

The Enterprise and Business Committee follow-up Inquiry into Science, Technology, Engineering and Mathematics (STEM) Skills

Response from the Higher Education Funding Council for Wales (HEFCW)

1. About HEFCW

HEFCW is responsible for funding higher education (HE) in Wales. We distribute funds for education, research and related activities at higher education institutions, including the teaching activities of the Open University in Wales. We also fund higher education courses at further education colleges. As a Welsh Government Sponsored Body, we receive our funds from, and are accountable to, the Welsh Government.

2. Purpose

This submission provides responses to the issues under discussion by the Committee. We have not had the opportunity to seek approval of HEFCW's Council for this submission which must therefore be regarded as a submission from HEFCW executive only.

3. Issues under consideration

We address in turn each of the areas that the Committee wishes to consider in the course of its Inquiry. We understand that the Inquiry is a follow up and intends particularly to address progress since the 2011 Enterprise and Learning Committee Inquiry.

3.1 What impact has the Welsh Government's strategy *Science for Wales* and Delivery Plan had on science, technology, engineering and mathematics (STEM) skills in Wales?

Under the umbrella of the *Science for Wales* strategy and Delivery Plan, HEFCW has worked with the National Science Academy in 2012/13, joint funding seven Higher Education projects with a combined value of £121k. These are:

- Enriching STEM
- GCSE Science Easter Revision Roadshow
- Maths Apps Roadshow
- Science Summer School
- Materials Live
- Medical STEM
- Supporting Innovation

We are aware that Welsh Government has commissioned an evaluation of these projects. Six new Higher Education STEM projects have been funded by Welsh Government in 2013/14. HEFCW is represented at the NSA partner hub meetings. However, our understanding is that these have not taken place for some time, raising a question about how the statement in *Science for Wales* - 'It will be the NSA's role to bring national direction and coordination to STEM outreach activities, and the appointment of a coordinator is required'¹ is being implemented. While welcoming involvement in the funding of a range of STEM projects, we consider there to be a risk that impact has been lessened by the lack of a strategic approach to STEM outreach, and a failure to maximise the opportunity offered by the Strategy to provide coordination and leadership of outreach activities.

HEFCW is a joint funder of the Welsh Government's *Sêr Cymru* programme set up under the auspices of *Science for Wales* to provide additional investment in the Welsh research base. It was established by the Welsh Government following the recognition within *Science for Wales* that although universities in Wales are engaged

¹ Science for Wales chapter 5, p32

in some truly world-class science, overall, research in Welsh HEIs is not as strong as it should be for a nation of Wales' size and aspiration. One of the key objectives identified is to increase Wales' share of Research Council grant income to closer to 5% of the UK total.

Sêr Cymru has a total budget of £50 million over five years (2013 to 2018). HEFCW will contribute £15 million for the programme (30% of the total), with the Welsh Government providing the remaining £35 million. The programme funds the following:

- The appointment of global research 'stars' to work in Wales as Sêr Cymru Research Chairs
- The establishment of three National Research Networks – one in each of the three Grand Challenge areas identified in *Science for Wales: Advanced Engineering and Manufacturing; Life Sciences and Health; Low Carbon, Energy and Environment*. Each of these Networks includes provision for a graduate school to reflect the fact that the provision of highly trained PhD research scientists remains central to the health of these identified STEM disciplines.

In terms of the impact of the funding on the supply of PhD level skills, it is currently too early to judge, although clear objectives have been agreed for each National Research Network. The Welsh Government expects to receive the first annual monitoring reports in September 2014.

In support of the above, the Inquiry may wish to note that, as we advised in our previous submission, in 2013/14 HEFCW will provide £38.7m to support research in STEM subjects through our QR funding stream. We allocate this funding on the basis of research quality and volume, but include in our allocation formula subject weightings that recognise the higher costs of undertaking research in STEM subjects. The breakdown of funding by broad STEM areas is as follows:

- Clinical medicine £8.6m
- Subjects allied to medicine £6.4m
- Science and mathematics £16.3m
- Engineering £7.3m

The proportion of QR funding allocated to STEM subjects is 54% of the total £71.1m. We operate a separate funding stream to support the training that higher education institutions provide for postgraduate research (PGR) students. In 2013/14, we are providing £5.2 million through our PGR funding stream, a similar proportion of which is allocated in support of STEM subjects.

3.2 What progress has been made in the adequacy of provision of STEM skills in schools, further education colleges, higher education and work based learning (including apprenticeships)?

In our response to the initial Inquiry we indicated that the flow into STEM from schools / FEIs at GSCE and A level across the UK was positive. Our assessment is that this is still the case

Annex A provides data on full person equivalent higher education enrolments on STEM subject courses for Wales, England, Scotland and Northern Ireland over the period 2008/09 to 2012/13. The Wales data show that enrolments for HE STEM subjects have continued to increase suggesting that provision at school and FE level as well as at HE level itself is adequate. Between the academic years 2008/09 and 2012/13 full-time undergraduate enrolment numbers for Biological Sciences increased by 37.5% for males and 14.8% for females with an overall increase of 24.2%. In the same period enrolments on to Physical Sciences programmes increased by 27.1% for males, 12.3% for females and 21.2% overall while enrolments on to Mathematical Sciences increased by 38.1% for males, 21.6% for females and 30.4% overall. Engineering increased by 27.4% for males, 54.0% for

females and 30.2% overall while Computer Sciences enrolments increased by 8.0% for males, 11.7% for females and 8.5% overall. Technologies saw an increase in males by 2.1% while females rose by 16.5% with 3.9% change overall.

For the same period, for part-time undergraduate enrolments, there were increases in Biological Sciences, Mathematical Sciences, Computer Sciences and particularly in Engineering with an 88.6% increase in females and a 34.8% increase in males. However, part time enrolments on to both Technologies and Physical Sciences decreased. Nevertheless, overall both male and female part-time undergraduate STEM enrolments increased by more than 15% in a context of declining part-time enrolments overall

In summary, Wales leads the UK in the increase in both male and female Higher Education enrolments in Biological Sciences, Physical Sciences, Mathematical Sciences and Engineering. More generally, Wales leads the UK in the increase in full-time undergraduate STEM in both male and female enrolments.

The Inquiry may wish to note that utilising Welsh Government 'One Wales' funding, HEFCW provided funding for a number of Foundation Degree programmes, many of which were in STEM subjects, including, for example Biomedical Science, Health Informatics, Information Technology Management for Business, Creative Technology and Digital Media, and Assistive Technologies in Health and Social Care. This has provided access to STEM learning at higher level for those qualified at Level 3 and a pathway to further learning. A focus on Foundation Degrees in STEM through the separately funded Universities Heads of the Valleys Institute indicates a growth of 283 students by 2012/13 from the Heads of the Valleys studying Technology, Engineering and Science Foundation Degrees and 384 Work Based Learning students in those subjects. This responds particularly to the needs of STEM employers – including in the pharmaceutical industry – in the heads of the valleys area.

HEFCW has taken steps to enhance the adequacy of STEM provision via its work with the Higher Education Academy (HEA). HEFCW requested, in its annual grant

letters to the HEA for 2011/12 through to 2013/14, that it raise the status and professionalism of teaching in higher education in Wales specifically working with Welsh higher education institutions in STEM subjects. As a result HEA Wales and the HE STEM Programme Wales have funded seven STEM projects in Welsh HEIs through Learning and Teaching Enhancement Grants. These are:

- Cardiff University - Data analysis with R statistical software: development of teaching and learning resources for STEM scientists;
- Swansea Metropolitan University - Can a mobile platform and digital technologies bring a new dimension to the engineering workflow and communication within SME's;
- Swansea University - Materials Science Surgery;
- Swansea University - Stereoscopic 3D displays in anatomy teaching;
- Swansea University - Using Cutting Edge Medical Imaging to Assist the Teaching and Understanding of Neuroanatomy for Medical/Allied Health Students and Medical Researcher;
- University of Wales - Embedding Education for Sustainable Development and Global Citizenship in STEM subject curricula in Wales;
- University of Wales, Newport - Chemistry at Work Day.

In addition, Welsh HEIs have benefited from the best practice shared at the HEA's Annual UK STEM Conference, as well as from the seminar series arranged specifically by the HEA on STEM subjects. The HEA's STEM subject leaders develop and disseminate evidence informed practice in learning and teaching in higher education across the UK and support the work of STEM departments in Welsh higher education institutions including support for Teaching Development Grants and through departmental visits. The HEA offers a STEM technician of the year award which was won in 2013 by a member of staff at a Welsh University.

