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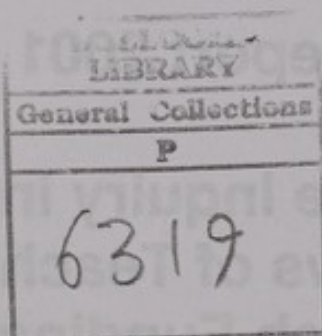
**Enterprise and Lifelong Learning
Committee**

12th Report 2001

**Report on the Inquiry into the
SHEFC Reviews of Teaching and
Research Funding**

Volume 1

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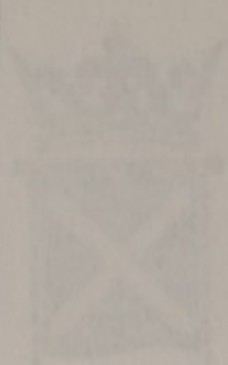
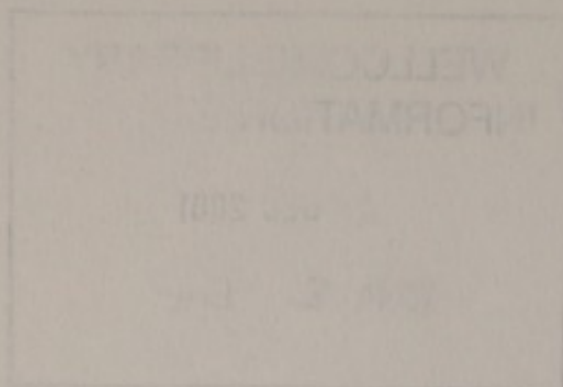
The Scottish Parliament

Enterprise and Lifelong Learning Committee

12th Report 2001

Report on the Inquiry into the SHEFC Reviews of Teaching and Research Funding

Volume 1



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Enterprise and Lifelong Learning Committee

Report on the Inquiry into the SHEFC Reviews of Teaching and Research Funding

Remit

The remit of the Enterprise and Lifelong Learning Committee is to consider and report on matters relating to the Scottish economy, industry, tourism, training and further and higher education and other matters within the remit of the Minister for Enterprise and Lifelong Learning.

Membership

Alex Neil (Convener)
Miss Annabel Goldie ¹(Deputy Convener)
Bill Butler
Mr Duncan Hamilton
Marilyn Livingstone
Mr Kenny MacAskill
Mr Kenneth Macintosh
Des McNulty²
David Mundell³
Tavish Scott
Elaine Thomson

Committee Clerks

Simon Watkins
Judith Evans
Linda Orton

¹ Miss Annabel Goldie declared an interest as a member of the Court of the University of Strathclyde

² Des McNulty declared an interest as a former member of staff of Glasgow Caledonian University and a former member of the Court of the University of Glasgow

³ Mr Mundell became a Member of the Committee on 3 May 2001 in place of Nick Johnston



The Scottish
Parliament

Enterprise and Lifelong Learning Committee

12th Report 2001

Report on the Inquiry into the SHEFC Reviews of Teaching and Research Funding

The Committee reports to the Parliament as follows—

Introduction

1. At the Enterprise and Lifelong Learning Committee meeting of 7th March 2001, it was agreed that the Committee would hold a series of three hearings on the subject of SHEFC funding policy. The remit was agreed as:

"to review SHEFC funding policy for teaching and research in higher education institutions."

2. The Committee's meetings between March and June 2001 together with supporting paperwork supplied, by the Scottish Higher Education Funding Council (referred to in this paper as SHEFC or 'the Funding Council'), by SPICE and by those invited to give evidence, provide the basis for this report. An additional volume of responses to the Committee's invitation to provide written evidence has also been considered. Finally submissions in July from Scottish Enterprise and SHEFC were presented at the request of the Committee as written evidence to clarify points raised in open session.

3. The layout of this report is as follows:

Section A: Teaching Funding

Section B: Research Funding

Section C: Summary and Recommendations

4. Sections A and B have a common format. The Committee's approach is evidence-based with the main points identified in both the written and oral evidence considered in sequence as this was taken by the Committee. The focus is on the main themes of questioning adopted by the Committee without reference to individuals. Any substantial new material or views that emerge from the additional written evidence have been incorporated. The transcripts

of the meetings are in the public domain and form part of the final report, so repetition of text has been avoided as far as possible.

SECTION A: TEACHING FUNDING

Background

SHEFC Proposals

5. This Inquiry was established following the publication of the SHEFC Review of Teaching Funding: Third Stage Consultation (HEC 08/00). The SHEFC review had its origin in 1998 when the Funding Council began to consult with the sector about future approaches to teaching costs.

6. As pointed out in a SPICe briefing⁴, the Funding Council distributed £604m to Scottish Higher Education Institutions (HEIs) in the financial year 1999-2000, of which the main teaching grant amounted to £440m. The Council has maintained a high degree of transparency in the information provided to institutions on the formulaic distribution of these funds.

7. The Scottish Executive sets a target for student numbers each year. The Funding Council then agrees numbers for each institution within this total, with sanctions for over or under recruitment outside SHEFC limits. About 10% of student places are 'fees-only' which means that institutions receive only the tuition fee and no additional costs of teaching for such places. The current funding formula is well described in the SPICe Research Note and the SHEFC Consultation document.

