June 2005/24

Policy development

Report of advisory group

This report is for information

This report sets out the advice of the HEFCE Chief Executive's Strategically Important Subjects Advisory Group, chaired by Sir Gareth Roberts. It considers definitions of strategically important and vulnerable subjects in higher education, and principles to focus any further intervention. It informed HEFCE's subsequent advice to the Secretary of State.

Strategically important and vulnerable subjects

Final report of the advisory group



Strategically important and vulnerable subjects Final report of the advisory group

Summary

1. This report sets out the advice of the HEFCE Chief Executive's Strategically Important Subjects Advisory Group, which was delivered in May 2005. This group considered what principles should be used to define strategically important and vulnerable subjects in higher education (HE). They then set out principles to focus any further intervention, usually by the Council in partnership with others, which might be required to support such subjects. In drawing up their advice, the group took into account the wide range of existing activity to support subjects of strategic importance, as well as (often encouraging) evidence on supply and demand.

2. In summary, the group advises that:

- a. We have a healthy and vibrant higher education system in this country. As the Science and Technology Select Committee has stated, it would be exaggerating to say that university science departments are in crisis. Nevertheless, there are risks and opportunities in the future that need a response. But that response must be proportionate, targeted and effective. The dynamism of the English HE sector is a great strength, and interventions should, as a rule, be kept to a minimum.
- b. Attention should be focused on subjects which are both strategically important and vulnerable. Vulnerability may be measured by a mismatch between supply and demand, or by a concentration of the subject in institutions which may be vulnerable to change (such as monotechnics). Departmental closures do not of themselves mean vulnerability.
- c. HEFCE should guard against an overly interventionist role in the market. The Council should be wary of preventing the natural development of disciplines or infringing institutional autonomy or academic freedom. Second-guessing the market may ultimately reduce the dynamism of the English HE sector.
- d. However, HEFCE is able to take an overall view of the system and identify where the aggregate individual interests of higher education institutions do not match the national or regional interest. There is, therefore, a range of approaches which HEFCE may choose according to the nature of the mismatch between supply and demand for each subject. These need to be deployed within a clear framework and only where there is evidence to warrant intervention. The key principles of such a framework should be:
 - a clear evidence base
 - wherever possible to support a market-led solution

- to look at issues holistically and ensure that problems of demand are not addressed with supply solutions (and vice versa)
- to seek wherever possible to work in partnership with all those with an interest in protecting strategic and vulnerable subjects
- to intervene only where we have a clear understanding of the nature of the problem, where it is located and where HEFCE intervention is appropriate.
- e. It is vital to recognise the very large number of activities already being undertaken to support subjects of strategic importance, particularly with reference to raising demand and increasing specific research capacity. HEFCE will need to target its resources carefully, and avoid raising expectations inappropriately, particularly as additional funding is unlikely to be available.
- f. Having said that, there is a range of additional interventions that HEFCE could consider taking forward on a case by case basis, following full consultation with the relevant stakeholders. This should be considered as phase two of this project, and should include:
 - taking a more proactive change management role, for example, encouraging
 collaboration; expecting early conversations with HEFCE where strategic and
 vulnerable subjects are at risk, which may enable the transfer of provision;
 ensuring that one or more national centres remain for certain strategically
 important and vulnerable subjects where national capacity is deemed
 necessary; enabling reviews of the sector in a very small number of subjects
 - continuing and enhancing its efforts to support others who are trying to increase informed demand from potential students
 - continuing and enhancing its efforts to ensure that employer demand is appropriately fed into the system, particularly through Sector Skills Councils and Regional Development Agencies.
- g. HEFCE cannot and should not attempt to prescribe where subjects should be provided, or to interfere in proper institutional decisions about their strategic direction.

Introduction

- 3. The Chief Executive's Strategically Important Subjects Advisory Group (referred to as 'the group' throughout this report) was set up in January 2005 and met three times between January and April 2005. Their terms of reference are at <u>Annex A</u>. The group was informed by the HEFCE Board's discussion of strategic subjects at their meeting in December 2004.
- 4. The group was charged with providing HEFCE's chief executive with advice relating to subjects of strategic importance. This will enable the chief executive to advise the Board, so that the chairman may reply to the Secretary of State's request for the Council's view on 'whether there are any higher education subjects or courses that are of national strategic importance, where intervention might be appropriate to enable them to be available...and the types of intervention which it believes could be considered' (Secretary of State's letter to HEFCE, 1 December 2004). It is important to note that the Secretary of State stated that he was 'not looking for a new set of possible initiatives, nor a bid for extra funds. And it may well be that you suggest that action to be taken should not fall to the Funding Council itself.'
- 5. This document sets out the advisory group's final advice to HEFCE's chief executive. In the main, advice relates to actions for HEFCE; in many cases these are actions for HEFCE in partnership with other organisations, such as Sector Skills Councils, the Department for Education and Skills (DfES), Research Councils and the Higher Education Academy.