The Inquiry may also wish to note that the Quality Assurance Agency for Higher Education produces [subject benchmark statements](#) in a range of subject areas, including STEM subjects to 'describe the nature and characteristics of programmes

in a specific subject or subject area. They also represent general expectations about standards for the award of qualifications at a given level in terms of the attributes and capabilities that those possessing qualifications should have demonstrated'².

3.3 What progress has been made in terms of the value for money from the additional funding to support and promote STEM skills and whether the current supply of STEM skills is meeting the needs of the Welsh labour market?

Agreement by the HEFCW Council in 2008 to provide funding enabled HEFCW to join a three year 'National Higher Education STEM Programme' which the Higher Education Funding Council for England (HEFCE) was developing to improve access to key STEM subjects, especially for disadvantaged groups. It also sought to advance engagement with employers and workplace learning. The Programme was hosted by the University of Birmingham following a tender exercise mounted by HEFCE, and commenced on 1 August 2009, as a three year £21m initiative (with £1m from HEFCW over the three years).

The Programme primarily supported the disciplines of Chemistry, Engineering, Mathematics and Physics (as these were the focus of earlier pilot projects which centred on schools delivery in England and Wales, and which HEFCW bought into at the time). The Programme subsequently sought to support HEIs in six regional groupings (spokes) to encourage the exploration of new approaches to recruiting students, and the delivery of innovative programmes of study within the STEM disciplines. The Wales Institute of Mathematics and Computation Sciences (WIMCS) at Swansea University was chosen to host the Welsh Spoke.

We are now able to report that the National HE STEM Programme has been evaluated and that the [evaluation](#) concluded that it made “an effective and valuable

² <http://www.qaa.ac.uk/AssuringStandardsAndQuality/subject-guidance/Pages/Subject-benchmark-statements.aspx>

contribution to the challenges facing the supply and diversity of STEM graduates in England and Wales, and overcame challenges relating to scope and complexity. With hindsight, the effectiveness and impact of the Programme might arguably have been increased by undertaking a more streamlined Programme model. However, the reasons for having a Programme model that was resourced at the national, regional and subject levels were valid and understandable and remain so”³.

In our response to the 2011 Inquiry, we reported on the way in which HEFCW’s credit-based Funding Methodology provided support for STEM subjects. We informed the Inquiry that the funding per credit for STEM subjects was considerably higher than for non-STEM subjects and also referenced the HEFCW STEM Incentivisation Exercise. Since then there have been significant changes to HE funding, with Academic Year 2012/13 being the first year of transition to the new student fees and finance system. The new arrangements provide for a fee of up to £9,000 for Full Time Undergraduate (FTUG) (and PGCE) students which is not varied by subject and thus there is an in-built economic disincentive to universities which offer more expensive subjects, such as some STEM, to continue provision. HEFCW’s funding is increasingly being used to meet our growing commitment to fund FTUG tuition fee grants for Welsh domiciled students, irrespective of where in the UK they choose to study. HEFCW’s previous Funding Methodology therefore no longer generally applies. The following extract from HEFCW’s 2012/13 funding circular explains our current position:

Welsh Government (WG) officials confirmed that, after meeting fee grant commitments, HEFCW would need to consider the balance of the remaining resources, taking account of the tuition fee income that is available to the sector, before deciding how to allocate these resources towards other For our Future (FoF) priorities. We were asked to take a ‘whole system’ approach, ‘with all funding

³ CFE, *Summative evaluation of the National HE STEM Programme*, (July, 2013), p5

*(student finance and HEFCW recurrent grant, research funding, tuition fee income, etc.) to be treated as one pot of money*⁴.

Following a consultation exercise and Council approval, circular W11/40HE – **‘Changes to the teaching funding mechanism for higher education in Wales’** set out the changes to the teaching funding mechanism for higher education in Wales for 2012/13 and 2013/14, in light of the new tuition fee regime. The proposals responded to WG’s policy on tuition fees from 2012/13 and the expectation on HEFCW to develop an appropriately focused method of allocation of residual funding after the payment of fees.

In response to a remit from the Welsh Government, two additional premia were introduced in 2012/13: a priority subject premium (including mathematics) and an expensive subject premium (including science, technology, engineering, medicine and dentistry). These premia were designed to support activity ‘that a student-led teaching funding system alone would not necessarily deliver’ with a ‘focus on the increased delivery of subjects of strategic importance, namely STEM and the maintenance of modern foreign languages (MFL)’⁵

The Inquiry should note that the priority subject premium and expensive subject premium for Science, Technology and Engineering has already been withdrawn in relation to new entrants, given the increasing costs of tuition fee grants. HEFCW is currently considering a proposed reduction / removal of premia for expensive subjects (medicine and dentistry; and conservatoire). The proposals include that:

- *FT UG funding will be adjusted so that the two higher rates of expensive subjects premium are each cut by £25 per credit value in 2014/15.*

⁴ HEFCW’s Funding Allocations 2012/13, p2

⁵ HEFCW Remit 2011-12

For priority subjects which included STEM but is only available for continuing students funded under the previous funding regime, the following is proposed:

- *Any FT UG/PCGE funding premium payments that were previously only allocated with respect to students still under the old fee regime (lower rate expensive subjects, priority subjects, Welsh medium and disability premia) to be removed from 2014/15.*

In summary, the Inquiry should note that funding previously provided to institutions via HEFCW's credit based funding methodology now largely flows via full-time undergraduate fees which are not differentiated by subject.

Against the backdrop of substantially reduced HEFCW funding for taught STEM provision, the current arrangements for FTUG fees in Wales provides scope for the income of Welsh institutions to rise because students studying in Wales, but domiciled in the rest of the UK (RUK), will bring higher fees into Wales. This could provide scope for institutions to continue to allocate resources in support of STEM provision in lieu of former HEFCW STEM funding. Estimates of the extent to which the sector will gain additional income vary, depending on the assumptions which underlie those estimates. In order to generate this potential growth in income, institutions will have to be successful in attracting RUK FTUG students. Performance will be variable across the sector. In addition, any such additional income will bring with it obligations to invest in the teaching of those RUK students who are paying the fees: it is not uncommitted additional resource. Where those students are in STEM areas, the fee income they pay will be barely adequate to meet the costs of teaching them and, in some cases, will be substantially inadequate. The Welsh Government has recently instigated a Review of Higher Education Funding and Student Finance Arrangements in Wales, chaired by Professor Sir Ian Diamond.

With respect to whether the current supply of STEM skills is meeting the needs of the Welsh labour market, we can cite recent major UK studies on STEM skills and

the labour market. These studies have highlighted some specific Welsh findings: In November 2013 the UK Commission for Employment and Skills (UKCES) published a report on the Supply and Demand for High-Level STEM Skills in the UK.⁶ The report focused on Core STEM subjects and distinguished these from Medicine and related STEM subjects. The report suggested that, based on overall numbers, there was no shortage of Core STEM graduates in the Welsh labour market and it was also estimated that by 2020 there would not be an overall numbers shortage of Core STEM graduates in Wales. These calculations were based on the assumption that the relative size of Core STEM employment remained in line with its historical size. However, should Core STEM employment increase by 5% by 2020, the authors have estimated that there would likely be a shortage of 200,000 Core STEM graduates across the UK.

An increase in the demand for Core STEM graduates has been predicted by employers interviewed during the UKCES study and has been echoed in reports by the Social Market Foundation⁷ and the Institute for Public Policy Research⁸. This increase in demand for Core STEM graduates could be compounded by a further finding by UKCES that, whilst there does not appear to be a shortage in numbers of Core STEM graduates, there was evidence of a shortage in the quality of Core STEM graduates with particular Core STEM occupation vacancies being difficult to fill. Additionally there was evidence from UKCES that new Core STEM graduates were not entering Core STEM employment with the finance sector identified as an increasingly popular occupation sector for Core STEM graduates to enter. In 2011 66% of new Core STEM graduates worked in a non-Core STEM job compared to 52% in 2001. The significance of this trend has been highlighted by the Social Market Foundation who have suggested that the number of general STEM graduates needs to be increased by 50% to meet the demand for STEM occupations. The Social Market Foundation have further suggested that another factor to consider

⁶ UK Commission for Employment and Skills, *High-level STEM skills: supply and demand*, (November 2013)

⁷ Social Market Foundation, *In the Balance: The STEM human capital crunch*, (March 2013)

⁸ Institute for Public Policy Research, *An Avalanche Is Coming*, (March 2013)

when assessing the demand for STEM graduates would be the impact of the tightening of immigration laws, as migrants have tended to make up the historical shortfall of UK STEM vacancies suggesting that these policies could result in an increasing demand across the UK for STEM graduates.

