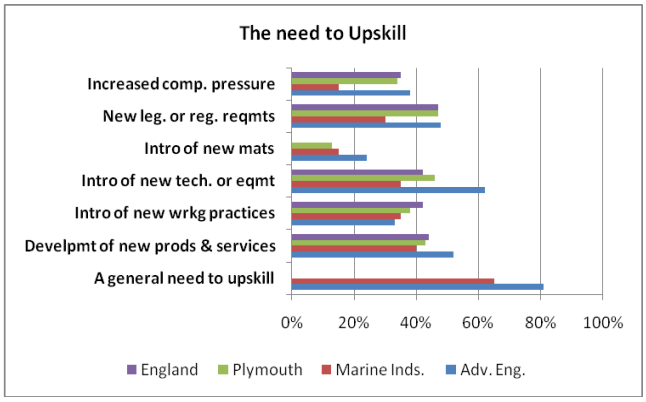
[24] *'Plymouth Priority Sector Skills Audit'* by SERIO, University of Plymouth, June 2010.

The need to Upskill

Across all sectors surveyed by SERIO, around three quarters (74%) of all employers anticipated that some of their staff would need to acquire new skills or knowledge over the coming year, higher than the NESS 2009 figure of 69%. This is also higher than the proportion of employers identifying current skills gaps among their staff. Although this may reflect a dynamic environment of fast changing skills needs, it is also likely that for many employers staff classified as proficient still have plenty of scope for improving their skills and knowledge. Results indicate that larger establishments were more likely to anticipate the need to upskill staff over the next 12 months, rising from 67% amongst employers with fewer than five staff, to 95% amongst those with 50 or more staff.

The Advanced Engineering (AE) sector were the most likely to anticipate the need to upskill staff over the next 12 months at 81% with the Marine Industries (MI) sector less so at 65%.

When assessing main causes for the need to upskill AE quoted the *'introduction of new technology or equipment'* as being the prime reason (62%) followed by the *'introduction of new products or services'* (52%). MI, also cited the *'introduction of new products or services'* (at 40%) as being the most significant reason. Local examples of the introduction of new technology include Tamar Foods and Rittal-CSM's use of robotics. As this tends to be specialist in nature the training is often undertaken by the supplier rather than a local college.



Vocational Skills capability in manufacturing

Probably the most significant set of qualifications is the National Vocational Qualifications in relevant fields. According to a 2008 assessment of the South West region[25], recent trends are as follows: data on Registrations (entry) and Certifications (achievement) for the most significant ones confirm that:

- Strong growth from 2002 in take up of the N/SVQ in Performing Engineering Operations (PEO) at level 1, with less interest over recent years in the Performing Manufacturing Operations (PMO) qualification;
- At level 2, PEO N/SVQ registrations and certifications have also grown strongly, while PMO N/SVQ registrations have recently eased from a sound base. Registrations and Certifications of Engineering Production have faded into insignificance as the qualification has been superseded by PEO/PMO. B-IT Registrations grew strongly from 2004, and Certifications are on the increase.
- At Level 3 Certifications of the Engineering Production N/SVQ have declined over recent year (take up of the qualification was valuable for 6-7 years). Certifications of Engineering Maintenance are continuing to be steady.
- As is generally the case in most sectors, overall take up of N/VQs at the higher levels is disappointing: however the trend at Level 4 is upwards for B-IT and Engineering Management, albeit from a low base.

Anticipating Future Skills Needs

According a SEMTA report[26] written in December 2009, the erstwhile Government's Advanced Manufacturing Strategy, together with expertise from the application sectors, had identified six areas of technological innovations/applications.

- Aerospace
- Plastic/printed electronics
- Silicon electronics
- Industrial Biotechnology
- Composites
- Nanotechnology

This list is reproduced here on the assumption that it probably still applies regardless of the change of Government. The report drew the following conclusions:

High-level technical skills represent the most important element of specific skills demand in relation to Advanced Manufacturing. …the attractiveness of the work is probably more

[25] An Assessment of Current Provision in the Metals, Mechanical Equipment and Electrical Equipment sectors, South West England, January 2008

[26] Skills and the future of Advanced Manufacturing, SEMTA et al, 2009

important than possible limits on numbers studying the relevant technologies in universities. The wide range of application areas for most of these technologies means that, for effective and creative exploitation, **expertise in the technology itself needs to be augmented by knowledge and understanding of the various application areas,** and this means the need for a range of disciplines to be applied.

While high-level technical skills are central, any serious national investment strategy to accelerate effective exploitation and commercialisation of emerging technologies should also include a commitment to **assuring an accelerated supply of capable and competent technical support staff. …**With a poor track record of respect for, and initial formation of, technicians in our country, as compared to most continental European countries, making this happen will require considerably greater commitment than in the past. This commitment will need to involve:

- Substantial promotional investments to raise the image of technical support work,
- Major public investment for learning provision through initial formation frameworks, in particular *apprenticeships*, probably at both *advanced* (NVQ Level 3) and *higher* (NVQ/QCF L4) levels, and
- A new attitude among employers (not just large employers) to the investment for the future involved in mentoring young people, both in relation to work placement for undergraduate students and formal apprenticeship programmes for the technicians.

According to Learning & Skills Improvement Service (LSIS) unless circumstances change, by 2020 there will be a **severe shortfall in technicians and skilled operators.** The forecast demand is 72k the forecast supply is 31.6k: a shortfall of 40.4k.

Returning to the Semta report, effective and fast commercialisation of applications of new technologies requires expertise beyond an adequate supply of technical skills. … In particular, **this must include skills in a) Intellectual Property (IP) management, b) New Product and Process Development and Implementation (NPPDI), c) Production and Manufacturing Engineering, and d) Marketing.**

This confirms the conclusion of many studies that companies, in particular **SMEs, could benefit particularly strongly from the provision by HEIs of short-courses, focused on specific technical areas, and timed for company convenience.** While many university staff would like to increase the amount of such provision, the funding realities of universities do not always make this easy, and improved mechanisms and funding arrangements for this would be welcomed by industry.

A case study in training shared across the manufacturing sector. PMG – Leadership and Management Best Practice Forum run by Exeter leadership Consulting Ltd

In 2010, PMG members expressed interest in leadership and management development. The result was a Forum founded in 2011 led by Exeter leadership Consulting Ltd aimed at senior managers, and directors of manufacturing businesses. The forum meets quarterly for ½ day currently with 8 members. Participants bring real strategic and operational business issues and projects, which they are prepared to discuss during the programme with fellow participants.

The purpose of the forum will be to increase the leadership and management capability of individual members therefore raising leadership capacity in members companies. Each quarter the group comes together with a particular focus drawing on high quality leadership development materials provided by Exeter Leadership Consulting Ltd. Participants expect in the region of one hours focus on learning materials and inputs with two hours for discussion.