Definitions: Strategic and vulnerable

- 6. The group agrees that many subjects provided vital research and graduates with specialist knowledge, skills and competencies to the economy or society. Subjects may be strategic on the grounds of wealth creation. Others are important for reasons of diplomacy, international relations or on cultural grounds. The criteria developed for strategic subjects are:
- a. Does the subject currently provide vital research and/or graduates with recognisably specialist knowledge, skills and competencies to the economy or society?
- b. Is there a substantiated prediction that vital research and/or graduates with recognisably specialist knowledge, skills and competencies will be required by the economy, society or Government in future?
- 7. Many strategic subjects are well supplied, so the group concentrated on strategically important subjects which are deemed vulnerable. In this context, the group does not simply define vulnerable subjects as those which are weak or small. Rather, they agreed two definitions of vulnerability.

- 8. The first definition relates to institutional vulnerability, meaning subjects which are primarily located in small specialist institutions (monotechnics), which may be more susceptible than larger institutions to changes in the external environment.
- 9. The second definition of vulnerable is where there is a vulnerability of the public interest, in that the provision of the subject is misaligned with employer, government or other demand. This mismatch may be identified at national level and/or at regional level. Vulnerable subjects should be defined as those where there is a mismatch between two or more parts of:

Supply of potential students for HE

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HE provision (whether of skills, business and community activities or research) to the nation

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Employer, government or 'other' (eg. cultural) demand, whether current or predicted

- 10. The group has carefully considered a range of data including A-level results and UCAS applications. They also looked at time series (1999-2000 to 2003-04) across a number of datasets for science, technology, engineering and maths (STEM) subjects, concentrating particularly on undergraduate provision in the first instance. The detailed data, together with description and some analyses, are at Annex B.
- 11. The analysis at HESA cost centre level shows the anticipated profile of some decline in activity in mathematics; chemistry; chemical engineering; mineral, metallurgy and materials engineering; and information technology and systems science. However, other aspects of engineering have seen steady or only very slightly declining activity; these being civil engineering, general engineering and mechanical, aero and production engineering. Indeed, some engineering has seen steep increases in activity. For example, computer software engineering had seen growth in activity of nearly 10,000 FTEs (full time equivalents) between 1999-2000 and 2003-04 (an increase of 29%). Similarly electrical, electronic and computer engineering grew by some 1500 FTEs in the same period, an increase of 9.5%.
- 12. Mathematics has seen a fall in activity of 9.3% (or 1,800 FTEs). However, total activity remained nearly 17,500 in 2003-04, providing a substantial base on which to build.
- 13. The physical sciences show a differentiated profile, with biosciences and physics displaying virtually no change over the period, and chemistry some decline. It is interesting to view these subjects against medically related subjects however, where there has been an increase in activity of some 9,700 FTEs over the period, against a fall of just over 2,100 in chemistry, biosciences and physics. For example, pharmacy alone has seen an increase of nearly 2,000 FTE activity; and medicine, dentistry and veterinary sciences together account for an increase in activity of nearly 6,400 FTE. Perhaps

students are not simply shying away from 'harder' subjects as implied by some of the evidence put to the Science and Technology Select Committee. Rather, this may be seen as a move to undergraduate degrees offering a more obvious vocational output.

- 14. The group has also found the analysis in the Science and Technology Select Committee's recent enquiry into strategic science provision in English universities very useful (although they expressed some reservations about the report's recommendations). The analysis suggested that 'it would be exaggerating to say that university STEM [science, technology, engineering, mathematics] departments are in crisis'. Having said that, if departmental closures continue unchecked, the Committee believed 'there is a very real possibility that the system will no longer be able to provide sufficient numbers of STEM graduates to meet the needs of the UK economy'. The group also noted the ambition in the Government's 10 year Science and Innovation Investment Framework 2004-2014 to 'achieve a step change in ... the numbers choosing SET (science, engineering, technology) subjects in post-16 education and in higher education; and the proportion of better qualified students pursuing R&D (research and development) careers'².
- 15. The group also used HESA data from 2002-03 to look at student numbers in the languages, and, where information was available, at minority language provision. Some area studies activity is included within the language cost centre. These data show that there were some 21,465 FTEs studying modern foreign languages either as a degree subject or as part of their degree at undergraduate or postgraduate (taught or research) level. In the minority languages, both Chinese and Japanese studies have seen growth in recent years, with some 13 institutions across the country offering provision. There were also some 590 FTE undergraduates studying Modern Middle Eastern studies in 2002-03, again, across a range of higher education institutions (HEIs). Well over 800 undergraduates were studying Russian and East European Studies across some 25 HEIs. However, there was a low or sometimes non-existent presence of postgraduate research students in some of the minority languages, and this could impact on their future sustainability.
- 16. The data have led the group to focus on the following subjects, identified as nationally strategically important <u>and</u> vulnerable. In many cases withdrawal would have an impact on other disciplines:
- science, technology, engineering and mathematics
- area studies and related minority languages, including:
 - Arabic and Turkish language studies and other Middle Eastern area studies, former Soviet Union Caucasus and central Asian area studies