8. The Funding Council explains its justification for undertaking a fundamental review in terms of the need to update a system that has existed since 1993, at which time student numbers were expanding, and which, with 22 subject headings, is complex and lacks flexibility both for HEIs and for the future needs of Scotland.

9. The main elements of the SHEFC proposals are as follows:

- The number of subject groups to be reduced from 22 to 6;
- Price, price relativity and estimated change in funding is given for each subject group. Overall, clinical and veterinary subjects benefit with an 8.3% rise in funding while all other subjects show an average 1% decrease;
- Volume activity is re-based to incorporate the 10% 'fees-only' student places within the funding envelope. It is argued that this will assist in the analysis of the relationship between the teaching provision and that being delivered. The total amount of funding for teaching will remain unchanged, but the effect of this change will be to lower the SHEFC price paid per full time equivalent student (FTE);

⁴ SPICe Research Note: Funding Higher Education Institutions (13 March 2001)

- A 5% additional cost to be provided per FTE for providing higher education to 'wider access' students using the UK-wide post code database to measure 'wider access';
- Additional funding to be provided for disabled students within the main teaching grant;
- Prices to remain undifferentiated by year of study;
- Formula funding for post-graduate research students to be transferred from the teaching formula to the research formula;
- Continue to allocate a 10% cost supplement for part time students.

10. The Funding Council emphasised that these changes were being proposed as part of a continuing consultation and had to be seen against a background of increased funding for the sector which will receive a 5.6% real terms increase to £660m in 2001-02 rising to £700m in 2003-04. Also the reduction in the number of subject areas from 22 to 6 was seen as providing institutions with greater flexibility to vary numbers in courses within subject bands and to initiate new course programmes.

11. It should be noted that while institutions have considerable discretion as to how they allocate funds between major subject areas, increases in overall funded student numbers over the Government's consolidation targets require SHEFC agreement; there is little scope for flexibility in this area.

Reaction to the SHEFC Proposals

12. Not surprisingly the reaction to the Funding Council proposals was vigorous; after all, the Main Teaching Grant is the single most important element of institutional funding. If the proposed changes produced a substantial recurrent reduction in funding, then institutional stability could be at risk. Some of the main points raised in the aftermath by the sector and others including Committee members were as follows:

- The lack of an evidence-base for such changes in pricing groups;
- The lack of openness in the workings of the Advisory Group on Teaching Funding;
- The lack of an assessment of the impact on individual institutions;
- The lack of clear guidance on tapered implementation of the proposals over time;
- The justification for the favourable adjustment in clinical medicine;
- The perceived adverse effects on subjects that are central to Scotland's economy.

13. Despite the Funding Council's reassurances about the consultative nature of the process and its willingness to enter into discussions with Universities Scotland (formerly COSHEP, the Committee of Scottish Higher Education Principals), the level of concern remained very high. The Committee decided to hold a short inquiry for two reasons:

- (i) The Committee was concerned about the impact on institutions and their teaching portfolios.
- (ii) The Committee was concerned that changes in the principles underlying allocations of over £400m of public money should be subject to public scrutiny.

Evidence Taking Sessions

Committee Meeting of 21 March 2001

Written Evidence

14. In preparation for its first public session on 21 March, the Committee received written briefings as follows:

- The SPICe Research Note on the teaching funding system for HE in Scotland and the proposals incorporated within the SHEFC Third Stage Consultation.
- The SHEFC Review of Teaching Funding: Third Stage Consultation (HEC 08/00) document. Though lengthy, the Executive Summary is clear and identifies all the major recommendations.
- Submissions from Universities Scotland, Association of University Teachers Scotland and Educational Institute of Scotland.
- SHEFC commentary on Tables published in The Herald.

Oral Evidence

15. David Caldwell (Director of Universities Scotland) and Professor Andrew Miller (Principal and Vice Chancellor of Stirling University) gave evidence on behalf of Universities of Scotland.

16. Committee members probed the key areas, namely,

- What would be the impact on institutions? Would this be critical for some?

Answers indicated that the impact on small specialist colleges eg the Art Colleges could be very serious, otherwise the effects would be of middle order but not marginal.

- Several members picked up the lack of an evidence-base and asked why the Funding Council had abandoned an evidence-based approach in mid-stream. Was Universities Scotland working with the Funding Council on the next steps?

Universities Scotland obviously wanted to improve the channel of negotiation with SHEFC, which had been achieved. They were critical of the lack of an evidence-base in the final stages and felt that while the

study undertaken was incomplete, good progress had been made which should have been brought to a conclusion.

- Did Universities Scotland accept the validity of the reduction from 22 to 6 subject groupings? Did they support the increase in the price for clinical medicine? What did the changes mean for individual subject groupings?

The reduction in the number of groupings to 6 was supported though Universities Scotland could not agree the composition of the groupings and the prices without further evidence. Differences between levels of funding for clinical medicine in England and Scotland were well known but an upward adjustment in funding for medicine required convincing evidence though Universities Scotland were sympathetic to the case. The new groupings contained unrelated teaching areas that have different teaching requirements and costs, therefore the new proposals will adversely affect certain subjects.