From a student perspective a study conducted by the Higher Education Careers Service Unit⁹ on the relationship between higher education, employment and career planning has highlighted that graduates from STEM subjects were more likely to have accessed graduate level employment than graduates from non-STEM subjects. Additionally it identified that students from non-European countries studying higher education in the UK were more likely to study STEM subjects than UK students.

The evidence cited above suggests that meeting the need for STEM skills within the Welsh labour market is complex. While it would appear that the simple supply of STEM skills has been improved, it is not always the case that the skills can be transferred seamlessly to the labour market. There may be mismatches between the type of skills offered by graduates and those sought by employers, often because employers needs can change quite quickly over time and can be very specific. Those with STEM skills may choose to use their skills outside of a STEM environment where roles may be more highly rewarded or more attractive in other ways. Alternatively, they may feel that they have little choice because the type of STEM role that they would like to have is not available where they need to work. In addition some STEM graduates find roles outside of Wales, which may indicate a need to stimulate demand for STEM skills or more attractive STEM roles in Wales.

A recent report by the National Centre for Universities and Business¹⁰ uncovers inconsistencies in approaches that match skills supply to skills demand, in that graduate skills are often identified with subjects of study while business are increasingly using other attributes to identify the talents needed. “Agility and

⁹ Higher Education Careers Service Unit, *Futuretrack Stage 4: transitions into employment, further study and other outcomes*, (November 2012)

¹⁰ Career Portfolios and the Labour Market for Graduates and Postgraduates in the UK, Feb 2014

dynamism are reported most important as valued attributes and do not correspond to any particular subject of degree”¹¹ and “to understand the positive effects of HE on economic performance we must consider where the skills and knowledge carried by graduates are being put to use rather than just accounting for the number of students or graduates per subject”¹².

3.4 What progress has been made in terms of the supply of education professionals able to teach STEM subjects and the impact of Initial Teacher Training Grants and the Graduate Teacher Programme on recruiting STEM teachers and educational professionals?

As reported in our previous response HEFCW has statutory responsibility for the initial teacher training (ITT) of school teachers.

ITT intake targets for Secondary PGCE are divided into priority and non-priority subjects. Priority subjects include Mathematics, Physics/Chemistry and Information Technology. Non- priority subjects include Biology and Design and Technology.

The table below provides is a breakdown of recruitment against target since 2009/10 for PGCE secondary for the subjects noted above.

Subject	2010/11		2011/12		2012/13	
	Target	Intake	Target	Intake	Target	Intake
Mathematics	79	77	84	82	82	71
Chemistry and Physics	76	73	81	78	77	72
Information Technology	47	44	48	47	41	38
Biology and Integrated Sciences	88	90	85	87	75	70

¹¹ Career Portfolios and the Labour Market for Graduates and Postgraduates in the UK, p4

¹² Career Portfolios and the Labour Market for Graduates and Postgraduates in the UK, p4

Design and Technology	61	65	63	60	56	59
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(Source: HEFCW, HESES data)

PGCEs contribute the largest percentage of secondary provision although there is some undergraduate secondary provision in Mathematics, Science and Design and Technology. As noted in our previous response these courses are a combination of two and three year courses, providing an alternative route to initial teacher training.

The table below provides a breakdown of recruitment against target since 2009/10 for secondary undergraduate provision in the subjects noted above.

Subject	2010/11		2011/12		2012/13	
	Target	Intake	Target	Intake	Target	Intake
Mathematics	26	26	21	23	21	25
Science	15	13	10	12	10	11
Design and Technology	38	38	34	33	34	24

3.5 Whether any progress has been made in terms of the effectiveness of education and business links between education institutions and STEM employers

In our response to the initial Inquiry HEFCW indicated its commitment to supporting effective HE/ employer interactions. At this point in time we would like to draw attention to the Agreement on Skills and Employability for Wales which is a partnership of HEFCW, Higher Education Wales, NUS Wales and CBI Wales launched in 2012. It aims to increase the availability of work placements and work experience, increase the number of employer approved courses and embed employability skills across all higher education curricula. Although the aims are expressed in general terms, work with STEM curricula and employers is key, and the Skills and Employability Action Plans which HEFCW has required HEIs to prepare in

support of the Agreement include initiatives applicable to all students and employers including STEM students and employers as well as some with a specific STEM focus.

We would also like to draw attention to the GO Wales project, delivered by the HE sector in Wales which HEFCW funds with the support of ESF monies in the convergence area of Wales. While GO Wales is a generalist programme HEI delivery partners work both with STEM employers and STEM students and graduates to provide quality work experience opportunities helping to deliver STEM skills to organisations in Wales.

3.6 What progress has been made on addressing negative perceptions and gender stereotypes of STEM and promoting good practice to encourage women to acquire STEM skills and to follow STEM related careers?

As we have seen, in terms of Full Time Undergraduate enrolments to STEM courses there have been increases across the board, and in Engineering, Computer Science and Technologies, the increased enrolments have been greater for females than males. There has also been a big increase in women studying engineering part time.

We have recently published [HEFCW's Annual Equality Report](#) covering the period April 2012 to March 2013 providing an overview of HEFCW's progress towards meeting and going beyond our statutory responsibilities in relation to the Equalities Act 2010 and the Wales specific duties. The 2012-13 report also includes our progress report on our Strategic Equality Plan. Our Strategic Equality Plan covers the period April 2012 to March 2016, and evidences how we are meeting the general and specific duties and includes our aims and objectives and proposed actions. Therefore, this report outlines progress with our year one equality objectives for the period 2012-13.

With its partners, HEFCW continues to fund the [Equality Challenge Unit](#) (ECU), which promotes equality and diversity in UK higher education. The ECU aims to further and support equality and diversity for staff and, where appropriate, students

in UK higher education. The ECU seeks to ensure that staff and students are not unfairly excluded, marginalised or disadvantaged because of any protected characteristic or through any combination of these characteristics or other unfair treatment. The ECU provides expertise, research, advice and leadership to funding councils, institutions and students. The ECU runs the [Athena SWAN](#) Charter which recognises commitment to advancing women's careers in science, technology excellence in science, technology, engineering, mathematics and medicine (STEMM) employment for women in academia. Any higher education or publicly-funded STEMM-focused research institute which is committed to the advancement and promotion of the careers of women in STEMM in higher education and research can apply for membership. In Wales, Cardiff University, Bangor University and Swansea University hold Athena Swan Bronze Awards, while Aberystwyth, Cardiff Metropolitan and University of South Wales are members.

In relation to widening access to STEM provision, following discussion with the Welsh Government, we have provided regional Reaching Wider Partnerships with targeted funding to develop further and consolidate STEM pathways to and through higher education. The three regional Reaching Wider Partnerships are developing innovative pilot models of effective practice in STEM provision for learners of all ages as part of their strategies for widening access. Our funding guidance¹³ indicated that partnerships should consider equality and diversity issues in relation to STEM, including under-representation of women in subject areas and share effective practice. All Partnerships confirmed that they will include provision supporting females into STEM subjects and encouraging female STEM role models to challenge existing stereotypes and address the gender imbalance in STEM subjects.

3.7 What progress has been made on learning STEM skills through Welsh medium education and training?

¹³ HEFCW Circular W13/30HE

HEFCW is the main funding body for the The Coleg Cymraeg Cenedlaethol, which currently runs an Academic Staffing Scheme. This scheme is made available annually to support Welsh medium academic posts for a period of 5 years each.

Holders of these posts are responsible for teaching and developing Welsh medium provision in their subject areas.

To date the following appointments have been made to STEM subjects;

- Biological Sciences (2)
- Chemistry (1)
- Healthcare (2)
- Mathematics and Physics (2)

The Coleg has established an Academic Board and launched its first five-year Academic Plan in September 2012. Its aim is to establish a strategic framework to develop individual subject plans by discipline, which will set aims, objectives, targets and funding priorities for the future. Individual subject panels have been established for individual subject areas and they meet regularly during the year to discuss the plans.