¹ House of Commons Science and Technology Committee, *Strategic Science Provision in English Universities*, Eight Report of Session 2004-05, Volume I: paragraph 15

² HM Treasury (2004), *Science and innovation investment framework 2004-12*: paragraph 12

- Japanese, Chinese, Mandarin and other far eastern languages and area studies
- Courses relating to recent EU accession countries, especially those in Eastern Europe and the Baltic (which includes new accession countries such as Bulgaria and Romania scheduled for entry in January 2007)
- modern foreign languages
- land-based studies
- quantitative social science
- vocationally oriented courses of particular interest to employers in industries that are of growing importance to the UK economy. This may include certain specialised subdisciplines in the cultural and creative industries where employers clearly identify a lack of skills at HE level. However, the advisory group does not recommend that creative and cultural industries should be specified as a target subject as a whole, because these subjects, while strategically important, show no signs of vulnerability on grounds of lack of student demand at the national level. There are however, some concerns about the long-term sustainability of some creative arts institutions.
- 17. This list is broadly similar to that in the Annex to the Secretary of State's letter, with the following exceptions:
- the addition of modern languages, land-based studies and quantitative social science.
 - a. Modern languages was identified in the National Languages Strategy for Higher Education³ as an area of concern. This was due to the shrinkage in language capacity at national and regional level in HE, with institutional concentration of provision and a narrow student class profile.
 - b. Land-based studies are vulnerable both because demand is falling, but also because provision is frequently supplied by monotechnics which are more vulnerable to change than larger, multi-faculty institutions.
 - c. Quantitative social science is a particular concern of the Economic and Social Research Council, as supply is seen as insufficient, particularly as this subject underpins other disciplines.
- the removal of e-skills. Although strategic, the group could see no evidence that this subject was vulnerable at present. However, HEFCE will need to continue to work

³ Commissioned from Hilary Footitt, on behalf of the University Council of Modern Languages, and managed by the Higher Education Academy Subject Centre for Languages, Linguistics and Area Studies. Published by the DfES in 2005.

with other stakeholders, including e-skills UK and JISC (Joint Information Systems Committee) to ensure that growing demand in this area is met.

- 18. Strategically important and vulnerable subjects are also identified at the regional level, as vocationally oriented courses of particular interest to regional employers where capacity is deemed insufficient (as identified, for example, in the Regional Skills Strategies, or by Sector Skills Councils). For example, Skillset (the Sector Skills Council for audio visual industries) has identified interactive media as a skills shortage for the South West. The South West's Regional Development Agency (RDA), like other RDAs, has identified important industry sectors and priorities in education, skills and training.
- 19. The group advises that the closure of departments does not in itself mean that a subject is vulnerable. Departments may not always close due to shortage of student demand, but due to strategic reinvestment or because a course is deemed too expensive to run. Provision may be transferred elsewhere or become part of a new degree (so be partly moved to a new cost centre). Capacity may be redeployed, and often is maintained in a manner that takes the discipline forward in innovative ways.

Example: Following the decision of the University of East Anglia (UEA) to close its School of Physics, the University of Bath was awarded £186,000 of HEFCE funding to help meet the costs associated with establishing new research laboratories at Bath and to accommodate the research interests of staff relocating from UEA. The transfer of a department may be a sensible way to ensure the sustainability of a nationally excellent research centre.

Example: When closing the small and specialist Department of East Asian Studies, the University of Durham's strategy was to build on its existing interests in contemporary East Asia in its larger, viable disciplines such as geography, business, economics, politics and international studies. Some viable programmes were moved to these departments. Chinese language teaching is being moved into the Language Centre. The Centre for Contemporary Chinese Studies and its staff have been moved into a new School of Government and International Affairs.

While events at the University of Durham have generated a substantial amount of publicity, it is worth highlighting that new and additional investment in this subject area by the universities of Nottingham and Bristol has tended to go unnoticed.

- 20. In some cases, a decision to close a department may mask a longstanding dissatisfaction with its performance, not just in terms of research performance and student demand, but also in terms of student satisfaction, leadership or engagement with business and the community.
- 21. Area studies and related minority languages often comprise small pockets of provision, making them difficult to sustain. The group feels that no more than one or two national centres are required for the sustainability of these subjects. Obviously this does

not mean that HEFCE should try to impose closures in minority subjects with more than one or two centres. However, it may be the case that minority subjects provided in an isolated setting are more difficult to sustain than where there is a critical mass of languages and related studies (such as social science, history, literature and culture).