17. Other issues highlighted by Universities Scotland included the profound effect of incorporating 'fees-only' students into the funding model. This reduces the level of funding per FTE and could have uneven and unfair effects across institutions.

18. Dr Bill Stewart (President) and Dr Tony Axon (Research Officer) gave evidence on behalf of the Association of University Teachers (Scotland).

19. Opening remarks by the AUT made the point that there are several strategic reviews underway or about to start in relation to higher education, lifelong learning, research and economic development. This, they argued, made it bad timing for SHEFC to launch a new methodology for teaching funding. In its proposals the Funding Council has failed to take account of the long-term effects on institutions. Although the recent increase in funding is very welcome there have been 20 years of underfunding and some institutions will continue to have financial problems that will be magnified by these proposals. AUT supports a delay in changes to the teaching funding methodology at this time.

20. Questions from the Committee touched on the underlying requirement for a review:

- Given that AUT consider the proposals to be premature, why do they think the review is being carried out at this time?
- Why the preferential treatment of clinical medicine?
- What about the adverse effects on subjects of great importance to the economy eg engineering and technology?
- Is the Funding Council's approach badly timed in light of the other reviews currently underway?

21. AUT responded that the creation of 'fees-only' students, which attracted only tuition fees, has had a negative effect on some subjects while others

have been preferentially treated with full funding. This aspect together with the fact that the Funding Council inherited an historic funding base justifies a review. However AUT agree that the changes being proposed are premature and should not be introduced until the several strategic reviews that are imminent are completed.

22. The proposals for medicine seem to have followed from warnings from the University of Edinburgh that medicine is underfunded.

23. In response to questions about access funding and improved funding for disabled students, AUT support immediate implementation with no need for delay.

24. Marian Healy (Further and Higher Education Officer, EIS), Howard Wollman (Educational Institute of Scotland – University Lecturers Association (EIS-ULA) representative from Napier University), Dr Alex Fotheringham (Vice President EIS-ULA) and Iain McDonald (Former President EIS-ULA) gave evidence on behalf of the Educational Institute of Scotland (EIS)

25. EIS take the view that the Funding Council's proposals are damaging especially to subject areas that are taught in small groups and for small specialist institutions. While they suggest that the improvements for disadvantaged and disabled students should proceed immediately, they maintain that the substantive teaching funding proposals should be shelved pending wide-ranging discussion with the sector. The Funding Council should return to the drawing board with an evidence-based approach.

26. Most of the questioning of this group was on research, which will be dealt with in Section B of this report. However in response to probing on the increase being proposed for medicine, EIS conclude that the 'evidence' for this change has not been subject to peer group assessment. Also EIS were not convinced that there should be 6 subject groupings or that the subject relativities were appropriate.

Subsequent Committee Meetings

27. At its meeting of 24 April, the Committee decided to examine the SHEFC proposals on research in detail and issued an invitation to every Scottish higher education institution funded by SHEFC to submit written evidence. The meetings of 2 May, 8 May, 30 May and 12 June each dealt to a large extent with Research Funding. Research Funding will be covered in Section B of this report.

28. At the meeting of 30 May the Committee also received a written submission update from the Funding Council of its review of Teaching Funding and responses received to its consultation document. This submission, as well as the oral evidence by SHEFC in response to Committee questioning about Teaching Funding, is considered below.

Committee Meeting of 30 May 2001

Written evidence from SHEFC

29. In written evidence the Funding Council restated the aims of the review of Teaching Funding and provided a synopsis of responses to it.

30. The Funding Council stated that it carried out the review because:

- The funding model had not changed for 10 years despite changes in the sector;
- The rapid expansion of the early 1990s had slowed markedly by 1997;
- The government agenda is now firmly aimed at ensuring widening opportunities for under-represented groups of learners;
- The institutional landscape has changed with six mergers in place;
- It is "no longer necessary or appropriate to use the level of detail previously used in funding methodology";
- Small institutional status for the music and art colleges recognises the diseconomies of scale of these operations.

31. The conduct of the review through its three stages of consultation is restated. Of particular interest are the comments about the pricing study. On the matter of an evidence-base, the paper states that:

"In the absence of robust evidence for a 'first principles' approach to clustering and pricing of subjects, and in the light of the recommendations of the Prices Working Group and the Advisory Group on Teaching and Funding, the Council concluded that it should propose broader groups of subjects for consultation by creating six clusters of existing funding subject groups that have similar prices."

32. The Funding Council concludes that the response to the proposals indicated clear support for the measures to address under-represented groups and students with disabilities. Funding by mode of study and maintenance of neutral funding by level were also endorsed.

33. The proposals on pricing and 'fees-only' student places provoked concerns. It is said that the majority of respondents were supportive of the reduction in the number of funding groups. However there has been debate about the allocation of particular subjects to these groups.

34. In response to this criticism, the Council paper states:

"It would be for institutions to decide at what level they fund individual subjects and courses rather than follow the very broad groupings proposed by SHEFC, so it is not meaningful to draw comparisons at individual subject levels."

35. On clinical medicine, the Funding Council states that its Advisory Group on Teaching Funding was aware of a significant difference in the level of funding for clinical medicine in Scotland compared to that in England.

36. The paper concedes that the Funding Council will moderate its proposal on 'fees-only' places "...thus allowing institutions some flexibility to determine enrolment levels".