Through separate funding from Welsh Government, Scholarships have been provided to students studying through the medium of Welsh. Incentive scholarships (those studying at least 120 credits over three years (or proportionate for two or one years) through the medium of Welsh) were awarded in various STEM subjects. These include in 2012/13, Mathematics, Nursing, Physics, and Psychology; and in 2013/14 Nursing, Biology, Psychology, Chemistry, Mathematics and Physics.

4 Conclusions

We conclude from the evidence above that:

1. The Welsh Government's strategy *Science for Wales* and Delivery Plan is having a positive impact on science, technology, engineering and

mathematics (STEM) skills in Wales, but there is an opportunity for outreach activities to be further coordinated through the National Science Academy. We note that STEM skills will continue to be a vitally important and enduring concern for Wales.

2. There is evidence to suggest that progress has been made in the adequacy of provision of STEM skills in, higher education. The value for money from the additional funding to support and promote STEM skills with which HEFCW has engaged has been demonstrated. Issues regarding whether the current supply of STEM skills is meeting the needs of the Welsh labour market, are complex and we are of the view that the situation will always be fluid and will need ongoing action.
3. There is evidence of a small shortfall in recruitment to Initial Teacher Training in STEM subjects although recruitment has been variable.
4. At HE level, the Agreement on Skills and Employability for Wales, together with institutional Skills and Employability Action Plans, have helped to promote effective education and business including with STEM employers
5. There is evidence of successful outcomes in terms of addressing negative perceptions and gender stereotypes of STEM and promoting good practice to encourage women to acquire STEM skills and to follow STEM related careers.
6. HEFCW's work with the Coleg Cymraeg Cenedlaethol has helped to demonstrate that progress has been made on learning STEM skills through Welsh medium education and training.

Full person equivalent enrolments on science, technology, engineering and mathematics subjects 2008/09 to 2012/13

Subject	Country of institution	Gender	Mode	Level	Full person equivalent enrolments					Year on year change				Total change 2008/09 to 2012/13
					2008/09	2009/10	2010/11	2011/12	2012/13	2008/09 to 2009/10	2009/10 to 2010/11	2010/11 to 2011/12	2011/12 to 2012/13	
Biological Sciences	Wales	Male	FS	UG	3,484	3,944	4,292	4,595	4,790	13.2%	8.8%	7.1%	4.2%	37.5%
			FS	PG	301	370	473	479	512	22.8%	28.0%	1.4%	6.9%	70.2%
			PT	UG	291	335	338	402	369	14.9%	1.1%	18.7%	-8.2%	26.6%
			PT	PG	233	242	260	290	356	4.1%	7.3%	11.6%	22.8%	53.0%
			Total		4,310	4,891	5,363	5,767	6,028	13.5%	9.7%	7.5%	4.5%	39.9%
		Female	FS	UG	4,930	5,194	5,276	5,526	5,659	5.4%	1.6%	4.7%	2.4%	14.8%
			FS	PG	489	611	671	747	851	24.9%	9.8%	11.4%	13.9%	74.1%
			PT	UG	681	694	783	776	802	1.9%	12.9%	-0.9%	3.3%	17.8%
			PT	PG	291	329	383	448	461	13.1%	16.5%	16.7%	2.9%	58.3%
			Total		6,391	6,828	7,114	7,497	7,773	6.8%	4.2%	5.4%	3.7%	21.6%
	Total		10,700	11,719	12,477	13,263	13,801	9.5%	6.5%	6.3%	4.1%	29.0%		
	England	Male	FS	UG	36,139	38,895	42,081	45,465	46,892	7.6%	8.2%	8.0%	3.1%	29.8%
			FS	PG	5,527	5,965	5,932	6,128	5,966	7.9%	-0.6%	3.3%	-2.6%	8.0%
			PT	UG	7,032	7,817	7,971	8,292	8,215	11.2%	2.0%	4.0%	-0.9%	16.8%
			PT	PG	2,980	3,156	3,101	3,149	3,220	5.9%	-1.7%	1.5%	2.2%	8.0%
			Total		51,678	55,833	59,085	63,035	64,293	8.0%	5.8%	6.7%	2.0%	24.4%
		Female	FS	UG	55,553	58,093	60,249	63,773	64,564	4.6%	3.7%	5.8%	1.2%	16.2%
			FS	PG	9,799	11,070	11,123	11,417	10,765	13.0%	0.5%	2.6%	-5.7%	9.9%
			PT	UG	18,383	19,074	19,483	20,071	19,184	3.8%	2.1%	3.0%	-4.4%	4.4%
			PT	PG	6,665	7,033	6,874	6,956	7,043	5.5%	-2.2%	1.2%	1.2%	5.7%
			Total		90,399	95,270	97,730	102,218	101,555	5.4%	2.6%	4.6%	-0.6%	12.3%
	Total		142,077	151,103	156,815	165,253	165,848	6.4%	3.8%	5.4%	0.4%	16.7%		
	Scotland	Male	FS	UG	4,667	5,039	5,068	5,107	5,443	8.0%	0.6%	0.8%	6.6%	16.6%
			FS	PG	714	737	786	810	822	3.2%	6.7%	3.1%	1.4%	15.2%
			PT	UG	209	231	283	195	482	10.6%	22.5%	-31.2%	147.3%	130.7%
			PT	PG	140	131	179	178	205	-6.2%	35.9%	-0.6%	15.6%	46.5%
			Total		5,729	6,138	6,316	6,289	6,951	7.1%	2.9%	-0.4%	10.5%	21.3%
Female		FS	UG	8,730	9,113	9,129	9,234	9,572	4.4%	0.2%	1.2%	3.7%	9.6%	
		FS	PG	1,103	1,226	1,342	1,358	1,326	11.1%	9.4%	1.2%	-2.3%	20.2%	
		PT	UG	436	523	515	410	646	19.8%	-1.5%	-20.4%	57.6%	48.0%	
		PT	PG	345	373	430	351	374	8.2%	15.4%	-18.4%	6.5%	8.6%	
		Total		10,614	11,235	11,416	11,353	11,918	5.8%	1.6%	-0.6%	5.0%	12.3%	
Total		16,344	17,372	17,732	17,642	18,870	6.3%	2.1%	-0.5%	7.0%	15.5%			
Northern Ireland	Male	FS	UG	711	727	777	818	809	2.2%	6.8%	5.3%	-1.1%	13.7%	
		FS	PG	127	136	207	184	141	7.1%	52.2%	-11.1%	-23.4%	11.0%	
		PT	UG	61	97	91	93	96	59.0%	-5.8%	2.2%	2.9%	57.4%	
		PT	PG	38	57	47	61	67	50.0%	-17.5%	29.8%	9.0%	75.0%	
		Total		937	1,017	1,122	1,156	1,112	8.5%	10.3%	3.0%	-3.8%	18.7%	
	Female	FS	UG	1,333	1,364	1,375	1,455	1,403	2.3%	0.8%	5.8%	-3.6%	5.2%	
		FS	PG	229	250	318	261	252	9.2%	27.2%	-17.9%	-3.4%	10.0%	
		PT	UG	67	88	91	103	79	30.8%	3.8%	13.2%	-23.6%	17.4%	
		PT	PG	112	124	104	143	155	10.7%	-16.1%	37.5%	8.0%	37.9%	
		Total		1,741	1,826	1,888	1,962	1,888	4.8%	3.4%	3.9%	-3.8%	8.4%	
Total		2,679	2,843	3,010	3,118	3,001	6.1%	5.9%	3.6%	-3.8%	12.0%			

Full person equivalent enrolments on science, technology, engineering and mathematics subjects 2008/09 to 2012/13