22. For these reasons, the group advocates cautious and thoughtful responses to departmental closures. The dynamism of the English HE sector is a great strength, and interventions should, as a rule, be kept to a minimum.

Nature of support required for vulnerable strategically important subjects that the Council or others could offer

- 23. There are a number of principles underpinning the dynamism of English HE. HEIs are autonomous bodies, who receive a block grant which allows them to invest (and disinvest) in subject areas as fits with their strategic planning. They do not need formally to inform or consult HEFCE about changes to their courses on offer. The group strongly believes that these principles should be protected.
- 24. It is important to attempt to pinpoint accurately where the misalignment is occurring between supply and demand, so that interventions can be suitably targeted. For example, misalignment may be observed in:
- curriculum or assessment mismatch between school, college and higher education
- lack of clear information, advice and guidance about progression to HE at school or college level
- poor relationship or communication between employers and HE institutions, meaning that the curriculum is not delivering the national skills needs, or that research is not delivering what industry requires
- poor match between regional skills needs (for example, at the technician level) and regional HE supply
- the cultural and diplomatic need for particular subjects being insufficient incentive for students to take them up or institutions to put on courses
- poor progression between further education (FE) and HE
- demand emerging at postgraduate level, where undergraduate demand is low.
- 25. Obviously this is not a comprehensive list, and there are many other places in the relationship between schools, FE, HE, employers and the public interest, where misalignment may be observed. It is vital to get a good understanding of the problem, in order to avoid prescribing supply solutions for problems with demand, or vice versa. This will also ensure that any interventions are targeted where the problem actually lies, which may be outside the HE sector.
- 26. The group feels that different approaches are necessary for different subjects, depending where the misalignment is. In general, wealth-creating subjects (such as physics, chemistry and engineering) should be driven by an informed market, so demand-side approaches might be appropriate. However, HEFCE may need to take a

more interventionist approach to supporting subjects that add to the UK's political and cultural capital (such as Japanese, Chinese and Arabic).

27. The group advises against:

- a. Sector-wide competitive bidding rounds like the Chinese studies initiative. A recent evaluation of this programme⁴ found that intervention in an otherwise market focused system may reduce the risks of undertaking new developments, which, in turn, may result in over-expansion. Sudden increases in the demand for staff and the provision of student places occurred which were unhelpful for good institutional management.
- b. Insisting that particular subjects were provided at particular institutions. This is neither practical nor desirable.
- 28. The group was interested to consider the 'hub and spokes model' of regional provision of STEM subjects, as set out in the Science and Technology Select Committee's report *Strategic Science Provision in English Universities*. They can see benefits arising where institutions choose to co-operate in this way, and thinks that HEFCE should encourage proposals by institutions along these lines. However, collaboration of this type requires trust and effective relationships between the partners. The group strongly rejects therefore the notion that these types of arrangements should be imposed. In particular, they did not support the Select Committee's proposal for competitions to select a regional centre of research in every main subject area.
- 29. The group also recognises that not all interventions are in the gift of HEFCE. For example, the impact of inspired and professional subject teaching in schools should not be underestimated, but this is a task being tackled by the Teaching Training Agency (TTA) (although specific HE institutions with TTA-funded provision make a contribution).
- 30. There is a very wide range of support that the Council or others already offer. The group believes that HEFCE should only intervene where there is clear evidence and a shared understanding of the nature of the problem and its location, and where HEFCE intervention is appropriate. This report sets out some possible action to support supply; influence and inform student and user demand; support teaching; and support research. A second phase of this project will be required to work with stakeholders in understanding the issues, before assessing whether interventions are necessary in particular subjects.

Action to support supply

31. The group strongly supports HEFCE's role as a broker to sustain or develop human and/or physical capacity within HE. This role should be further enhanced. This relies on heads of institutions having informal early discussions with HEFCE when considering closing departments in strategically important subjects. Individually, plans may be well considered, but there may be a role for HEFCE to act as a broker, for

⁴ Published at www.hefce.ac.uk/pubs/rdreports/2005/rd03 05/

example, if two HEIs were considering withdrawing similar provision in the same region. In order to ensure that this was not on a reactive basis, the group thought there would be benefit in HEFCE discussing with heads of institutions options and possibilities in specific subjects. The group preferred this option to the formal 12-month notice period recommended in the 10 Year Science and Innovation Investment Framework.

Example: After Lancaster University had restructured its chemistry department, the University of Sheffield, after giving HEFCE notice, transferred some of Lancaster's staff to Sheffield. Lancaster transferred its chemistry FTEs to its strong environmental science centre, and remaining staff were incorporated into a new multidisciplinary department. QR income associated with the Lancaster staff was transferred with them to Sheffield, and the University of Sheffield received some relocation costs to assist the move. The group thought that this was a good example which might be replicated in the future.