The purpose will be to provide support to members in their leadership roles thereby ensuring immediate payback from the modest investment. Important leadership issues such as:

- Increasing innovation and problem solving capability within the business,
- Increasing capability for scenario and crisis planning in your management team,
- Developing your managers ability to lead change and ambiguity,
- Embedding a mindset of continuous improvement throughout the business,
- improving focus on the customer,
- reviewing communication methods to enhance employee engagement
- enhancing performance management and coaching.

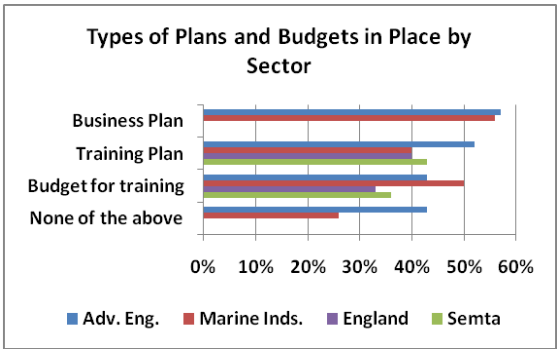
Since commencing the forum, a second group has been formed for smaller firms and support funding through Skills South East has been found for those who can match the eligibility criteria.

Where the adoption of new technologies by existing sectors is concerned (e.g. aerospace, electronics) the supply of R&D skills needs to be augmented with ***knowledge and understanding of how things work in existing industries***. Thus graduate and postgraduate flows in the enabling technologies need to be supplemented by graduates with more general engineering knowledge. Finally, as with most skills issues, the element of ***the image of work in these areas*** cannot be ignored.

Specifically, with regard to higher level skills training, research[27] reveals that:

- The more staff a business employs, the more likely it is to undertake higher level skills training;
- Universities have a larger share of the higher level skills training market than any other provider type;
- The majority of businesses have an *expectation* that higher level skills training will result in the award of a qualification;
- The demand for professional qualifications is greater than for academic or vocational qualifications;
- The importance of cost when choosing a training provider has increased in importance over time, perhaps reflecting the changing economic climate;
- Higher level skills training has a positive impact on the majority of businesses;
- To be effective, higher level skills training must form part of an organisation's wider business strategy.

It is recommended that: (1) the sector should work closely with City College Plymouth; the University of Plymouth and other providers to identify, through focus groups, short courses to help upskill the workforce. (2) That members of the PMG should aim to find further ways in which they can share courses and other training opportunities between firms.



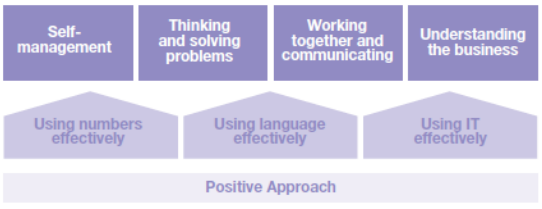
The table above shows the proportion of firms with or without plans and budgets in place for training. It is recommended that the PMG's Skills group addresses the subject of training plans and budgets at one of its future meetings to share best practice with regard to the former and to benchmark against the latter.

Employability Skills

Arguably, skills gaps first become discernible when one considers the employability of school leavers. According to the CBI[28],

- Many young people are still leaving school and college with serious shortfalls in their employability skills. Over half of employers (55%) experience weaknesses in school leavers' self management skills and two thirds (69%) believe they have inadequate business and customer awareness
- Levels of employer satisfaction with the employability skills of graduates are higher than for school and college leavers, but there are still alarming weaknesses in skills around teamworking (20%) and problem-solving (19%)
- Employers report widespread weaknesses in core workplace skills among their existing employees - with almost half reporting problems with literacy and numeracy
- To tackle the basic skills shortfalls across the workforce, around two fifths of employers are providing remedial training to school and college leavers.

UKCES[29] have provided a useful diagrammatic definition of what is meant by employability skills – see below.



Employability Skills – a diagrammatic representation

It is recommended that more needs to be done locally to improve the employability skills of school leavers and graduates.

The recent Wolf Report recommended (Recommendation 21) that: *'DfE should evaluate*

[27] *'Using demand to shape supply: An assessment of the higher level skills needs of employers in England',* Report by CFE to HEFCE July 2009.

[28] Building for Growth: business priorities for education and skills, CBI, 2011.

[29] The Employability Challenge, UKCES, 2009.

models for supplying genuine work experience to 16-18 year olds who are enrolled as full-time students, not apprentices, and for reimbursing local employers in a flexible way, using core funds. Schools and colleges should be encouraged to prioritise longer internships for older students, reflecting the fact that almost no young people move into full-time employment at 16; and government should correspondingly remove their statutory duty to provide every young person at KS4 with a standard amount of 'work-related learning'.

City College Plymouth's Employability Centre
City College Plymouth is proposing a new approach to the provision of employability skills for all its learners in the establishment of an Employability Centre for September 2011. This will bring together and enhance a number of employability and enterprise related activities in the college into a co-ordinated central provision. This includes work placements/visits, master classes, workshops, mentoring, surgeries, self employment awareness raising, business start-up guidance, and other activities. It will expand the current employer endorsement scheme, seeking additional employer partners. This is a project which deserves support, and may provide a model for citywide cross-partner adoption.

University Technical Colleges (UTCs)
In the Government's response to the Wolf Report[30] it stated that, *'We believe that it is right for young people to have a choice as to where they take their education. That is why we are supporting the creation of University Technical Colleges (UTCs), which offer full-time technically-orientated courses, with clear progression routes into higher education or further learning in work, including apprenticeships. Studying in UTCs provides opportunities for young people to integrate academic study with practical learning, studying core GCSEs alongside technical qualifications. UTCs specialise in subjects which need modern, technical, industry-standard equipment, such as engineering and construction, and teach these disciplines alongside business skills and the use of ICT. In the March 2011 Budget, Government committed to establishing at least 24 UTCs by 2014'.*

In Plymouth, a bid has been submitted for a UTC by a consortium from the University of Plymouth, City College Plymouth, and Plymouth City Council, together with Divisions of the Babcock International. The bid document states: *'We propose to reflect the importance of Plymouth's maritime heritage by incorporating marine engineering and advanced manufacturing as core curriculum areas underpinned by enterprise and innovation, using them as motivators, supplying underlying themes and organising principles, which will also transpose into all areas of the College. Specifically, this will generate positive opportunities for the local employment sector to provide work-based learning, utilising the employers and their employees as role models and mentors'.*

The local private sector has fully endorsed the Plymouth bid for a UTC and looks forward to working with the emerging College (assuming it to be successful) to assist in its inception and establishment.

The Plymouth UTC bid states, '*Our vision embraces the timely transformation of Plymouth's future by providing an extra educational dimension designed to foster our budding youth and to enable us to grow our own skilled workforce, within the next generation. Aspirational yet inspirational, the crux of our aim is clearly encapsulated in our motto, 'Cultivating Plymouth's future workforce in business, engineering and manufacturing' and is driven by a profound shared ambition to significantly reduce the number of young person's not in education and/or employment or training (NEETS)'.*

Whilst the general thrust of this vision is laudable, care needs to be taken that the desire to reduce the number of NEETs doesn't compromise the UTC's ability to produce students of a sufficient quality and standard that will meet with the requirements of local industry.