Subject	Country of institution	Gender	Mode	Level	Full person equivalent enrolments					Year on year change				Total change 2008/09 to 2012/13
					2008/09	2009/10	2010/11	2011/12	2012/13	2008/09 to 2009/10	2009/10 to 2010/11	2010/11 to 2011/12	2011/12 to 2012/13	
Physical Sciences	Wales	Male	FS	UG	2,219	2,412	2,429	2,651	2,820	8.7%	0.7%	9.2%	6.3%	27.1%
			FS	PG	375	407	411	418	379	8.7%	0.9%	1.9%	-9.5%	1.1%
			PT	UG	381	323	430	472	247	-15.2%	33.3%	9.8%	-47.7%	-35.1%
			PT	PG	40	51	45	42	54	27.6%	-12.4%	-6.4%	29.8%	35.9%
			Total		3,014	3,192	3,314	3,583	3,499	5.9%	3.8%	8.1%	-2.3%	16.1%
		Female	FS	UG	1,456	1,516	1,507	1,674	1,635	4.1%	-0.6%	11.1%	-2.3%	12.3%
			FS	PG	205	253	247	279	259	23.4%	-2.6%	13.4%	-7.3%	26.3%
			PT	UG	247	220	200	218	149	-10.8%	-9.2%	9.2%	-31.8%	-39.7%
			PT	PG	43	38	39	46	48	-10.1%	0.8%	18.1%	4.8%	12.2%
			Total		1,950	2,027	1,992	2,217	2,090	4.0%	-1.7%	11.3%	-5.7%	7.2%
	Total		4,963	5,219	5,306	5,801	5,590	5.2%	1.7%	9.3%	-3.6%	12.6%		
	England	Male	FS	UG	25,571	26,741	28,448	30,350	31,148	4.6%	6.4%	6.7%	2.6%	21.8%
			FS	PG	6,984	7,694	8,081	8,122	7,818	10.2%	5.0%	0.5%	-3.7%	11.9%
			PT	UG	6,777	7,672	7,421	6,347	5,245	13.2%	-3.3%	-14.5%	-17.4%	-22.6%
			PT	PG	1,745	1,840	1,808	1,746	1,624	5.4%	-1.7%	-3.4%	-7.0%	-6.9%
			Total		41,077	43,947	45,758	46,565	45,836	7.0%	4.1%	1.8%	-1.6%	11.6%
		Female	FS	UG	17,323	18,145	19,121	20,073	20,012	4.7%	5.4%	5.0%	-0.3%	15.5%
			FS	PG	4,680	4,904	5,041	5,076	4,961	4.8%	2.8%	0.7%	-2.3%	6.0%
			PT	UG	5,363	5,739	5,255	4,781	3,851	7.0%	-8.4%	-9.0%	-19.5%	-28.2%
			PT	PG	1,397	1,444	1,402	1,407	1,232	3.4%	-2.9%	0.3%	-12.5%	-11.8%
			Total		28,762	30,233	30,819	31,338	30,055	5.1%	1.9%	1.7%	-4.1%	4.5%
	Total		69,840	74,179	76,577	77,902	75,891	6.2%	3.2%	1.7%	-2.6%	8.7%		
	Scotland	Male	FS	UG	3,904	4,168	4,215	4,071	4,179	6.8%	1.1%	-3.4%	2.6%	7.0%
			FS	PG	1,030	1,103	1,147	1,228	1,240	7.1%	3.9%	7.1%	0.9%	20.3%
			PT	UG	125	181	179	206	169	44.4%	-1.3%	15.2%	-17.8%	34.9%
			PT	PG	319	224	126	78	101	-29.7%	-43.8%	-38.1%	29.7%	-68.2%
			Total		5,378	5,677	5,666	5,583	5,689	5.6%	-0.2%	-1.5%	1.9%	5.8%
Female		FS	UG	3,112	3,231	3,258	3,174	3,171	3.8%	0.8%	-2.6%	-0.1%	1.9%	
		FS	PG	711	738	792	760	782	3.7%	7.4%	-4.0%	2.9%	10.0%	
		PT	UG	142	157	145	150	180	10.1%	-7.6%	3.6%	19.8%	26.4%	
		PT	PG	95	99	78	78	84	4.8%	-21.7%	0.6%	7.1%	-11.6%	
		Total		4,061	4,224	4,272	4,162	4,216	4.0%	1.1%	-2.6%	1.3%	3.8%	
Total		9,438	9,901	9,938	9,745	9,905	4.9%	0.4%	-1.9%	1.6%	4.9%			
Northern Ireland	Male	FS	UG	494	499	530	486	557	1.1%	6.2%	-8.4%	14.7%	12.8%	
		FS	PG	189	192	207	204	210	1.6%	7.8%	-1.4%	2.7%	10.8%	
		PT	UG	23	30	26	18	34	27.3%	-10.7%	-32.9%	90.5%	45.3%	
		PT	PG	174	168	152	112	115	-3.5%	-9.3%	-26.6%	2.7%	-34.0%	
		Total		879	888	916	819	915	1.0%	3.1%	-10.6%	11.7%	4.0%	
	Female	FS	UG	488	477	466	379	419	-2.2%	-2.4%	-18.6%	10.6%	-14.1%	
		FS	PG	241	200	200	179	205	-17.0%	0.0%	-10.5%	14.5%	-14.9%	
		PT	UG	27	19	18	9	8	-27.7%	-6.1%	-52.8%	-5.9%	-69.8%	
		PT	PG	170	148	161	123	119	-12.9%	8.8%	-23.6%	-3.3%	-30.0%	
		Total		926	844	845	689	751	-8.8%	0.0%	-18.4%	9.0%	-18.8%	
Total		1,805	1,733	1,760	1,508	1,666	-4.0%	1.6%	-14.3%	10.5%	-7.7%			

Full person equivalent enrolments on science, technology, engineering and mathematics subjects 2008/09 to 2012/13

Subject	Country of institution	Gender	Mode	Level	Full person equivalent enrolments					Year on year change				Total change 2008/09 to 2012/13
					2008/09	2009/10	2010/11	2011/12	2012/13	2008/09 to 2009/10	2009/10 to 2010/11	2010/11 to 2011/12	2011/12 to 2012/13	
Mathematical Sciences	Wales	Male	FS	UG	484	543	600	640	668	12.3%	10.4%	6.7%	4.4%	38.1%
			FS	PG	41	39	66	70	57	-4.9%	69.2%	6.1%	-19.3%	37.8%
			PT	UG	138	148	174	174	155	7.2%	17.3%	0.3%	-11.3%	12.0%
			PT	PG	16	15	15	26	28	-6.3%	0.0%	73.3%	7.7%	75.0%
			Total		679	745	855	911	907	9.8%	14.7%	6.5%	-0.3%	33.7%
		Female	FS	UG	430	481	502	520	522	12.0%	4.4%	3.6%	0.4%	21.6%
			FS	PG	21	25	39	40	41	19.0%	56.0%	2.6%	2.5%	95.2%
			PT	UG	105	117	103	110	107	12.1%	-11.9%	6.6%	-3.0%	2.2%
			PT	PG	7	*	7	10	10	+	+	42.9%	0.0%	42.9%
			Total		562	+	652	680	680	+	+	4.4%	0.0%	21.0%
	Total		1,241	+	1,506	1,591	1,588	+	+	5.6%	-0.2%	27.9%		
	England	Male	FS	UG	12,520	13,406	14,175	15,084	15,477	7.1%	5.7%	6.4%	2.6%	23.6%
			FS	PG	1,989	2,146	2,522	2,623	2,663	7.9%	17.5%	4.0%	1.5%	33.9%
			PT	UG	3,983	4,352	4,592	4,776	4,028	9.3%	5.5%	4.0%	-15.7%	1.1%
			PT	PG	982	1,032	916	886	778	5.1%	-11.2%	-3.3%	-12.1%	-20.7%
			Total		19,473	20,937	22,205	23,369	22,946	7.5%	6.1%	5.2%	-1.8%	17.8%
		Female	FS	UG	8,023	8,728	9,268	9,833	9,875	8.8%	6.2%	6.1%	0.4%	23.1%
			FS	PG	991	1,169	1,311	1,356	1,381	18.0%	12.1%	3.4%	1.9%	39.5%
			PT	UG	2,543	2,718	2,731	3,016	2,470	6.9%	0.5%	10.4%	-18.1%	-2.9%
			PT	PG	385	597	527	391	276	55.1%	-11.8%	-25.7%	-29.5%	-28.3%
			Total		11,942	13,211	13,836	14,596	14,002	10.6%	4.7%	5.5%	-4.1%	17.3%
	Total		31,415	34,149	36,042	37,965	36,948	8.7%	5.5%	5.3%	-2.7%	17.6%		
	Scotland	Male	FS	UG	1,422	1,490	1,471	1,473	1,473	4.8%	-1.3%	0.1%	0.0%	3.6%
			FS	PG	229	261	292	306	309	13.8%	11.9%	4.9%	1.2%	35.1%
			PT	UG	67	72	50	42	56	7.2%	-30.0%	-15.9%	32.9%	-16.2%
			PT	PG	20	15	16	14	12	-25.0%	6.7%	-12.5%	-16.6%	-41.7%
			Total		1,738	1,837	1,829	1,835	1,850	5.7%	-0.5%	0.3%	0.9%	6.4%
Female		FS	UG	1,172	1,298	1,238	1,226	1,235	10.8%	-4.6%	-1.0%	0.8%	5.4%	
		FS	PG	176	147	173	221	190	-16.2%	17.7%	27.8%	-13.8%	8.5%	
		PT	UG	49	45	50	33	35	-7.3%	9.4%	-33.1%	4.4%	-29.2%	
		PT	PG	9	8	6	14	7	-11.1%	-25.0%	127.8%	-46.3%	-18.4%	
		Total		1,405	1,498	1,467	1,493	1,467	6.6%	-2.1%	1.8%	-1.7%	4.4%	
Total		3,143	3,335	3,295	3,328	3,318	6.1%	-1.2%	1.0%	-0.3%	5.6%			
Northern Ireland	Male	FS	UG	155	150	151	169	177	-3.1%	0.7%	11.7%	5.0%	14.4%	
		FS	PG	*	*	*	*	*	+	+	+	+	+	
		PT	UG	*	8	13	17	8	+	73.3%	26.9%	-54.5%	+	
		PT	PG	*	*	*	*	0	+	+	+	+	+	
		Total		164	163	171	192	+	-0.2%	4.6%	12.4%	+	+	
	Female	FS	UG	190	179	170	162	173	-6.1%	-4.8%	-5.1%	6.8%	-9.3%	
		FS	PG	*	*	*	7	8	+	+	+	14.3%	+	
		PT	UG	15	*	7	13	10	+	+	78.6%	-20.0%	-31.0%	
		PT	PG	0	0	0	0	0	+	+	+	+	+	
		Total		+	184	+	181	191	+	+	+	5.2%	+	
Total		+	348	+	373	+	+	+	+	+	+			