Example: Following the recent decision by the University of Exeter to close its chemistry department, HEFCE was able to support the transfer of chemistry students to the universities of Bristol and Bath. According to the vice-chancellor of the University of Exeter, HEFCE acted as: 'an enormously supportive broker. They have worked with us and other universities in the region to come up with a solution which actually increases the number of funded places for chemistry in the south-west. Our analysis is that by working collaboratively through HEFCE we have been able to come to a solution which we think strengthens chemistry provision in the long term, and I welcome that role of HEFCE as a broker rather than a manager or a planner.'5

- 32. While the group recognises the importance of accessibility, they do not see a need to have departments in all subjects in all regions. Student and graduate mobility should not be underestimated, and new opportunities from distance learning and short intensive courses are increasingly being explored. However, HEFCE has a valuable role in mapping provision against regional subject priorities, and taking an overall picture of the regional impact of the withdrawal of certain subject provision. The group considers that there might be occasions where, working with regional organisations, HEFCE might share the risk of providing some support to see if the market changed. But such support should be exceptional and time limited.
- 33. HEFCE should also take an approach to institutional vulnerability as it affects strategic subjects. For example, the group believes a review of land-based studies is appropriate, in order to establish how provision can be maintained and developed in the long term. This sort of approach could help put isolated departments and individuals on a more sustainable footing. It may be necessary to extend this approach to other subjects which are concentrated in monotechnics, such as the creative arts. Obviously, any interventions would need to be made within HEFCE's existing powers.

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⁵ House of Commons Science and Technology Select Committee, *Strategic Science Provision in English Universities*, Eighth report of session 2004-5, Volume II, (Paragraph Q403, Professor Steve Smith).

34. The group also considers that there is a particular role for some institutions. For example, the Open University is able to provide provision to relatively isolated pockets of student demand and can deploy centrally developed curriculum materials to a range of partners. HEFCE should consider funding some pilot projects to support institutions that want to continue to provide strategically important and vulnerable subjects, engage with partners to look at innovative ways of encouraging demand, and work with specialist institutions to enable the broad based delivery of some of the more specialist strategic subjects. HEFCE might also consider further approaches to supporting collaboration in strategic subjects.

Example: Following evidence in 1999 of declining recruitment trends in modern foreign languages, HEFCE awarded £500,000 to support ten projects that tested a range of models of collaboration between language departments in modern foreign languages, linguistics and area studies. The aim was to provide support for the departments and subjects involved, and in some cases much-needed strengthening of less widely taught languages. The positive outcomes of this initiative include new approaches to teaching, learning and research training; strengthening modern languages capacity; and, for Dutch studies, a national critical mass in this very small subject area.

Action to influence and inform student and user demand

35. The group does not want HEFCE to fund empty places, so demand-side support is absolutely essential. In many cases this is not about stimulating demand in general, but concentrating on groups such as state school students who are particularly underrepresented in certain subjects.

Example: The Aimhigher programme already supports demand-side measures in science. 'Chemistry, the next generation' is a partnership between the Royal Society of Chemistry, University of Leicester, eleven other HEIs, three multinational pharmaceutical companies and two Sector Skills Councils. It aims to develop materials and activities to raise the aspirations of potential students to take up courses in chemical sciences, and to provide subject-specific support and materials for Aimhigher partnerships.

In another example part-funded by HEFCE, an Aimhigher partnership between the University of Teesside, SETNET (Science, Engineering, Technology and Mathematics network) and the British Association for the Advancement of Science aims to raise aspirations into science and engineering through activities such as summer schools, discovery days and awards events focused on science and engineering.

- 36. HEFCE have been encouraged by the positive responses from the Royal Academy for Engineering, the Institute of Physics and the Institute of Mathematics in pursuing similar opportunities. The group considers that these should be supported.
- 37. The DfES and Department of Trade & Industry are undertaking a review of initiatives designed to improve aspirations and attainment in STEM subjects, with a view

to rationalising such initiatives and building on what works. The group believes that it is important for HEFCE to continue to contribute actively to this review.

- 38. The group welcomes the National Languages Strategy, and believe that if successful in schools, it will have an important impact on demand for languages at HE level. They support the advice recently set out in the National Languages Strategy for HE, and note that HEFCE is actively considering its response.
- 39. It is also important to ensure that subjects meet the needs of employers. Therefore, the group supports existing actions to improve the supply of provision, including promoting dialogue between HEIs and the full range of potential 'users'. Continued support for the Higher Education Innovation Fund will be vital. HEFCE should also build on its existing relationship with the Sector Skills Councils (SSCs) and RDAs to help ensure that HEIs meet skills needs.