Assuming the bid is successful, it is recommended that proponents of the UTC bid should engage with members of the sector to help deliver its aims and objectives.

Available Support - 'High growth skills service'
As the name suggests, this service is designed to support businesses that are experiencing high growth. Through the service, Peninsula Enterprise can provide up to 15 hours of support, including administration time – completely free to SME's. Essentially, the service is designed to be led by client need and to focus on the development of people and skills within the business.
Examples of help include:

[30] Wolf Review of Vocational Education, Government Response DfE, 2011

- implementing appraisal systems
- skills audits
- training plans/skills matrices
- identifying skills for leaders and managers
- helping with recruitment and selection
- job descriptions/person specs
- personal development plans for managers

It is recommended that Plymouth needs to ensure that as many eligible firms from within the Advanced Manufacturing sector are at least made aware of the *'High growth skills service'*, whether they choose to use it or not.

Summary of Recommendations:

1. Members of the PMG's Skills Group should assess the Semta Competency framework and discuss its potential usage with providers.
2. The sector should work closely with City College Plymouth; the University of Plymouth and other providers to identify, through focus groups, short courses to help upskill the workforce.
3. Members of the PMG should aim to find further ways in which they can share courses and other training opportunities between firms.
4. The PMG's Skills group should address the subject of training plans and budgets at one of its future meetings to share best practice with regard to the former and to benchmark against the latter.
5. More needs to be done locally to improve the employability skills of school leavers and graduates.
6. (Assuming the bid is successful), proponents of the UTC bid should engage with members of the sector to help deliver its aims and objectives.
7. Plymouth needs to ensure that as many eligible firms from within the Advanced Manufacturing sector are at least made aware of the *'High growth skills service'*, whether they choose to use it or not.

Growing the number of Apprentices

The coalition government has pledged to spend £60m on creating Apprenticeships and work placements in private companies. The *'Supporting Youth Employment'* scheme is intended to fund 250,000 Apprenticeship places for 16- to 24-year olds over the next four years and 100,000 work placements over the next two years. The plan, jointly announced by Prime Minister David Cameron and Deputy Prime Minister Nick Clegg in May 2011, will also include a two-year pilot project to provide 50,000 youngsters with six-week periods of intensive support to find a job.

Nationally, employers views on apprenticeships tend to be very positive. However, perceived barriers to hiring remain[31].

Nine in ten (89 per cent) employers view apprentices as key to the future success of their business over the next two years, as they fight their way out of recession.

Over half (52 per cent) of those companies that already recruit apprentices believe that they offer greater value than hiring university graduates.

Seven in ten (71 per cent) of employers of apprentices say apprenticeships are a vital element in an organisation's recruitment and training and development mix.

Despite general recognition of the benefits of apprenticeships to business and the economy, eight out of ten (80 per cent) of all employers claim still there are barriers to hiring apprentices.

In spite of the barriers, seven in ten (71 per cent) of employers without apprentices say they could be encouraged to hire an apprentice, while almost all employers with apprentices (94 per cent) agree.

Across Devon & Cornwall (no statistics exist for Plymouth alone) the number of engineering apprenticeships starts has risen for the past three years year on year and the number of completions is amongst the best in the country. See charts opposite.

Skills Action Plan for the Food Supply Chain

Tens of thousands of new apprenticeship opportunities in the food industry were announced by Food Minister Jim Paice today (22nd June 2011). The apprenticeships are part of an industry drive to get more young people into skilled food jobs. Mr Paice made the announcement as he launched a Defra-sponsored action plan to get food businesses to run more apprenticeships and change the way young people to think about working in the food industry.

Speaking at the Institute of Grocery Distribution's (IGD) Skills and Employability Summit, Food and Agriculture Minister Jim Paice said:

"Our food industry is hugely important to growth, employing 3.7 million people and contributing almost £90 billion to the UK economy. But we know that there is a big skills gap right across the food chain. The industry must attract more well qualified and ambitious candidates if it is to continue to grow and innovate."

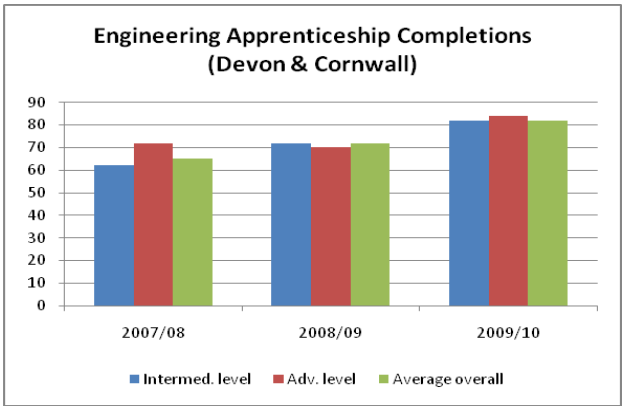
"These 50,000 apprenticeships show that the food industry is serious about becoming a place where young people seek out skilled and fulfilling careers. I would encourage anyone out there looking for a challenging career in a growing sector to think about the food industry."

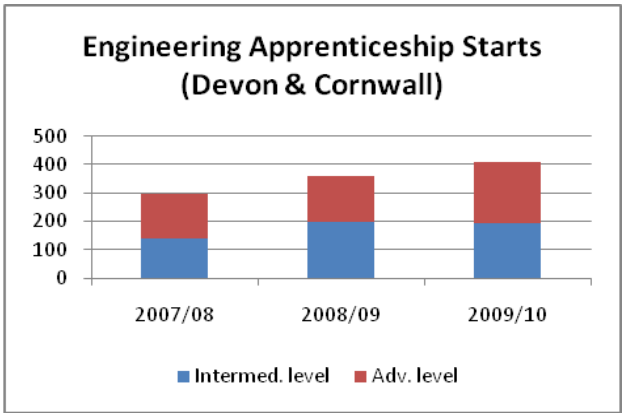
The new Skills Action Plan for the Food Supply Chain aims to:

- Change the way that young people think about careers and development in the food industry. As part of this the industry will push a new 'Feed your Ambition' message to over 60,000 young people in over 800 schools; and
- Encourage more apprenticeships across the entire Food Supply Chain but in particular in SMEs.

The PMG has developed a close working relationship with the local National Apprenticeship Service (NAS) team. In March this year the PMG's Skills sub-group held a special meeting focusing entirely on apprenticeships. The following questions were raised illustrating the level of knowledge that some firms currently possess.

[31] *City & Guilds, Building Business Through Apprenticeships - February 2011*





What makes a suitable employer for an apprentice?