37. The Funding Council's paper states that it has accepted the offer of Universities Scotland to "contribute to the next stage of the review" and in particular to address the availability of a better evidence-base and the way forward on 'fees-only' places.

Oral Evidence

38. SHEFC was represented by Rowena Arshad (Board member), Professor Vicki Bruce (Board member) and Professor John Sizer (Chief Executive).

39. Committee members focussed on the key points raised in criticism of the Teaching Funding review:

- Why did the Funding Council abandon the evidence-based approach?
- How robust are the definitions of the six groupings?
- How long would it take to conclude a radical evidence-based review?
- How sustainable are the proposals on re-basing the funding of 'fees-only' places?

40. The answers given reflected the summary of the Funding Council's written evidence:

- The six bands were justified in terms of simplification and flexibility;
- The evidence-based approach was abandoned because it is intrinsically too difficult;
- Teaching patterns are too variable within subject areas;
- It was stated that the ability to innovate new courses was not possible under the 22-subject system.

41. The confusion over groupings was compounded by the Funding Council's own responses: "As a funding Council our responsibility is to ... group accordingly. However we cannot say exactly how each subject area has been funded."

42. The Funding Council placed heavy emphasis in answers on coming to an accommodation with Universities Scotland, though there is no indication of how long this will take.

43. The Chief Executive of the Funding Council accepts that the proposals on 'fees-only' places were mistaken.

44. Written submissions to the Committee's consultation on Research Funding include the respondents' responses on the Teaching Funding review. Those from new universities are particularly critical. It is clear that much bad feeling has been generated by this exercise.

SECTION B: RESEARCH FUNDING

Background

SHEFC Proposals and the Committee's Inquiry

45. The SHEFC proposals on research funding, as contained in the SHEFC Review of Research Policy and Funding: Second Stage Consultation, have to be seen against a background of growing interest among many stakeholders in the extent to which research of all kinds is central to the future development of Scotland's Knowledge Economy. The SPICe Research Note⁵ lists the most recent policy reports in this area. As the universities are overwhelmingly the main source of research output in Scotland, it is entirely appropriate that the Funding Council's proposals are assessed in a wider context. The Committee decided at an early stage to examine the system for research funding (especially the Research Assessment Exercise, or RAE) and the extent to which basic and applied research together are being exploited for economic good. With specific regard to funding, members wished to take evidence on the extent to which mechanisms are in place to encourage the commercial exploitation of research findings.

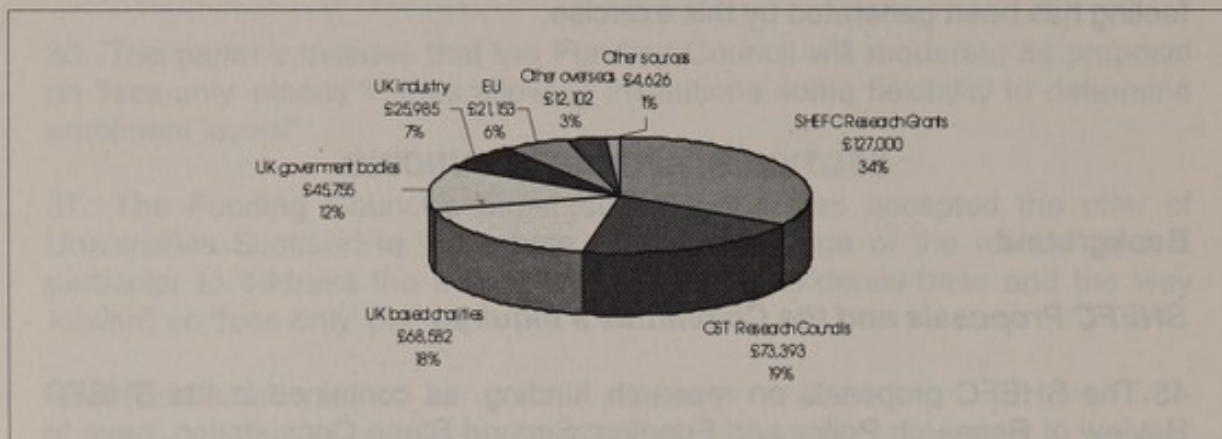
46. In the knowledge that Scottish Enterprise and the Scottish Executive are currently engaged in strategic reviews in this area the Committee wishes the Inquiry to serve as a contribution to policy development. The announcement of 'A Science Strategy for Scotland', published while this report was being prepared, is an example of the current direction of policy⁶

47. It should be noted that Scottish universities are strikingly successful in research. The overall income generated in 1999-2000 was to £368.5m, of which only about 34% was derived from SHEFC as research infrastructure funding.

⁵ SPICe Research Note: Funding Research in Higher Education Institutions (23 April 2001)

⁶ The key points of the Science Strategy are listed in Appendix 1

Diagram 1: Income from research grants and contracts by source and institution 1999-2000



Source: SHEFC Statistics branch (updated August 2001)

The Funding Council spend on research in 2001 will be approximately £155m of which £116m will be distributed through the main RAE quality grant.

48. Research funding is intensely competitive with most of the funding routes, other than core SHEFC funding, being awarded as a result of peer review. Success rates in such competitions are often as low as 20%.