Example: SEMTA (the SSC for science, engineering and manufacturing technologies) has produced a report that considers the demand for and supply of forensic science provision. Supported by HEFCE and the Higher Education Academy, the report was undertaken because of employers' concerns about the increasing supply of forensic science provision in preference to other high quality science provision. There were also concerns about the limited availability of jobs in this field. The report makes a number of broad recommendations to improve, in consultation with employers, the quality and curriculum of forensic science provision and strengthening the UK science base. HEFCE is working with SEMTA on its Sector Skills Agreement to address these issues (in collaboration with the Higher Education Academy and institutions).

SSCs will have the opportunity to input guidance on the allocation of additional student numbers for 2006-08. They will also contribute, via the Sector Skills Development Agency (SSDA), to HEFCE's Teaching Funding Review.

Sector Skills Agreements (SSAs), which are being developed by SSCs between 2004-2007/8, will put in place a framework that will enable employers to sign up to a key set of skill priorities with the main funding and delivery agencies. The focus of the agreements will be on national sector issues, although delivery of the agreements is likely to involve a regional and local dimension. HEFCE, with DfES, has supported the first four pilot SSCs to engage with the HE sector to address both supply and (employer and student) demand issues. In particular, HEFCE is encouraging SSCs to develop closer partnerships with institutions to deliver the provision required by employers, for example through involvement in Lifelong Learning Networks, foundation degree sector frameworks, and collaboration on the design and delivery of curricula. SSAs will identify more effective routes for brokering engagement between the HE sector and SSCs.

The group thought that this kind of work was important, and should be a high priority for HEFCE.

Action to support teaching

- 40. These actions should be considered in the light of the Teaching Funding Review and any move towards cost-based funding. HEFCE should consider as part of the Teaching Funding Review whether a premium might be paid to HEIs teaching the final year of a taught Masters course in science or engineering. However, the group is conscious that the underlying problem is that all teaching is underfunded. Within a single funding envelope, simply altering weightings will not provide an effective solution. It is therefore vital to continue to seek to protect and enhance the unit of resource for teaching in the forthcoming Spending Review. If this is not protected, the group fears that better resourced programmes and more attractive fee arrangements could encourage more students to study outside of England.
- 41. It is also important to recognise that the main HEFCE grant for both teaching and research is a block grant at the institutional level; university management has discretion as to how it is allocated internally. HEFCE must continue to emphasise that its funding formula does not necessarily provide a guide to internal resource allocation. It is important for vice-chancellors and principals to continue to make strategic choices.
- 42. The group wonders whether certain science departments (for example, chemistry) should be encouraged to focus more clearly either on courses to meet technical skills gaps or courses to meet high-level research needs. The group also sees merit in pursuing additional sources of funding, particularly in the regional context, where specific types of provision such as work-based and heavily vocationally oriented provision might attract additional support, eg. from Regional Development Agencies or industry. Another option would be a concordat, by which students could spend the first two years of their course in a less research-intensive HEI, before being selected to move to a more research-intensive HEI for the final two years of their course. Such a model could only work if the full costs of the model were funded. We would encourage HEFCE to explore with others the possibilities through funding a few pilots.

Example: Manchester Metropolitan University (MMU) has a thriving Department of Chemistry and Materials. Average RAE performance in chemistry hides a department that meets the needs of local students and regional industry. Recruitment to chemistry courses remains strong with an evenly distributed gender balance while ethnic minority distribution is vastly in excess of national proportions. Work-based learning and professional development is realised through its provision of part-time and distance-learning programmes. Work-based learners travel to MMU from as far afield as Stoke in the south to Cumbria in the north and Wales to the west to study at MMU and update their skills. New online distance-learning provision targets a national outreach in this regard. Research and scholarly activities are focussed for best effect in areas such as materials and e-learning respectively.

MMU has recently invested £42.5 million in a capital building project for its science and technology programmes. Facilities and laboratory provision in the science are shared by STEM subjects. The group thought that this kind of provision should be clearly recognised.

43. HEFCE should continue its support for teaching excellence in strategic subjects. For example, the Higher Education Academy's network of subject centres provides support for learning and teaching by way of professional and pedagogic development. There are also discussions about further links between the academy and the SSDA.

Example: The Higher Education Academy's Engineering subject centre aims to support learning and teaching among the UK's Engineering community. An example of its work is a workshop, teaching mechanics to scientists and engineers, which aims to understand national trends in the uptake of mechanics at A-level. The workshop will review the issues that arise – such as the learning resources that are available or could be commissioned – in order to help promote mechanics in the undergraduate curriculum.

44. There is also an option of commissioning Centres for Excellence in Teaching and Learning (CETLs) in particular subject areas. These could build on the 74 CETLs established in 2005, which cover a wide range of subject areas including engineering, maths and statistics, chemistry and physics, modern languages, land-based studies and the creative arts.