- *What opportunities do you need to be able to offer?*
- *What constitutes meaningful apprenticeship training (provided by the employer)?*
- *How much time and resources do you have to invest?*
- *What do you need to offer in the way of pastoral care (personal, social and emotional).*
- *Are all apprentices destined to become at least a technician grade?*
- *Who mentors the host employer?*

How much bureaucracy is there?

What does an apprentice expect to earn?

What do the providers have to offer?

- *How do you differentiate between good/average and poor providers?*
- *How much of the administration do the employers handle?*

What qualifications does an apprentice receive?

- *Explain the links with NVQs*
- *What impact can the employer have on choice of subjects learnt?*

The recruiting process - How do people go about it?

After the meeting, Bob Harrison, Employer Service Manager, wrote, *'Following on from the PMG Skills Group meeting in March I'm pleased to report the positive outcome from the 13 companies in attendance:*

- *From the nine I had not met before, I have met or have in the diary to meet with six of them*
- *Two of these are now already planning to take on Apprentices by September and I'm supporting them through this process in finding the most suitable training provider to meet their needs.*
- *In addition to this those companies who take on Apprentices and are already working with NAS, I've also had the opportunity to meet with three SMT staff to look at introducing new Apprenticeship Sectors, such as Business Administration and Logistics, that will benefit their business'.*

Issues and Challenges

According to the SW Regional Employment & Skills Partnership[32], the ambition to expand the number of Apprenticeships faces a number of very significant challenges, including:

- The maintenance and expansion of employer demand in the current, difficult economic climate.
- Overcoming the significant inequalities within sectors - white males currently dominate the best opportunities, while females predominate on Level 2 Apprenticeships in low-paid sectors.
- The impact of plans to raise the age of participation to 18 by 2015 which will both raise demand from the 16-18 age group and could have the effect of exacerbating existing inequalities.
- The impact of the decision that, for those aged 24+ (which currently represents the fastest growing group), loans will be required.
- Maintaining the balance between quality and quantity, given that the main driver in recent years has been to increase the numbers of Apprenticeships – how to do more for less.

[32] Delivering Apprenticeships: the Challenges for the South West Briefing Paper, commissioned by Employment and Skills Partnership Alliance, written and researched by Chris Evans, Dr Andrew Dean, Adam Crews SLIM, Marchmont Observatory, University of Exeter, April 2011

- Readiness for the new Specification of Apprenticeship Standards for England (SASE) in 2011, designed to improve the transparency and consistency of Apprenticeships.

The PMG welcomes innovative ways of delivering apprenticeships that serve the needs of the sector and, as a consequence, has recently been interested to listen to Stourbridge-based Lean Education And Development Limited's (LEAD) proposals of offering an alternative approach.

The LEAD approach to apprenticeships

LEAD's exciting approach to apprenticeships is different in a number of ways. One way is the addition of Lean Business Improvement Techniques into the Advanced Engineering programme, this is proving highly successful with employers. It encourages apprentices to look at their working environment in a completely different way, they learn to add value in order to help improve business outputs and customer satisfaction.

LEAD are committed to finding apprentices full time employment (not simply a placement), and provide a valuable first step in their career. Working closely with employers and apprentices alike to match skills and abilities with those required, LEAD pride themselves on their success in this area. Apprentices are employed from day one and are paid the weekly apprenticeship wage of £95, which gives them a real sense of worth and belonging.

LEAD's on-going support structure is second to none, meeting regularly with employers and apprentices to develop a training plan, assist with any concerns, make sure work is on target and positively ensure all parties are happy with progress made.

Finally, LEAD offer a flexible approach to learning, working individually with employers to ensure the appropriate amount of days are spent at college and work so they enhance one another and add value to both employer and apprentice. (Taken from LEAD's publicity brochure).

Recommendation 16 in the Wolf Report[33] stated: *'DfE and BIS should discuss and consult urgently on alternative ways for groups of smaller employers to become direct providers of training and so receive 'training provider' payments, possibly through the encouragement of Group Training Associations (GTAs)'.*This recommendation has been accepted by the Government.

Recommendation: The local private sector under the auspices of the PMG should consider ways in which firms can collaborate locally to enable smaller firms to take on apprentices.

[33] Review of Vocational Education – The Wolf Report, by Alison Wolf, March 2011

The STEM Skills challenge

In 2005 Fortune magazine started alarm bells ringing by proclaiming on its cover that *"Last year more than 600,000 engineers graduated from institutions of higher education in China. In India the figure was 350,000. In America, it was about 70,000."* Although the accuracy of the figures has since been disputed[34], there is undeniable evidence that STEM skills (science, technology, engineering and maths) are an increasing problem – not just for the US but the UK too. And it is problem that is acutely felt within the advanced manufacturing sector.

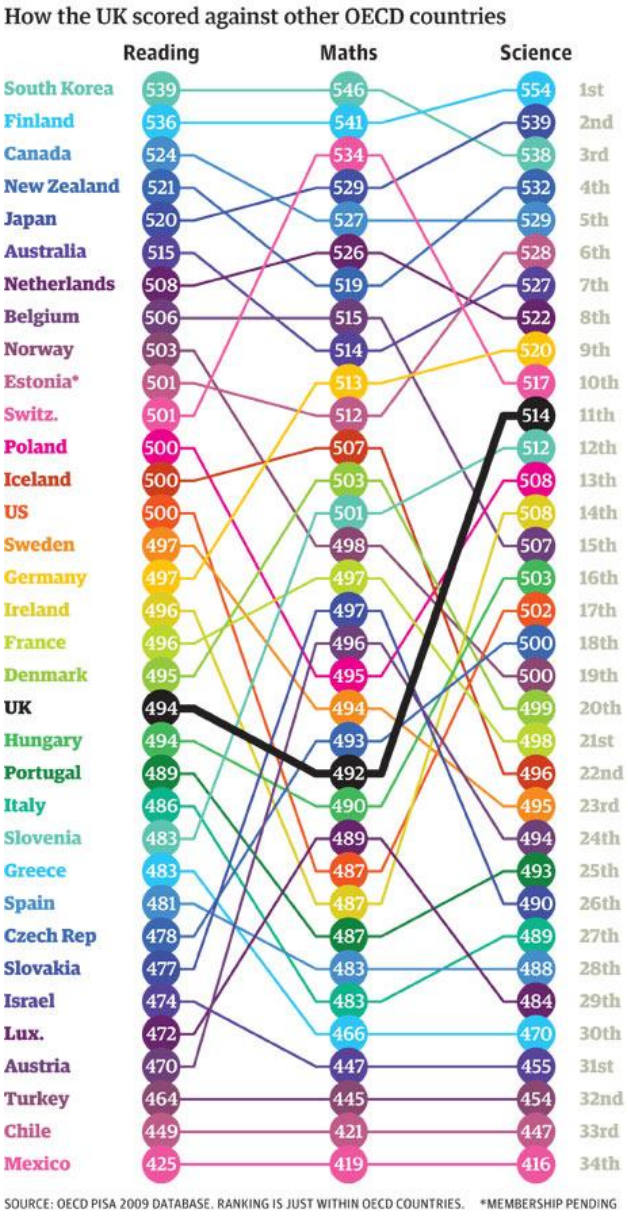
More recently, in December 2010 the Organisation for Economic Co-operation and Development (OECD) published its latest rankings by the Programme for International Student Achievement (PISA), an international education benchmark in maths, reading and science, of 470,000 15-year-olds from 65 different countries[35].