49. Universities regard research performance as a vital indicator and a key component in attracting research stars. The modern universities established in 1992 are understandably keen to maximise their research capability and regard present funding mechanisms as favouring the established universities and particularly the ancient universities. Any Funding Council proposal to alter research funding mechanisms will therefore attract almost forensic attention to detail.

50. SPICe⁷ and SHEFC⁸ papers describe the existing and the proposed scheme for allocation of available SHEFC funding for research. As the SPICe Research note concludes, the new proposals are 'not revolutionary'. The majority of funding will again be channelled through the formula-based grant, which is dependent on institutional performance in the RAE. Rather more attention will be paid to infrastructure and much emphasis is laid on the proposals for research development in strategically important areas. The relatively modest support for knowledge transfer will continue. The proposals reflect a serious attempt by the Funding Council to respond to ministerial guidance and policy developments generally.

51. The Funding Council faces significant funding stress as levels of performance are increasing faster than the levels of funding. It seems likely that Scottish universities will again improve their RAE standing. SHEFC must decide how to handle both ends of the scale with limited funds. What premium

⁷ SPICe *ibid*

⁸ SHEFC Review of Research Policy and Funding: Second Stage Consultation

if any does it award for 5* (highest) rated performance?⁹ Will it implement the much trailed threat to exercise a cut off at a rating of 4? The irony is that because Scottish universities' research departments have rapidly improved their capabilities in recent years, it is reaching the point where they are in danger of outstripping the funds available. Moreover there is real disquiet about the capability and funding available to exploit Scottish discoveries for Scotland. Are we smart enough? Are other countries doing it better?

52. These issues represent the core of concern expressed by witnesses in oral evidence and in the many thoughtful written submissions.

53. Committee members have been rigorous in probing the workings of the RAE that so dominates the research climate in universities. The details of this monumental undertaking have been clearly described in papers and oral evidence. The sheer scale of the RAE is staggering. Submissions from 50,000 researchers are assessed by 685 experts in 68 panels. By comparison the allocation of the Main Teaching Grant appears simplistic and not based on evidence.

Evidence Taking Sessions

Committee Meeting of 21 March 2001

Written Evidence

54. The main points raised in the Committee hearings with regard to research funding are outlined in this section. Most of the points outlined in written evidence below were developed in direct response to questions by Committee Members. However the following should also be highlighted.

55. Universities Scotland submission put forward the opinion that:

- "It is the strongly held view of Universities Scotland that research in the Scottish higher education sector must be resourced at a level which ensures that its quality and volume, compared to that in other countries, is at least maintained and preferably enhanced. This is critical to the international competitiveness of the Scottish economy, and therefore to the welfare of the Scottish people. It therefore should be an important principle of the funding system that it supports good quality research wherever it is found. Moreover, this should apply both to basic research and also to research which is more applied in character."
- "... there is clear evidence from previous RAEs that units with Level 3 ratings can improve to Level 4 and above in the course of an RAE cycle."

56. The Association of University Teachers (Scotland) argued that:

- "SHEFC research funding is not just a reward it is also to build up the infrastructure to enable institutions to continue to bid for research funding. Too much selectivity will reduce this capability"

⁹ The Rating Scale used in the RSE appears as Appendix 2 to this report

- "There should be a 'seedcorn' fund available to university researchers for starting up new programmes. This should be aimed at counterbalancing to some extent the concentration effect of research selectivity"

57. The Educational Institute of Scotland (EIS) submission included the concerns that:

- "The proposal to withdraw from Level 3-rated departments will have the effect of re-creating the pre-1992 binary funding divide where Polytechnics were ineligible to receive research funding as well as ensuring the stifling of development of new areas ..."
- Of the new Research Development Foundation Grant which is being proposed to support new and emerging areas of research, EIS compare it unfavourably with the existing system "The five million pounds proposed for the Foundation Grant seems something of a 'sop' compared to the £22.5 million currently distributed to departments rated at 3a and 3b."¹⁰

Oral Evidence

58. The Committee took evidence from Mr David Caldwell and Professor Andrew Miller of Universities Scotland; Dr Bill Stewart and Dr Tony Axon of AUT (Scotland); Marian Healy, Howard Wollman, Dr Alex Fotheringham, and Ian McDonald of Education Institute of Scotland.

59. The following key lines of questioning were explored by members:

- *Why is the RAE UK-wide?*
This achieves a common approach to quality across the UK but not a common approach to funding.
- *Will Scotland be disadvantaged under the new arrangements?*
Yes if SHEFC does not fund level 3 rated departments whereas the equivalent English body, HEFCE, does so.
- *Will the RAE outcome create subject bias?*
Some subjects such as nursing and midwifery could lose funding altogether. Staff in such areas will drift away.
- *Does the funding level rating affect university submissions?*
No, as universities are always unaware of the effect of ratings on funding before submission to the RAE.

¹⁰ Witnesses talked of grade 3 departments when referring to level 3 rated departments etc. To some extent these terms are interchangeable. The Rating Scale appears as Appendix 2 to this report.