Example: 'Languages of the Wider World' is a CETL funded at the School of Oriental and African Studies, in partnership with University College London. This CETL will promote, foster and support excellence in the teaching and learning of less commonly taught languages, particularly those of the Middle East, Africa and Asia, and less commonly taught European languages. These include many languages of growing civic and strategic importance. It will mark a significant raising of the national and international profile of these languages, increase the number of students studying them in UK HE, and create a focal point from which teaching innovations and curricular enhancements can be disseminated.

45. The DfES funds a substantial EU and International Programme, which includes the European Youth Programme, Socrates and Leonardo da Vinci projects⁶. These provide opportunities to work with partners in other countries in multinational European educational projects, vocational training, youth work, or in bilateral or multilateral programmes with countries around the world. Action to support languages and area studies in particular should complement this work.

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⁶ For further information, see www.dfes.gov.uk/eip

Action to support research

46. The group notes the actions to support research capacity in sub-disciplines of strategic importance, and recommends that it should continue.

Example: The group supports the efforts of the Arts and Humanities Research Council, which has set aside a number of ring-fenced doctorates specifically for vulnerable and emerging disciplines and sub-disciplines. Following a consultation, 61 subject areas were proposed as being of strategic importance and therefore worthy of ring-fenced studentships. Five were then selected for funding, including:

- the linguistics of major continental European languages (French, German, Dutch, Spanish, Portuguese, Italian and Russian)
- East and Central European and Balkan Studies: Literatures, History, Culture and Languages
- 47. The group was pleased that the HEFCE Board has recently agreed to allocate £15 million towards a suite of collaborative arrangements with Research Councils to support threatened sub-disciplines.

Example: The Science and Innovation Awards were launched in 2004 by the Engineering and Physical Sciences Research Council working in partnership with HEFCE and the Scottish Higher Education Funding Council. Each award is a large, long-term grant supporting staff in a research group, with commitment from the host HEIs to continue support after the end of the grant. The awards aim to address the concern that areas of strategic research in the UK may be compromised in their ability to sustain the necessary research capacity in the future, with consequent adverse impact on the international standing of UK research.

In the first round, five Science and Innovation Awards were made, including two in England. The successful bids were for research in the field of statistics at the University of Warwick and at the interface of chemical engineering and chemistry at the University of Nottingham. A second awards round has recently been launched and once again it is envisaged that approximately five awards of around £3 million each will be made nationwide.

Next steps

48. This report has set out a number of interventions which might be required to support strategically important and vulnerable subjects. However, it has not attempted to prescribe exactly which interventions might apply to which subjects. This should be the next stage of work, and should involve extensive consultation with interested stakeholders, in order to develop consensus around interventions by the broad subject groups identified in this report.

- 49. Each subject is different: HEFCE cannot develop on its own an intervention strategy for each of them. Accordingly the group recommends that for the subjects identified as strategic and vulnerable, HEFCE should invite the relevant learned society, and/or subject centre and/or representative body to provide further evidence (over and above that gathered as part of this report) relating to the case for intervention. This information might include data on supply and demand and employer needs evidenced as appropriate (for example, SSC and RDA reports). This might take place through, for example, 'town meetings' (ie. invite all interested parties to a meeting on a selected day).
- 50. Stakeholders should then be invited to work with HEFCE to explore bespoke interventions that will address the most pressing issues and develop a specific business case for intervention, including the most appropriate funding route.
- 51. The ability of HEFCE to work with others to develop and implement interventions will be constrained by the amount of funding available. HEFCE will not be able to answer all requests for support but will need to target limited funds where they will have most impact. This case-by-case approach will require a substantial additional effort by HEFCE if it is to be effective. The DfES should be asked to consider this as part of their wider consideration of HEFCE's running costs.
- 52. This report sets out the position at the time of writing. The group recommends that the approach to strategically important and vulnerable subjects is kept up-to-date, as interpretations of evidence relating to vulnerability and effectiveness are likely to change over time.

Annex A Chief Executive's Strategically Important Subjects Advisory Group

Terms of reference

- 1. To advise on a rationale, process and criteria for identifying academic subjects as being of strategic importance, both now and in the future; and for identifying those strategically important subjects that are particularly vulnerable.
- 2. To advise on the nature of support required by vulnerable strategically important subjects that the Council or others could appropriately offer, including consideration of:
 - action to influence and inform student and user demand and/or to improve the supply of provision, including promoting dialogue between HEIs and the full range of potential 'users'
 - support for teaching, research, and/or knowledge transfer activities within HEIs
 - support to sustain or develop human and/or physical capacity within HE
 - the scope for providing support through or in conjunction with existing mechanisms (eg. Strategic Development Fund) and in collaboration with other stakeholders (eg. RDAs, Research Councils)
 - ensuring the sustainability of provision in the longer term
 - the importance of ways and methods that take knowledge and discovery forward in trans-disciplinary ways.
- 3. To consider and advise on the feasibility and implications of taking a UK-wide approach to these issues, including in context of developments across the European HE system.
- 4. To advise on research and information requirements to underpin the Council's approach to this issue in the longer term