Against other OECD countries, the UK is ranked 20th for reading, 22nd for maths and 11th for science. Andreas Shleicher, head of the Pisa programme, said the picture for the UK was *"stagnant at best". "Many other countries have seen quite significant improvement,"* he added.

Here in the UK in 2009, the Russell Group of Universities warned that while its graduates and postgraduates were meeting a significant proportion of the demand for high-quality STEM skills and thus making an important contribution to business productivity and innovation, there was, nevertheless, already a shortage of high-quality STEM graduates entering the UK economy and demand for such graduates was set to increase[36].

Previously, in January 2008, prior to the public sector expenditure cuts, the Schools Minister, 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.

More recently, in June 2011, speaking at the 10th Cheltenham Science Festival, Science Minister David Willetts said that *"science and engineering are vital for economic growth, and we need to do everything we can to inspire the next generation*

[34] *Business Week: US Schools are still ahead – way ahead by Vivek Wadhwa* http://www.businessweek.com/smallbiz/content/dec2005/sb20051212_623922.htm

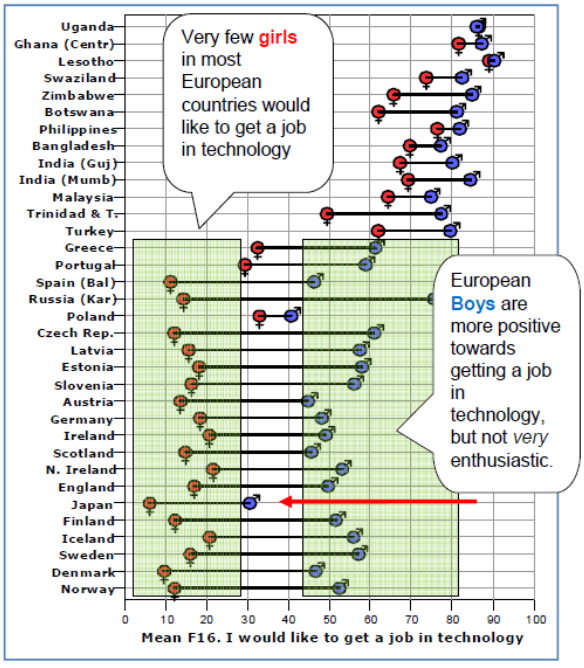
[35] Taken from The Guardian website Tuesday 7 December 2010 http://www.guardian.co.uk/news/datablog/2010/dec/07/world-education-rankings-maths-science-reading

[36] http://www.russellgroup.ac.uk/uploads/STEM-briefing.pdf

and show them the vast range of careers available to them.
"The Government is absolutely committed to outreach in schools and public engagement with science, and this funding will give thousands of people the chance to experience firsthand the very best that British science has to offer."

Gender Differences

Sjøberg and Schreiner highlight some important findings in how young people around the world relate to STEM subjects (although they refer to them as 'SET'). The following paragraphs are précised extracts taken from their ROSE (the Relevance of Science Education) background paper[37]. The ROSE project takes the views of young learners at the age of 15 from more than 40 countries on several subjects related principally to science and mathematics. It concludes that while young people are great consumers of modern technological products, they are not willing to be producers. They are very hesitant to choose STEM subjects in schools and (even more) at degree level and within their careers.



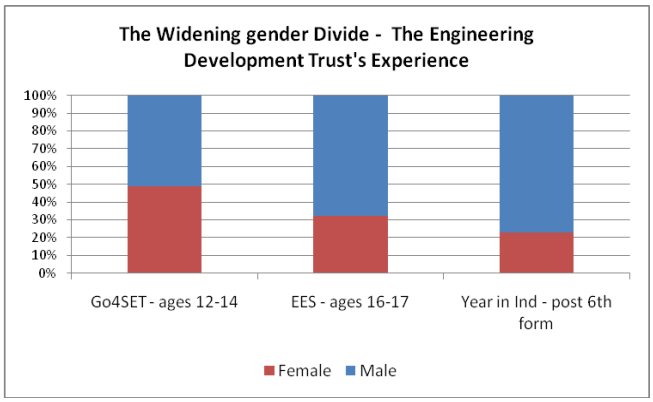
Young learners in all kinds of countries have rather positive attitudes to STEM. It seems, however, mainly in richer countries, that the young generation is more ambivalent towards STEM than adults: girls much more than boys, and the differences are most dramatic in the richest North-European countries.

[37] Young People, Science and Technology Attitudes, Values, Interests and Possible Recruitment - ROSE background paper by Svein Sjøberg and Camilla Schreiner.

The ROSE data confirms that educational choices for young people, to an increasing degree, are determined by their values. And unless STEM occupations fit with their values they will be reluctant to enter such careers. Girls are typically 'people-oriented' - they like to work with other people, and they want to get a job where they may be of help for other people. Unfortunately, their perceptions of engineers or scientists do not seem to fit this 'people-oriented' image. Boys, on the other hand, are more interested in 'things'. They want to learn about spectacular phenomena, machines, bombs etc. They also want jobs where they can use and repair machines and things.

School science seems to fail in many respects. Young people like school science less so than most other subjects. School science fails to stimulate their choice of occupations and careers, and rather few think that school science will be of value for their future life. In most countries, there are large gender differences on all such questions. ROSE offers a broad range of data and results. The graph displayed above clearly shows the gender divide - very few girls in most European countries, including England, would like a technology related job. Boys, on the other hand, are more positive but less so than boys in other continents, for example, Africa. For more elaborate analysis and publications, see the ROSE web site. http://roseproject.no./

Locally, in Plymouth we can see the dramatic effect of gender differences in STEM related activities offered by the Engineering Development Trust (EDT) to students ranging from ages 12 to 19.



At age 12-14 when students participate in the EDT's Go4SET programme there is barely any difference at all. At Year 12, the Engineering Education Scheme attracts only a third female students and the Year in Industry students are one fifth to at best one quarter female.

The Leaky Pipeline

The UK's education system can be seen as a 'pipeline' for skills, with children entering the system at one end of the pipe and emerging with relevant skills into the workplace at the other end. In terms of STEM skills, the pipeline is often characterized as having a series of leaks, 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

Within the South West this has been well illustrated by the Skills and Learning Intelligence Module (SLIM) which is managed by the Marchmont Observatory, at the University of Exeter. Commissioned by SWRDA and the Regional Employment and Skills Partnership, in June 2009, SLIM produced a report which examined the demand and supply of STEM skills within the region[38]. The report included the pipeline diagram which is replicated on the page overleaf.