Full person equivalent enrolments on science, technology, engineering and mathematics subjects 2008/09 to 2012/13

Subject	Country of institution	Gender	Mode	Level	Full person equivalent enrolments					Year on year change				Total change 2008/09 to 2012/13
					2008/09	2009/10	2010/11	2011/12	2012/13	2008/09 to 2009/10	2009/10 to 2010/11	2010/11 to 2011/12	2011/12 to 2012/13	
Engineering	Wales	Male	FS	UG	3,273	3,613	3,949	4,244	4,170	10.4%	9.3%	7.5%	-1.7%	27.4%
			FS	PG	583	857	949	859	858	47.0%	10.7%	-9.5%	-0.1%	47.2%
			PT	UG	2,119	2,013	1,949	2,310	2,856	-5.0%	-3.2%	18.5%	23.6%	34.8%
			PT	PG	187	200	209	225	247	7.0%	4.3%	7.7%	10.0%	32.1%
			Total		6,162	6,683	7,056	7,637	8,131	8.5%	5.6%	8.2%	6.5%	31.9%
		Female	FS	UG	380	404	443	527	585	6.3%	9.9%	18.9%	10.9%	54.0%
			FS	PG	116	172	180	157	181	48.5%	4.7%	-12.5%	15.3%	56.7%
			PT	UG	197	187	144	253	371	-5.1%	-23.1%	76.2%	46.6%	88.6%
			PT	PG	27	36	48	41	41	33.3%	33.3%	-15.6%	1.2%	51.9%
			Total		719	798	814	977	1,177	11.0%	2.1%	20.0%	20.4%	63.8%
	Total		6,881	7,481	7,870	8,614	9,308	8.7%	5.2%	9.5%	8.1%	35.3%		
	England	Male	FS	UG	49,916	52,866	54,899	58,198	58,986	5.9%	3.8%	6.0%	1.4%	18.2%
			FS	PG	16,393	18,647	19,213	17,559	15,902	13.8%	3.0%	-8.6%	-9.4%	-3.0%
			PT	UG	16,426	15,508	15,421	16,129	15,001	-5.6%	-0.6%	4.6%	-7.0%	-8.7%
			PT	PG	7,104	7,464	7,442	7,032	6,404	5.1%	-0.3%	-5.5%	-8.9%	-9.9%
			Total		89,839	94,485	96,975	98,917	96,292	5.2%	2.6%	2.0%	-2.7%	7.2%
		Female	FS	UG	7,463	8,064	8,421	9,024	9,316	8.1%	4.4%	7.2%	3.2%	24.8%
			FS	PG	3,804	4,326	4,735	4,812	4,697	13.7%	9.4%	1.6%	-2.4%	23.5%
			PT	UG	1,608	1,435	1,402	1,464	1,225	-10.7%	-2.3%	4.4%	-16.3%	-23.8%
			PT	PG	1,507	1,707	1,597	1,387	1,208	13.2%	-6.4%	-13.1%	-12.9%	-19.9%
			Total		14,383	15,533	16,155	16,687	16,446	8.0%	4.0%	3.3%	-1.4%	14.3%
	Total		104,222	110,018	113,130	115,605	112,738	5.6%	2.8%	2.2%	-2.5%	8.2%		
	Scotland	Male	FS	UG	8,235	9,047	9,052	9,283	9,695	9.9%	0.1%	2.6%	4.4%	17.7%
			FS	PG	2,372	2,420	2,631	2,356	2,367	2.1%	8.7%	-10.5%	0.5%	-0.2%
			PT	UG	1,401	1,321	1,330	1,202	1,176	-5.7%	0.6%	-9.6%	-2.1%	-16.1%
			PT	PG	959	1,017	1,253	1,185	1,129	6.1%	23.2%	-5.4%	-4.7%	17.8%
			Total		12,966	13,805	14,265	14,026	14,367	6.5%	3.3%	-1.7%	2.4%	10.8%
Female		FS	UG	1,206	1,354	1,418	1,546	1,697	12.3%	4.7%	9.0%	9.8%	40.7%	
		FS	PG	502	564	619	657	670	12.2%	9.9%	6.1%	2.0%	33.4%	
		PT	UG	142	125	108	111	115	-12.1%	-13.7%	2.3%	4.5%	-18.9%	
		PT	PG	196	237	288	270	261	20.7%	21.8%	-6.3%	-3.3%	33.2%	
		Total		2,046	2,279	2,433	2,583	2,743	11.4%	6.7%	6.2%	6.2%	34.1%	
Total		15,012	16,084	16,698	16,609	17,110	7.1%	3.8%	-0.5%	3.0%	14.0%			
Northern Ireland	Male	FS	UG	1,520	1,628	1,724	1,864	2,092	7.1%	5.9%	8.1%	12.3%	37.7%	
		FS	PG	256	355	397	298	229	38.5%	11.8%	-24.8%	-23.2%	-10.5%	
		PT	UG	168	185	174	142	172	10.2%	-5.8%	-18.5%	21.0%	2.3%	
		PT	PG	87	114	109	93	72	31.0%	-4.4%	-15.1%	-22.2%	-17.2%	
		Total		2,031	2,282	2,404	2,396	2,565	12.3%	5.4%	-0.3%	7.1%	26.3%	
	Female	FS	UG	352	368	402	417	429	4.5%	9.2%	3.8%	3.0%	22.0%	
		FS	PG	97	134	140	101	103	37.6%	4.9%	-27.9%	2.0%	6.2%	
		PT	UG	21	20	23	11	19	-1.6%	14.8%	-53.9%	79.8%	-6.4%	
		PT	PG	15	15	19	17	22	-3.3%	31.0%	-10.5%	29.4%	46.7%	
		Total		484	536	584	545	573	10.6%	8.9%	-6.6%	5.1%	18.4%	
Total		2,515	2,817	2,988	2,942	3,139	12.0%	6.1%	-1.6%	6.7%	24.8%			

Full person equivalent enrolments on science, technology, engineering and mathematics subjects 2008/09 to 2012/13