- *Are the criteria for research funding appropriate?*
Universities understand and generally accept the criteria. However the criteria do not encourage collaboration and interdisciplinary research.
- *Do institutions play games with grade inflation?*
Because funding is dependent on a formula based on staff numbers multiplied by a sum of money allocated to a rating, it could sometimes be of financial benefit to institutions to submit fewer staff at higher grades in order to achieve the highest rating possible. Putting forward a small number of highly qualified research staff might improve a department's rating to level 5 while the inclusion of a number of less-qualified staff might reduce the average and achieve a lower rating of level 4, for instance. Institutions have to look strategically at whether high rating grades or higher volume of staff will reap the best rewards.
- *Have universities succeeded in changing RAE rules?*
Yes, over the years the rules have been influenced by feedback, for example more assessors have been appointed and the range of acceptable research outputs extended.
- *Will SHEFC proposals have a damaging effect?*
If research funding for level 3 ratings is cut off then continuity of development in some areas will cease. e.g. nursing.
- *Should research funding be more aligned with Scotland's economic objectives?*
There is a danger in having different criteria in different parts of the UK as far as RAE is concerned. While the universities in Scotland can be seen to be contributing to the economy, they would not want the RAE to be changed to demonstrate that kind of excellence when it is not a requirement for the rest of the UK. The retention of a level playing field is important.
- *Will the resulting selectivity post-RAE lead to a 'desert' in some subject areas?*
Yes. Some areas could be teaching in a non-research environment and this would diminish the student experience.
- *Is there now too much emphasis on commercialisation of research?*
The boundary is not clear especially in modern subject areas such as the creative industries. Commercialisation is healthy but all areas of scholarship require a research base.

Committee Meeting of 2 May 2001

60. The sole witness at this meeting was Mr John Rogers, Manager of the UK Funding Councils' Research Assessment Exercise (RAE) team.

Written Evidence

61. Members received two briefing papers in advance of this meeting:

- (1) A description of the RAE procedures from the RAE team¹¹
- (2) A SPICe briefing on research in Scottish universities¹²

62. Most of the detail of the RAE is well-documented in written evidence from various sources. However Mr Rogers' introduction served as a useful reminder:

- Submissions look back over five years, or seven in the case of arts and humanities.
- The four research outputs assessed from members of staff can come from any of the following:
 - Traditional journal articles
 - Policy reports
 - Patents
 - Devices
 - Designs
 - Works of Art (sculptures, performances, exhibitions)
- The funding formula in each part of the UK includes three elements:
 - the quality element;
 - the volume factor;
 - the cost factor.

Oral Evidence

63. Questions raised by members to John Rogers teased out the following features of the RAE and its outcomes for institutions:

Effects of the Rating System

- Selectivity produces a huge range of funding outcomes for institutions from £0 to £60m.
- Some pockets of very good research are found in non-research intensive institutions
- If institutions have only departments rated as level 1 or 2 they have to look elsewhere for funding.
- If institutions lost funding for level 3 rated units the biggest impact would be on continuity of research planning. The RAE over 15 years has made institutions much more strategic.

¹¹ A Guide to the 2001 Research Assessment Exercise

¹² SPICe Research Note: Funding Research in Higher Education Institutions (23 April 2001)

Consistency of approach

- Variation in judgements between disciplines is a problem. Various measures have been taken to reduce this effect. External advisers will be used and umbrella groups with cross subject remits will be created.

The Funding Council's role

- Funding Councils cannot give institutions clear guidance on the level of funding for different ratings because of the uncertainty of performance by departments.
- "...the funding councils do not have any remit or locus to determine how institutions behave in pursuit of their objectives, other than to safeguard the use of public funds."

Flexibility

- On the whole institutions do reflect RAE outcomes in their support of departments but they have discretion to apply strategic top slicing to promote development.
- "It is within the rights of institutions to take an element from the total teaching and research allocation to invest strategically..."

Efficiency

- The RAE operates relatively efficiently, costing 0.8% of the research funding distributed compared to the 5-6% typical spend on the assessment methods of the UK research councils.

Quality

- Applicability of research is a factor within a process that is driven by quality. Quality is the hallmark. Industrial panellists have been appointed and confidential reports to companies can be submitted as output. To that extent applicability is built into the RAE.
- Top performing institutions excel with grants from the Research Councils and Industry. Local industry can be a source of support for departments with lower ratings especially if there is an element of training.
- The decline in UK percentage GDP spent on research has not affected competitive quality performance. UK research is first in the world for citations and produces more papers per dollar spent than any other country in the world. We are good because we work very hard and are strategic.

Commercialisation

- Funding from RAE performance is core funding; it is for the research councils, Department of Trade and Industry and others to create targeted priorities that have economic importance.

Demand exceeding funding supply

- As the standard continues to rise so the pressure will mount on Funding Councils. Unless more money is pumped into the system, the funding available for high ratings will be diluted. It is essential for the

UK to remain internationally competitive and that is getting more difficult.

- A submission will be made to Government for more funding through the Comprehensive Spending Review.

Committee Meeting of 8 May 2001

64. Written submissions were received from Hugh Thomson, Director, Research and Consultancy Services University of Strathclyde and from Technology Ventures Scotland. Oral evidence was given by Hugh Thomson, by John McClelland (Chair) and Douglas Mundie (Chief Executive) of Technology Ventures Scotland, and by Nelson Gray, a business angel¹³.