Key factors which affect the flow of STEM students include the following:

- Differences with the maintained and independent sectors - while just 16% of higher achievers at Key Stage 3 (age 13/14) in the maintained sector took the Triple Science route, in the independent sector pupils were much more likely to take it, even if they had not achieved level 6 or above at Key Stage 3.

- As asserted by the CBI, 'studying each science separately at GCSE hugely increases the chance of studying science at A level'. Around 55% of those who took triple science at school went on to study at least one science at A level, compared to just 25% of those taking the Double Science Award.

- Taking Single Award Science at GCSE does not provide a detailed enough knowledge base for the study of Sciences at a higher level, as less than 5% of students who took this GCSE went on to study Science A levels in school.

- 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.

- 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.

- 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 were having difficulties finding appropriate employment relevant to their studies. Some STEM subjects retain a very high percentage of graduates in STEM occupations. The highest rates are in those subjects with a more defined occupational emphasis i.e. Medicine, Dentistry and related, Architecture, Building & Planning, and to a lesser extent, Engineering.

Cause and Effect

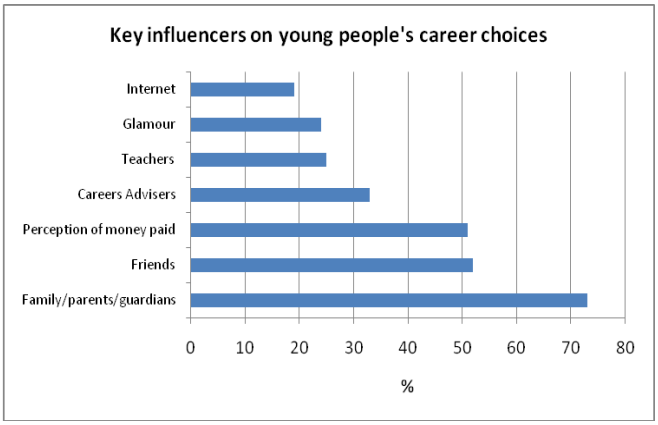
The European Round Table of Industrialists[39] identify the key causes of STEM pipeline problems (for students) as being: the lack of a rationale for education and work in STEM related employment and secondly, a lack of role models in working life. For teachers, they attribute the problem as being a lack of information on the use of STEM skills in working life. Their solution is ever closer collaboration between schools and industry.

As the chart[40] below shows, the key influencers on young people's career choices are family, parents and guardians followed by friends.

[38] STEM: Demand and Supply of Skills in the South West, Key Findings and Recommendations, Commissioned and funded by the SW Regional Development Agency, Supported and endorsed by SW RESP, Produced by SLIM, June 2009

[39] STEM Talent Pipeline for Europe 2020-2050 presentation by Hans van der Loo, Vice President European Union Liaison Shell International at the University of Warwick –October 16th, 2010

[40] Source: Claire Nix VT Group, SW STEM Careers Conference April 2010



According to the SLIM STEM report[5], other barriers identified include:

- The lack of inspirational teachers and a science curriculum irrelevant to modern living;
- 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
- 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;
- 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.

The SLIM STEM report closes with a series of recommendations – too many to list here but they are attached at Appendix X.

Key local actors in STEM

Across the City and beyond into the Region and nationally there are no-end of initiatives underway to address the STEM Challenge. Within Plymouth alone the following bodies are active: -

Plymouth City Council's Lifelong Learning Department for Services for Children & Young People have a STEM Action plan for 2010/11 which is essentially school's focused. It includes the following three key objectives:

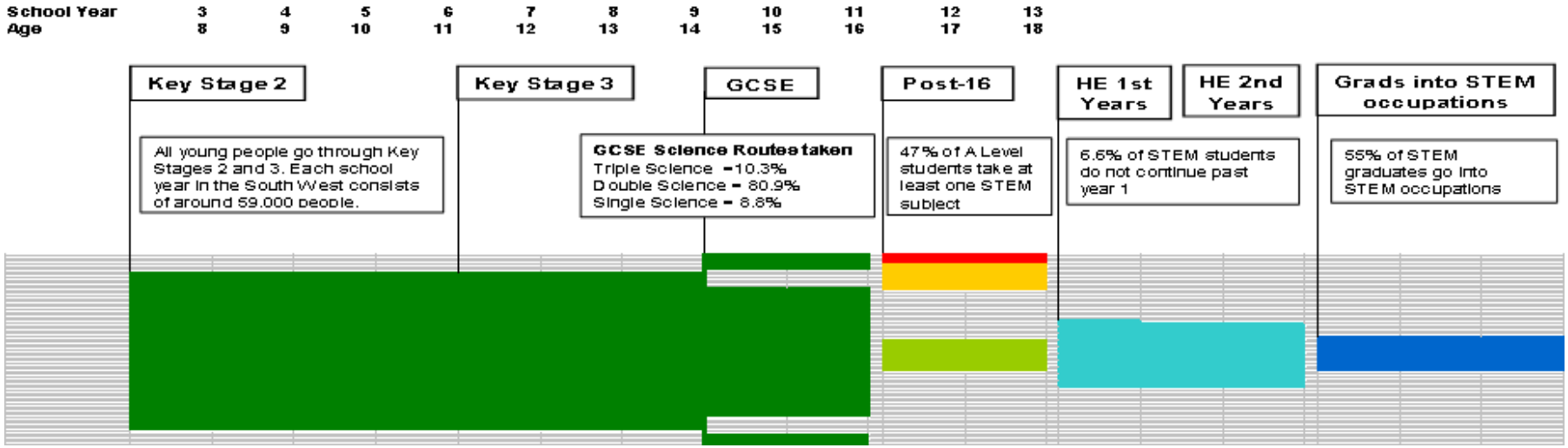
- Developing, refining and implementing the STEM Agenda in Plymouth Schools.
- To engage cross curricular links with Science, Maths + DT at a LA level.
- To offer STEM Enrichment/Enhancement Days at all secondary Key Stages.

This is led by Claire Plumb, Science Consultant. PCC also employ – within Lifelong learning - a 14 -19 Advisor – Economic Development and Skills, Kathy McHugo who amongst other things has been developing engineering development pathway diagrams and promoting employer engagement for events such as Inspire '11, the skills event for young people aged between 14 – 19 years from Plymouth Schools.

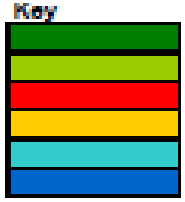
The **Engineering Development Trust** is an independent registered charity whose mission is to encourage young people to fulfil their potential through careers in science, engineering and technology. Established in 1984, the EDT is a leading national provider of work related learning programmes targeting 11-21 year olds and annually involves over 6000 students. The Trust aims to inspire and motivate young people into choosing a SET career by giving them the opportunity to experience real life exposure to industry, business and higher education. The awareness gained empowers students to make informed choices at key stages of their education. EDT's South West Regional Director is Charity Watkins, Tamar Science Park, Plymouth.