Subject	Country of institution	Gender	Mode	Level	Full person equivalent enrolments					Year on year change				Total change 2008/09 to 2012/13
					2008/09	2009/10	2010/11	2011/12	2012/13	2008/09 to 2009/10	2009/10 to 2010/11	2010/11 to 2011/12	2011/12 to 2012/13	
Computer Sciences	Wales	Male	FS	UG	2,582	2,830	2,860	2,751	2,787	9.6%	1.1%	-3.8%	1.3%	8.0%
			FS	PG	546	621	660	491	464	13.7%	6.3%	-25.7%	-5.5%	-15.1%
			PT	UG	760	750	715	777	801	-1.3%	-4.6%	8.7%	3.1%	5.4%
			PT	PG	189	184	147	133	115	-2.6%	-20.4%	-9.6%	-13.6%	-39.4%
			Total		4,077	4,385	4,382	4,151	4,166	7.6%	-0.1%	-5.3%	0.4%	2.2%
		Female	FS	UG	420	469	459	434	469	11.6%	-2.1%	-5.4%	8.1%	11.7%
			FS	PG	101	106	112	113	112	4.5%	6.2%	0.4%	-0.3%	11.1%
			PT	UG	253	320	310	290	294	26.4%	-3.3%	-6.3%	1.4%	16.1%
			PT	PG	49	36	31	40	38	-26.5%	-13.9%	27.4%	-5.1%	-23.5%
			Total		824	931	912	877	913	13.0%	-2.0%	-3.9%	4.2%	10.9%
	Total		4,900	5,316	5,294	5,028	5,080	8.5%	-0.4%	-5.0%	1.0%	3.7%		
	England	Male	FS	UG	38,323	39,737	40,876	41,809	40,263	3.7%	2.9%	2.3%	-3.7%	5.1%
			FS	PG	10,765	11,734	10,826	8,668	7,245	9.0%	-7.7%	-19.9%	-16.4%	-32.7%
			PT	UG	12,244	12,364	11,275	11,010	9,675	1.0%	-8.8%	-2.4%	-12.1%	-21.0%
			PT	PG	4,370	4,896	4,425	3,952	3,321	12.0%	-9.6%	-10.7%	-16.0%	-24.0%
			Total		65,702	68,731	67,402	65,439	60,504	4.6%	-1.9%	-2.9%	-7.5%	-7.9%
		Female	FS	UG	7,238	7,490	7,615	7,663	7,125	3.5%	1.7%	0.6%	-7.0%	-1.6%
			FS	PG	2,468	2,825	2,844	2,550	2,366	14.5%	0.7%	-10.3%	-7.2%	-4.1%
			PT	UG	4,072	3,654	3,014	2,624	1,929	-10.3%	-17.5%	-12.9%	-26.5%	-52.6%
			PT	PG	1,132	1,200	1,089	986	867	6.0%	-9.3%	-9.4%	-12.1%	-23.4%
Total				14,910	15,168	14,560	13,824	12,287	1.7%	-4.0%	-5.1%	-11.1%	-17.6%	
Total		80,613	83,899	81,962	79,263	72,791	4.1%	-2.3%	-3.3%	-8.2%	-9.7%			
Scotland	Male	FS	UG	4,584	5,084	5,287	5,070	5,351	10.9%	4.0%	-4.1%	5.5%	16.7%	
		FS	PG	1,343	1,387	1,401	1,168	998	3.2%	1.0%	-16.7%	-14.5%	-25.7%	
		PT	UG	525	520	440	404	360	-1.0%	-15.4%	-8.3%	-10.9%	-31.5%	
		PT	PG	216	172	219	260	289	-20.5%	27.0%	18.8%	11.4%	33.7%	
		Total		6,669	7,163	7,347	6,901	6,998	7.4%	2.6%	-6.1%	1.4%	4.9%	
	Female	FS	UG	751	886	971	920	1,017	17.9%	9.6%	-5.2%	10.6%	35.4%	
		FS	PG	364	385	399	386	327	5.6%	3.9%	-3.4%	-15.3%	-10.3%	
		PT	UG	377	299	225	186	120	-20.7%	-24.6%	-17.3%	-35.4%	-68.1%	
		PT	PG	78	83	83	106	111	6.3%	-0.8%	28.0%	5.0%	41.8%	
		Total		1,571	1,652	1,679	1,598	1,575	5.2%	1.6%	-4.8%	-1.4%	0.3%	
Total		8,239	8,815	9,025	8,499	8,573	7.0%	2.4%	-5.8%	0.9%	4.1%			
Northern Ireland	Male	FS	UG	1,526	1,588	1,702	1,852	1,938	4.0%	7.2%	8.8%	4.7%	27.0%	
		FS	PG	94	57	62	45	120	-39.0%	7.9%	-27.6%	169.7%	28.3%	
		PT	UG	82	227	132	134	173	177.1%	-41.9%	1.2%	29.4%	111.0%	
		PT	PG	74	95	81	74	64	27.7%	-14.3%	-8.6%	-13.5%	-13.5%	
		Total		1,776	1,967	1,977	2,104	2,295	10.8%	0.5%	6.4%	9.1%	29.2%	
	Female	FS	UG	525	546	569	594	647	4.1%	4.1%	4.3%	9.1%	23.3%	
		FS	PG	37	12	17	18	33	-67.1%	41.7%	2.9%	88.6%	-9.6%	
		PT	UG	19	88	41	30	41	356.5%	-53.3%	-26.6%	35.0%	111.2%	
		PT	PG	57	62	53	43	40	8.8%	-14.6%	-18.1%	-8.1%	-30.1%	
		Total		637	708	679	684	760	11.1%	-4.0%	0.7%	11.2%	19.4%	
Total		2,413	2,674	2,656	2,788	3,056	10.8%	-0.7%	5.0%	9.6%	26.6%			

Full person equivalent enrolments on science, technology, engineering and mathematics subjects 2008/09 to 2012/13

Subject	Country of institution	Gender	Mode	Level	Full person equivalent enrolments					Year on year change				Total change 2008/09 to 2012/13
					2008/09	2009/10	2010/11	2011/12	2012/13	2008/09 to 2009/10	2009/10 to 2010/11	2010/11 to 2011/12	2011/12 to 2012/13	
Technologies	Wales	Male	FS	UG	584	744	738	674	597	27.5%	-0.8%	-8.7%	-11.5%	2.1%
			FS	PG	99	129	131	142	151	30.3%	1.6%	8.4%	6.3%	52.5%
			PT	UG	217	200	192	169	171	-7.9%	-3.8%	-11.8%	1.0%	-21.0%
			PT	PG	94	95	88	50	48	1.1%	-7.4%	-42.9%	-4.0%	-48.7%
		Total		993	1,167	1,149	1,035	966	17.6%	-1.6%	-9.9%	-6.7%	-2.7%	
		Female	FS	UG	84	97	109	114	98	15.9%	12.5%	4.4%	-14.5%	16.5%
			FS	PG	20	24	27	36	38	20.0%	12.5%	33.3%	5.6%	90.0%
			PT	UG	30	28	30	20	24	-8.3%	9.1%	-32.2%	16.5%	-21.0%
			PT	PG	41	38	34	28	38	-7.3%	-11.8%	-16.4%	33.9%	-8.5%
		Total		175	187	200	198	197	6.8%	7.1%	-0.7%	-0.8%	12.6%	
	Total		1,168	1,354	1,348	1,234	1,163	15.9%	-0.4%	-8.5%	-5.7%	-0.4%		
	England	Male	FS	UG	6,323	6,738	7,086	6,845	6,123	6.6%	5.2%	-3.4%	-10.5%	-3.2%
			FS	PG	1,628	1,798	1,650	1,648	1,524	10.4%	-8.2%	-0.1%	-7.5%	-6.4%
			PT	UG	2,275	2,287	2,101	2,104	1,485	0.5%	-8.1%	0.2%	-29.4%	-34.7%
			PT	PG	1,139	1,232	1,284	1,192	1,070	8.2%	4.2%	-7.2%	-10.3%	-6.1%
		Total		11,365	12,054	12,121	11,789	10,202	6.1%	0.5%	-2.7%	-13.5%	-10.2%	
		Female	FS	UG	3,619	3,746	3,444	2,294	1,946	3.5%	-8.1%	-33.4%	-15.2%	-46.2%
			FS	PG	794	975	882	908	810	22.7%	-9.5%	2.9%	-10.8%	1.9%
			PT	UG	651	536	432	360	234	-17.7%	-19.4%	-16.6%	-35.1%	-64.1%
			PT	PG	664	729	746	686	609	9.9%	2.4%	-8.1%	-11.2%	-8.2%
Total			5,728	5,986	5,504	4,248	3,598	4.5%	-8.1%	-22.8%	-15.3%	-37.2%		
Total		17,093	18,040	17,624	16,037	13,801	5.5%	-2.3%	-9.0%	-13.9%	-19.3%			
Scotland	Male	FS	UG	481	511	507	463	411	6.2%	-0.7%	-8.8%	-11.3%	-14.6%	
		FS	PG	63	62	74	74	64	-2.4%	20.3%	0.5%	-13.5%	2.1%	
		PT	UG	52	28	28	18	32	-46.2%	0.0%	-35.7%	77.8%	-38.5%	
		PT	PG	15	16	14	15	8	11.5%	-15.5%	9.7%	-46.7%	-44.8%	
	Total		610	616	623	570	515	1.0%	1.1%	-8.5%	-9.7%	-15.6%		
	Female	FS	UG	186	161	173	134	145	-13.0%	7.2%	-22.8%	8.2%	-22.1%	
		FS	PG	30	41	42	65	57	39.0%	2.4%	55.5%	-12.2%	94.3%	
		PT	UG	15	8	6	6	*	-46.7%	-25.0%	0.0%	+	+	
		PT	PG	8	10	10	9	7	20.9%	0.0%	-6.9%	-27.8%	-18.8%	
	Total		238	220	231	214	+	-7.6%	4.8%	-7.3%	+	+		
Total		848	836	854	784	+	-1.4%	2.1%	-8.2%	+	+			
Northern Ireland	Male	FS	UG	93	91	169	85	62	-1.9%	86.7%	-49.8%	-27.1%	-33.0%	
		FS	PG	21	18	22	7	5	-14.3%	22.2%	-68.2%	-28.6%	-76.2%	
		PT	UG	7	*	8	*	*	+	+	+	+	+	
		PT	PG	101	139	90	62	33	37.6%	-35.3%	-31.1%	-46.8%	-67.3%	
	Total		222	+	289	+	+	+	+	+	+	+		
	Female	FS	UG	51	48	46	13	12	-6.0%	-3.5%	-72.0%	-7.7%	-76.5%	
		FS	PG	23	11	12	11	5	-52.2%	9.1%	-8.3%	-54.5%	-78.3%	
		PT	UG	*	*	*	0	*	+	+	+	+	+	
		PT	PG	34	41	23	14	9	20.6%	-43.9%	-39.1%	-35.7%	-73.5%	
	Total		+	+	+	38	+	+	+	+	+	+		
Total		+	353	+	+	131	+	+	+	+	+			