Written Evidence

65. As the first university to establish a commercialisation unit in Scotland, the University of Strathclyde has had some success in patented drugs, for example. Hugh Thomson, Director of Research and Consultancy Services at the University of Strathclyde was therefore invited to give evidence to committee. His paper included the following points:

- "In reality universities have very few near-market products. On average, a research result is 7-8 years away from market, i.e. universities are selling enabling technologies..."
- "An effective way of achieving Knowledge Economy growth is to select areas of research where there is a good prospect of commercialisation trade ...and to create fundamental research - commercialisation - incubation facilities within one facility...."
- "If we could achieve 15 such start-ups for every one academic staff spin-out, we would have a Boston-like business community in Glasgow"¹⁴

66. Technology Ventures Scotland has a strategic role across Scotland to bring business and the research base closer together and assist knowledge transfer. It is jointly funded by SHEFC and Scottish Enterprise. In their written submission, the following observations are worth noting:

- "The need to involve Scottish businesses with new technologies may not be something that five star departments can do easily"
- "...three star research departments are currently better aligned to the needs of business..."

¹³ Business angels provide finance and experience to fledgling companies

¹⁴ Start-ups do not need to be based on university IPR, whereas spin-outs do. See Annex B for full text.

- "...today's interface between business and research is inadequate..."

Oral evidence

67. Hugh Thomson's response to questioning by the Committee included the following points::

Preconditions for Commercialisation

- Good academic researchers in science and engineering are also the most likely to create technological opportunities. A good research base is essential.
- Commercialisation depends on good ideas from academics and approaches from companies. It should enable academics and fit with the institution's goals.
- Good funding of level 4 and 5 rated departments keeps good researchers in Scotland.

Patents

- There are budget constraints on patents. As more opportunities present themselves, universities are finding it difficult to finance patents.
- The RAE has further to go in recognising patents as high quality research output.
- Initial intellectual property negotiations with academics are best done in-house.

Spin-outs

- University of Strathclyde aims to spin out 4/5 companies per year and has already spun out 32 companies.
- Typically a spin-out requires £100,000- £200,000 as first round funding. A combination of soft monies is now available to help.
- Typically equity shares at the outset are 50% staff, 25% university and 25% venture capitalists.
- It is notoriously difficult to pick winners. The Foresight Programme has helped.
- Proof of Concept funds and Challenge funds have helped.

68. From the panel evidence of John McClelland, and Douglas Mundie of Technology Ventures and Nelson Gray, business angel, the following points emerged:

69. Technology Ventures:

- The aim of Technology Ventures Scotland is to help deliver an effective venture process in Scotland.
- Most university deals involve larger companies. The SME sector is hungry but fragmented. There is difficulty in achieving connection between such companies and universities. Newer universities have a more commercial outlook to their local markets.

- There has been resistance by academics to progressing the commercialisation agenda but this is changing with the Scottish Institute for Enterprise as a good exemplar.
- New opportunities create new ideas eg the UHI project has added impetus to business development in the Highlands.
- There is an urgent need to create effective user-friendly databases of Scottish research that are accessible to companies. SHEFC is helping with this.¹⁵
- There is considerable potential for exploiting existing technology through university /business interaction; not everything depends on five star research.
- No matter which kind of development it is, early or late stage, there is a real need for a commercial market focus that is currently not well enough developed.
- We require a front door to university commercialisation that is clearly recognised and a catalyst to bring the business community to that door.

70. Nelson Gray:

- Scottish Enterprise and other public sector business developers need more expertise in the link between funding and investing.
- Quality of presentation of business propositions is a limitation. Significant amounts of money are not being invested (up to £1m per week) because propositions are weak though the ideas may be good.
- Venture capitalists and companies are looking to invest but many require a return over a relatively short period.
- Universities are funded by public money and should be more prepared to share Intellectual Property Rights.
- Focusing the research base would create more critical mass and could lead to more commercial success.

Committee Meeting of 30 May 2001

71. The Committee heard evidence from Sir William Stewart (President) of the Royal Society of Edinburgh, Dr John Taylor (Director General) of Research Councils, Alan Sim (Senior Director, Network Operations), Dr Janet Brown (Director of Competitive Business), Dr Stewart Brown (Member of the Competitive Business Team) of Scottish Enterprise, Rowena Arshad (Board member), Professor Vicki Bruce (Board member), Professor John Sizer (Chief Executive) of SHEFC.

Written Evidence

72. The written evidence of the Funding Council on research has been covered extensively at various points in this summary. Any new points made by SHEFC in questioning will be listed along with the evidence of the other witnesses.

¹⁵ The Scottish Research Information System (SRIS) initiative

73. The informative briefing paper by John Taylor appears in Annexe B to the report.

- "Within the UK, Scotland has 8% of the GDP, 9% of the population and 11% of OST's research expenditure. This reflects the excellence of the Scottish science base"

74. Scottish Enterprise point out:

- "Realistic valuations of intellectual property and demands for equity positions must be made with an understanding of the scale of the investment and risk required of private investors and of the input required by researchers/inventors in making new businesses a success."