The EDT boasts some impressive statistics. Of the Engineering Education Scheme (EES) students that took part in the EES in 2007/08, all but 9% of them went into STEM areas as their next step. Over 50% of all involved nationally in Go4SET (an environmentally themed 10 week science, technology, engineering and mathematics projects for Year 12-14yr old pupils) last year, thought an engineer was someone who fixed cars and wore dirty overalls when they started the scheme. There was a huge perception shift away from this image towards "clever", "logical" and "analytical" by the end of the 3 months involvement towards a positive perception of engineering and science as a future pathway. 75/80% (depending on year) of Year in Industry students return to industry upon graduation.

STEM Skills Pipeline in the South West[41]



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 progress past year one	



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 Level

[41] *STEM: Demand and Supply of Skills in the South West, SLIM, June 2009*

STEMNET is a national body with a regional presence. It creates opportunities to inspire young people in STEM subjects. This enables young people to develop their creativity, problem-solving and employability skills, widens their choices and supports the UK's future competitiveness. It helps encourage young people to be well informed about STEM, able to engage fully in debate, and make decisions about STEM related issues. It is particularly strong in recruiting STEM ambassadors as advocates and organizes a number of high profile and successful events such as the Big Bang South West event held in Exeter in June. The south west regional contact is Paul Hartley of Careers South West Ltd, Queen's House, Exeter.

The **Plymouth Engineering Skills Council (PESC)** which was originally set up with the aim: *'To improve the engineering skills base in Plymouth to meet current and future employer demand'.* PESC is unique in the City in that it engages secondary, further and higher education providers alongside employers and employer representative bodies. It is chaired by the Chair of the Employment & Skills Board and it continues to promote the sector to the local community through a proactive PR and communications programme.

In the past, PESC were heavily engaged in overseeing the progress of **Plymouth Enginuity** - a former grouping which operated under the strapline of: *'Developing, Attracting and Retaining Quality Skilled People for Engineering Companies in the Plymouth Travel to Work Area'.* Set up in 2006 it was funded by the Government's Learning & Skills Council and by the member companies themselves. Although now no longer operational, its activities were very much in tune with the STEM agenda and it is therefore worthy of note.

Tamar EBP operates as a separate business unit within Plymouth City Council's Services for Children and Young People, Lifelong Learning. It contribute to the 14-19 strategy and one of its key roles is to engage employer support to enhance young peoples' vocational & work-related learning, and to build their enterprise and employability skills. This includes the delivery of Science, Technology, Engineering and Maths (STEM) programmes and Tamar EBP staff work with local businesses and sector groups to help meet local, regional and national labour market needs.

The **National HE STEM Programme** is an initiative funded by the Higher Education Funding Councils for England and Wales. Although focused around Science, Technology, Engineering and Mathematics, it primarily supports the disciplines of Chemistry, Engineering, Mathematics and Physics. These are STEM subjects that have been deemed strategically important and vulnerable. The SW Spoke team brings together HEIs from across the region and engages them directly in the activities of the national programme, as well as acting as a conduit through which national practice is channeled and embedded directly within the HE sector. The team is also responsible for enabling regional networks that bring together appropriate stakeholders.

The **Learning and Skills Improvement Service (LSIS)** is the sector-owned body that aims to accelerate the drive for excellence in the learning and skills sector, building the sector's own capacity to design, commission and deliver improvement and strategic change. At LSIS we operate a number of funds designed to give sector providers support for innovative projects with the potential to secure significant improvements in sector practice or performance. LSIS offers STEM funding opportunities available for Skills Funding Agency funded providers. LSIS run a National STEM Centre.

The north Devon-based FE College, **Petroc** is a Regional Hub for the Government's Learning and Skills Improvement Service (LSIS) STEM programme and has a member of staff, Cerian Ayres, who is LSIS South West STEM Champion.

Widening Participation in the Faculty of Science and Technology at the University of Plymouth
Widening Participation (WP) aims to promote and provide the opportunity of successful participation in higher education to everyone, whether old, young, male, female, disabled or able. WP raises aspirations among people, to prepare them for higher education, ensure success and improve employment prospects.
The Faculty of Science and Technology has supported the WP agenda for a number of years, delivering activities to schools, colleges and the wider community. It aims to make science and technology accessible to all.

Girl Geeks Plymouth has now met on two occasions and has their next event planned for July 2011. Girl Geek Dinners started in London in 2005 and have spread across the UK, Europe and to India, North America and Australia and New Zealand. Men are welcome, but have to be invited by a woman attending the event. The aim is to:

- To break down old fashioned social stereotypes.
- To identify routes around barriers to entry for anyone to get into technology.
- To encourage and nurture those interested in technology.
- To work with local schools, colleges and universities to encourage more women into the technology industry.
- To support those currently in the industry and work together to figure out the issues and the solutions.
- To include men, women and children in this journey…. and not exclude men from Girl Geek Dinner Events

Other bodies that get involved in STEM related activities include: the **Engineering Employers Forum**, EEF is a national representational body for the manufacturing sector. It aim provides a range of business services, government representation and industry intelligence functions. It has a South West regional office at Engineers' House, The Promenade, Clifton Down, Bristol.

Finally there is also a regional **STEM Information Centre** - To coordinate information about a range of STEM activities which enhance and enrich pupils STEM experience and to assist the providers of STEM support to focus their efforts on addressing the identified needs of school, colleges and employers. Led by SW RSP.

In conclusion, the activities of various STEM related groups across the City and beyond seem less than fully coordinated. Some of the parties involved are unaware of others operating in the same field. As a result, people are progressing similar initiatives in isolation of one another. The private sector is also distant from some of the work that is going on or could be more engaged. More needs to be done to ensure that an analysis of STEM subjects taken at all levels within the City is maintained on an on-going basis.

It is recommended that (1) PESC be given the role of championing and overseeing the development of STEM skills in the City and its TTWA. As part of this role they should commission a holistic review the current position (with regard to STEM skills) and measure baselines; agree key issues and identify objectives and performance targets for the future.
(2) 'Girl Geeks Plymouth' needs to become financially viable through corporate sponsorship. Assistance should be sought across the sector.
(3) The private sector needs to ensure that its representatives who sit on the boards of some of the public sector led groups listed above are aiming (where appropriate) to achieve goals that are aligned with this growth plan.

The British Science Festival

The British Science Festival[42] is one of Europe's largest science festivals, taking place each September. Each year the Festival travels to a different UK location, bringing the latest in science, technology and engineering. It is recommended that Plymouth should aim to host the British Science Festival sometime over the next 5 to 10 years.

Employer Engagement with Schools

The PMG's membership has an exemplary track record in employer engagement activities with schools which was most recently demonstrated in support of both the engineering and

[42] http://www.britishscienceassociation.org/web/BritishScienceFestival/index.htm

manufacturing diplomas for 14-19 year old pupils in our local schools and colleges

Working in partnership with the EDT over the past eleven years, the PMG has regularly sponsored a Year in Industry prize for the best manufacturing project. This year's winner was Reece Williams from Goodrich who had devised a week long work experience programme of activities for young students visiting Goodrich from school.