Advisory group members

Professor Sir Gareth Roberts (Wolfson College, University of Oxford) (Chair)

Dr Liz Beaty (HEFCE)

Professor George Kolankiewicz (University College London)

Dame Janet Ritterman (Royal College of Music)

Professor Peter Scott (Kingston University)

Sir Richard Sykes (Imperial College of Science, Technology and Medicine)

Annex B Introduction to data tables (in the Excel file)

- 1. <u>Table 1</u> gives a five year (1999-2000 to 2003-04) time series of undergraduate FTE numbers showing home, EU and international students against HESA cost centre. It is important to note that this table is based upon student activity in each cost centre, not on individualised qualification aims. <u>Table 2</u> uses this same information but groups it into cognate areas for strategic subjects. In considering these particular areas it is interesting that:
- Biological Science: shows virtually constant Home activity, but major growth in International which more than offsets the decline in EC numbers
- Engineering: overall there is increased activity in engineering cost centres. However,
 this is accounted for by growth in Computer Software Engineering and Electrical,
 Electronic and Computer Engineering; other subjects in the group are showing a loss
 in activity. Computer Software Engineering has dipped in 2003-04 after a peak in
 2002-03. Again, there is a decline in EC activity overall, but a significant increase in
 International numbers
- Languages: this group shows overall improvement in Home and International activity.
 However, using these data it is difficult to judge how many students are involved in major subject study rather than occasional modules. More detailed information is given in Tables 7 and 8 and discussed in more detail below
- Mathematics: as with languages, activity in Mathematics can often be 'service teaching' and these data may not give an accurate picture of the subject.
 Nevertheless, it is interesting to see the large growth in International activity. More detailed information is given in Table 8
- Physical Sciences: here the data give an expected outcome, with Physics showing a stagnant profile, and Chemistry a decline in numbers, as does Earth, Marine and Environmental Sciences
- Design and Creative Arts: this cost centre shows buoyant activity.
- 2. The group looked in more detail at Mathematics, Chemistry, Physics and Biological Science, using the same database as above. In particular they viewed:
- FTE activity by Unit of Assessment (UoA) rating in the 2001 Research Assessment Exercise (RAE)
- growth/decline in full-time international undergraduate activity
- the number of departments (assumed) in 1999-2000 and then in 2003-04 with over 50 FTEs' worth of activity (this number is arbitrarily chosen as a figure to show a reasonable level of activity). This is shown by RAE score, and shows where activity has either ceased or moved

- A-level candidates in this subject between 1999 and 2003, how many passed and how many passed with grade A to C (NB total numbers for Biosciences not yet available)
- UCAS applicants from 2002 to 2004 (only three years of safe data available due to changes in codings mentioned above)
- closure of departments over a period and what their RAE scores were at the time (some may date back to before the 2001 exercise).
- 3. These analyses are shown in <u>Tables 3 to 6</u>. Points arising from these tables are:
- departmental closure is more likely in, but not confined to, departments with a low RAE score
- fewer departments leads to a change in profile of student activity, with more activity gravitating to departments with higher RAE scores
- International student activity has grown significantly in all four areas
- total A-level candidates have dropped significantly in Mathematics, Chemistry and Physics since 1999-2000, although the proportion of students gaining a grade A-C qualification has increased. The number of A-level candidates in Biology has increased slightly since 1999-2000.
- UCAS applications to these subjects have increased in Mathematics and Chemistry, but decreased in Physics and Biosciences (but note that the subject of application can differ markedly from the student's final subject place).
- 4. A different database was used to look more closely at languages and related study. <u>Table 7</u> maps the major European languages showing student numbers by mode and level and by institution. <u>Table 8</u> shows the same breakdown for minority language subjects. Data for both tables are sourced from HESA 2002-03 student surveys. <u>Table 9</u> shows a further breakdown of minority languages funded under HEFCE's Minority Subjects initiative; the numbers given here are from a 2003 survey carried out by HEFCE. Points that can be drawn from this information are:
 - some languages subsist with a very small student base
 - most languages have relatively small numbers of postgraduate students, particularly at research level, and some have none.
- 5. Further analyses were also undertaken of language studies (not included here) which shows that single honours studies in French, German and Scandinavian, and Italian have shown a decline in student numbers between 1998-99 and 2003-04. Iberian Studies (Spanish and Portuguese) have demonstrated some growth however. As mentioned above, there are low levels of postgraduate research students in these subjects, particularly in those following a single subject strand.
- 6. There are, of course, subtleties with regard to subject provision which are not revealed by merely counting numbers of students in this way. For example at

undergraduate level, languages may be offered alone or combined with aspects of area studies.