Full person equivalent enrolments on science, technology, engineering and mathematics subjects 2008/09 to 2012/13

Subject	Country of institution	Gender	Mode	Level	Full person equivalent enrolments					Year on year change				Total change 2008/09 to 2012/13
					2008/09	2009/10	2010/11	2011/12	2012/13	2008/09 to 2009/10	2009/10 to 2010/11	2010/11 to 2011/12	2011/12 to 2012/13	
Total	Wales	Male	FS	UG	12,625	14,086	14,868	15,556	15,831	11.6%	5.5%	4.6%	1.8%	25.4%
			FS	PG	1,945	2,422	2,689	2,459	2,420	24.6%	11.0%	-8.6%	-1.6%	24.4%
			PT	UG	3,905	3,768	3,799	4,305	4,598	-3.5%	0.8%	13.3%	6.8%	17.7%
			PT	PG	759	787	762	765	848	3.8%	-3.1%	0.4%	10.9%	11.8%
			Total		19,234	21,064	22,118	23,084	23,698	9.5%	5.0%	4.4%	2.7%	23.2%
		Female	FS	UG	7,699	8,161	8,298	8,796	8,968	6.0%	1.7%	6.0%	2.0%	16.5%
			FS	PG	952	1,190	1,275	1,372	1,483	25.1%	7.1%	7.6%	8.0%	55.8%
			PT	UG	1,512	1,565	1,569	1,668	1,746	3.5%	0.3%	6.3%	4.7%	15.5%
			PT	PG	458	+	542	611	634	+	+	12.8%	3.8%	38.7%
			Total		10,619	+	11,684	12,447	12,831	+	+	6.5%	3.1%	20.8%
	Total		29,853	+	33,802	35,530	36,529	+	+	5.1%	2.8%	22.4%		
	England	Male	FS	UG	168,792	178,383	187,566	197,751	198,890	5.7%	5.1%	5.4%	0.6%	17.8%
			FS	PG	43,286	47,984	48,224	44,748	41,118	10.9%	0.5%	-7.2%	-8.1%	-5.0%
			PT	UG	48,737	49,999	48,780	48,658	43,649	2.6%	-2.4%	-0.3%	-10.3%	-10.4%
			PT	PG	18,320	19,621	18,977	17,957	16,417	7.1%	-3.3%	-5.4%	-8.6%	-10.4%
			Total		279,135	295,987	303,546	309,114	300,074	6.0%	2.6%	1.8%	-2.9%	7.5%
		Female	FS	UG	99,219	104,267	108,117	112,661	112,837	5.1%	3.7%	4.2%	0.2%	13.7%
			FS	PG	22,536	25,270	25,936	26,119	24,979	12.1%	2.6%	0.7%	-4.4%	10.8%
			PT	UG	32,620	33,155	32,316	32,317	28,892	1.6%	-2.5%	0.0%	-10.6%	-11.4%
			PT	PG	11,749	12,709	12,235	11,814	11,234	8.2%	-3.7%	-3.4%	-4.9%	-4.4%
			Total		166,124	175,400	178,604	182,911	177,942	5.6%	1.8%	2.4%	-2.7%	7.1%
	Total		445,259	471,387	482,150	492,025	478,016	5.9%	2.3%	2.0%	-2.8%	7.4%		
	Scotland	Male	FS	UG	23,292	25,339	25,600	25,466	26,551	8.8%	1.0%	-0.5%	4.3%	14.0%
			FS	PG	5,751	5,969	6,330	5,942	5,800	3.8%	6.1%	-6.1%	-2.4%	0.9%
			PT	UG	2,380	2,353	2,310	2,067	2,275	-1.1%	-1.8%	-10.5%	10.1%	-4.4%
			PT	PG	1,668	1,575	1,805	1,729	1,744	-5.6%	14.6%	-4.2%	0.9%	4.6%
			Total		33,090	35,236	36,045	35,203	36,370	6.5%	2.3%	-2.3%	3.3%	9.9%
		Female	FS	UG	15,157	16,043	16,187	16,233	16,836	5.8%	0.9%	0.3%	3.7%	11.1%
			FS	PG	2,886	3,100	3,368	3,447	3,353	7.4%	8.6%	2.4%	-2.7%	16.2%
PT			UG	1,161	1,156	1,049	896	+	-0.4%	-9.3%	-14.6%	+	+	
PT			PG	731	809	894	828	844	10.8%	10.5%	-7.4%	1.9%	15.5%	
Total				19,935	21,108	21,498	21,404	+	5.9%	1.8%	-0.4%	+	+	
Total		53,025	56,344	57,543	56,607	+	6.3%	2.1%	-1.6%	+	+			
Northern Ireland	Male	FS	UG	4,499	4,683	5,055	5,273	5,636	4.1%	7.9%	4.3%	6.9%	25.3%	
		FS	PG	+	+	+	+	+	+	+	+	+	+	
		PT	UG	+	+	445	+	+	+	+	+	+	+	
		PT	PG	+	+	+	+	350	+	+	+	+	+	
		Total		6,008	+	6,879	+	7,180	+	+	+	+	19.5%	
	Female	FS	UG	2,940	2,982	3,028	3,019	3,084	1.4%	1.5%	-0.3%	2.1%	4.9%	
		FS	PG	+	+	+	577	606	+	+	+	5.1%	+	
		PT	UG	+	+	+	165	+	+	+	+	+	+	
		PT	PG	388	389	360	340	344	0.4%	-7.6%	-5.4%	1.2%	-11.2%	
		Total		4,105	+	4,259	4,100	+	+	+	-3.7%	+	+	
Total		10,113	10,768	11,138	+	+	6.5%	3.4%	+	+	+			

Source: HESA student record 2008/09 to 2012/13

Notes

Figures for Wales include the Open University in Wales, all other Open University figures included in England figures

Numbers shown are full person equivalents (e.g. a student studying for a joint Physics and Mathematics degree is counted as half an enrolment in each; a student studying a joint Mathematics and Business Studies degree is counted as half in Mathematics and half in Business Studies).

UG = Undergraduate; PG = Postgraduate; FS = full-time and sandwich; PT = part-time

Values less than 5 have been expressed as *, to prevent recalculation some values greater than 5 have been expressed as +.

Students on the 2008/09 to 2011/12 HESA record with an Indeterminate Gender have been included under Male for data protection purposes

Students on the 2012/13 HESA record whose SEXID was defined by 'Other' have been included under Male for data protection purposes