Above: Former Chair of the PMG, Patrick O'Connell, Director of Banvulc Group, presents Reece Williams of Goodrich with his certificate and prize as winner of the 2011 PMG/EDT competition for best Year in Industry project.

It was designed so that the student would leave the site on the Friday having manufactured a product utilising many of Goodrich's complex components and at the same time gained a good grasp of the firm, its structures and functions.

It is recommended that local employers need to engage fully in initiatives that will help counter the STEM challenge. Current outlets for assistance include:

a. The Plymouth Inspire event.
b. The production of career progression maps and study pathways.
c. More direct work with individual schools.
d. Supporting EDT.

Manufacturers open doors to next generation of engineers

Students across the country will get the chance to see one of the UK's vanguard industries today, 29 June 2011, as companies in the automotive sector throw open their doors in a pilot for a new government initiative.

see inside manufacturing

As part of the *'See Inside Manufacturing'* programme, the Government and industry are calling on the budding young engineers of tomorrow to see how they can play a role in designing, developing or producing some of the world's most desired and ground-breaking products.

The automotive sector is spearheading the campaign this year inviting pupils, teachers and careers advisers to see firsthand some of the UK's world-class automotive and motorsport facilities and research centres.

They will be able to talk to apprentices and learn more about modern high-value manufacturing and the wide range of rewarding jobs in this exciting and diverse sector.

Business Secretary Vince Cable said:

"The UK has one of the most diverse auto sectors in the world. It is vital for us to enthuse the next generation about the opportunities these industries have for them.

"Anyone who visits the research labs or production facilities that drive our economy cannot fail to be impressed. This initiative will give thousands of school pupils and their teachers an experience they may never forget.

"I hope the people who take advantage of this opportunity leave with a better understanding of how they can aspire to be part of the success story of British automotive manufacturing."

More than 35 companies and organisations from the automotive sector including some of the most well known names in the Britain's car industry are supporting *'See Inside Manufacturing'*. The automotive sector is trailblazing this year and it is expected that *'See Inside Manufacturing'* will be rolled out to the wider manufacturing sector next year.

It is recommended that the PMG membership need to be ready to offer themselves available for the 2012 *'See inside Manufacturing'* event – or, if the need arises, arrange our own Plymouth equivalent.

Summary of Recommendations:

1. PESC be given the role of championing and overseeing the development of STEM skills in the City and its TTWA. As part of this role they should commission a holistic review the current position (with regard to STEM skills) and measure baselines; agree key issues and identify objectives and performance targets for the future.
2. 'Girl Geeks Plymouth' needs to become financially viable through corporate sponsorship. Assistance should be sought across the sector.
3. The private sector needs to ensure that its representatives who sit on the boards of some of the public sector led groups listed above are aiming (where appropriate) to achieve goals that are aligned with this growth plan.
4. Plymouth should aim to host the British Science Festival sometime over the next 5 to 10 years.
5. Local employers need to engage fully in initiatives that will help counter the STEM challenge. Current outlets for assistance include:
    a. The Plymouth Inspire event.
    b. The production of career progression maps and study pathways.
    c. More direct work with individual schools.
    d. Supporting EDT.
6. The PMG membership need to be ready to offer themselves available for the 2012 *'See inside Manufacturing'* event – or, if the need arises, arrange our own Plymouth equivalent.

Action Plan

Theme/Action	Lead Body	By When (Provisional dates).
Recruitment Difficulties		
1. Further research should be undertaken to identify the posts that are most difficult to fill.	PMG Skills Group	Q4 2011
2. PMG members should spend more time together sharing their strategies for circumventing the problems of filling vacant positions.	PMG Skills Group	On-going
3. The PMG should advertise vacancies on its website.	PMG	Q1 2012
4. The PMG members should explore the possibility of negotiating a 'pan-PMG recruitment agency contract'.	PMG Skills Group	Q4 2011
5. The PMG should work with the Head of City Marketing and other major employers in the City to take forward the '*Work, rest and Plymouth'* theme and develop materials that would entice people to re-locate to the City and convince them that to do so would be a sensible and desirable move.	PMG/Head of City Marketing	Q3 2012
Skills Gaps & Upskilling		
6. Members of the PMG's Skills Group should assess the Semta Competency framework and discuss its potential usage with providers.	PMG Skills Group	Q2 2012
7. The sector should work closely with City College Plymouth; the University of Plymouth and other providers to identify, through focus groups, short courses to help upskill the workforce.	PMG/Uni of Plymouth/City College	Q4 2011
8. Members of the PMG should aim to find further ways in which they can share courses and other training opportunities between firms.	PMG Skills Group	Commencing Q4 2011 then on-going
9. The PMG's Skills group should address the subject of training plans and budgets at one of its future meetings to share best practice with regard to the former and to benchmark against the latter.	PMG Skills Group	Q4 2012
10. More needs to be done locally to improve the employability skills of school leavers and graduates.	PESC	Commencing Q1 2012 then on-going
11. (Assuming the bid is successful), proponents of the UTC bid should engage with members of the sector to help deliver its aims and objectives.	City College/UofP/PCC	Post bid outcome announcement
12. Plymouth needs to ensure that as many eligible firms from within the Advanced Manufacturing sector are at least made aware of the *'High growth skills service'*, whether they choose to use it or not.	PMG/Peninsula Enterprise	Q1 2012

Apprentices		
13. The local private sector under the auspices of the PMG should consider ways in which firms can collaborate locally to enable smaller firms to take on apprentices.	PMG Skills Group	Q3 2012
STEM		
14. PESC be given the role of championing and overseeing the development of STEM skills in the City and its TTWA. As part of this role they should commission a holistic review the current position (with regard to STEM skills) and measure baselines; agree key issues and identify objectives and performance targets for the future.	PESC	Commencing Q1 2012 then on-going
15. *'Girl Geeks Plymouth'* needs to become financially viable through corporate sponsorship. Assistance should be sought across the sector.	PESC	Q1 2012
16. The private sector needs to ensure that its representatives who sit on the boards of some of the public sector led groups listed in the report are aiming (where appropriate) to achieve goals that are aligned with this growth plan.	PMG	Q4 2012
17. Plymouth should aim to host the British Science Festival sometime over the next 5 to 10 years.	PMG/PESC	Mid to long-term
18. Local employers need to engage fully in initiatives that will help counter the STEM challenge. Current outlets for assistance include:	PESC	Commencing Q4 2011 then on-going
a. The Plymouth Inspire event.		
b. The production of career progression maps and study pathways.		
c. More direct work with individual schools.		
d. Supporting EDT.		
19. The PMG membership needs to be ready to offer themselves available for the 2012 *'See inside Manufacturing'* event – or, if the need arises, arrange our own Plymouth equivalent.	PMG Skills Group	Dependent on the timing of the national event.

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