75. Scottish Enterprise's evidence also provided a listing of links between Scottish Enterprise and the Funding Council:

"The Scottish Enterprise Network presently engages with SHEFC in a number of ways:

- Participation in SHEFC's Advisory Group on Strategy, covering all aspects of the university sector;
- Observer status on SHEFC's Research Policy Advisory Committee (RPAC);
- Participation in SHEFC's Research Development Grant (RDG) Assessment Panel;
- Evaluation of individual RDG proposals for SHEFC by Network staff with knowledge of Scotland's clusters and their R&D and technology issues;
- Participation in SHEFC's Implementation Group for the Scottish Research Information System (SRIS) initiative
- Participation in SHEFC's Strategic Change Grant Assessment Panel

In addition, the two organisations have established a Joint Task Group on Research and Knowledge Transfer involving members of the SE Board and SHEFC Council. The Group's remit is:

" ... to advise each organisation on areas of common interest, in particular in areas of research and knowledge transfer, where working together would make a difference."

The work of the Task Group is due to be completed by autumn 2001."

76. The Royal Society of Edinburgh's paper makes the following points:

- "The cost factor differentials (for research) are somewhat crude. "...1.6/1.0 does not seem to fully reflect the higher costs associated with laboratory based subjects."

- On Quality Factor

"the average score in Physics was higher than in Chemistry, and yet there is no evidence in performance indicators...that such a difference is real. The Council needs to therefore play its part in ensuring that average weighted quality within subjects... is well founded."

Oral Evidence

77. Sir William Stewart, President of the Royal Society of Edinburgh confirmed that the Society:

- Supports selective funding of highly rated departments.
- Considers that more discretion be given to Vice Chancellors in deciding research investment within universities aimed at developing the stars of tomorrow in lower-rated departments.
- There should be a Scottish strategy for research and development.
- Believes a five-year gap between RAEs is about right.

78. Dr John Taylor's introduction placed heavy emphasis on the importance of research excellence to the UK. In response to questions he made the following points:

Measuring research

- Better performance assessments are needed to assess knowledge and know-how, training and economic impact. Future measures must take account of the burden of measurement (i.e. this has been too heavy in the past).
- Basic research in fundamental technology is now being supported and should have parity with basic science. Understanding high value-added, high tech and high growth potential of research is an urgent requirement.

Funding programmes

- Science Enterprise Challenge and the University Challenge programmes are up and running and are doing things other than basic research. We must be able to measure their impact.
- International level excellence can be factored into Research Council programmes, but different funding agencies will take different views as to how to achieve this.
- The Human Genome project is a good example of how major international research can be co-ordinated.
- In deciding on the national direction of exploitation of research it will be necessary to combine the capabilities of OST, the Research Councils and the Funding Councils. New measures will be essential. As will be five-year horizon scanning and focus on the key targets and solutions.

Industry pull

- Industry-pull has to link with science-push through an early route to market to potential users.

Patents

- Patenting requires specialist expertise and sometimes a cluster of 30 patents to protect a development. Spin-outs and start-ups are more likely to be productive for universities than the licensing route.

Supervision of research students

- Supervision of research students and post-doctoral researchers requires to be improved as does career development.

79. Scottish Enterprise made the following points: (This evidence was taken prior to the publication of the Scottish Executive's 'A Science Strategy for Scotland' on 27 August 2001 and the publication of Scottish Enterprise's Annual Report 2000-2001)

Role of industry

- Industry has an important role to play in the middle ground between basic and applied research.
- The commercial world helps to identify gaps in clusters.

Connections with the HE sector

- Scottish Enterprise officials now meet regularly with Universities Scotland
- Through Local Enterprise Companies it has contact with individual Principals.

Role of Scottish Enterprise

- Cluster and sector teams meet with researchers to assist with development of proposals for various initiatives.
- Scottish Enterprise has more knowledge of spin-out activity than start-up formation by universities. Local Enterprise Companies are familiar and active in relation to spin-outs.
- The current review of Scottish Enterprise will deal with a large number of areas, such as the lack of flexibility of the regional structure of Scottish Enterprise.

Funding

- The Scottish investment in key areas must be increased to compete with other countries such as Ireland. But the financing of this is a problem; a mix of private and public funding will be necessary.
- Scottish Enterprise has not explored the Ministry of Defence as a source of funding for university research.
- Scottish Enterprise should be more involved in assessing opportunities for research funding in commercially important areas.

80. The Scottish Enterprise team undertook to supply additional material on a number of issues including international comparators and the economic impact of research. This is included in Annexe B.

81. The Chief Executive of SHEFC summarised the Council's existing schemes in his preamble, emphasising that "excellence is the most reliable guide to future benefit although there must also be effective knowledge transfer".

82. The Research Development Grant is highlighted in connection with Foresight and Cluster strategies. Following RAE 2001, it is possible that "it will be difficult to maintain the funding for the research at 3a and 3b levels". £6m is provided for professionalisation of commercialisation. In response to questioning by members the following points were made:

- There is a need to go further in using measures other than publication in the RAE.
- There is on-going co-ordinated work in Scotland on performance assessment.
- Additional evidence submitted by the Funding Council in response to questions shows that the majority of Research Development Grant monies are allocated to the established universities. (The percentage of departments at different rating levels supported by Phase 1 of RDG show 57% of departments at level 4-5; 33% at level 3a and 3b; 10% others.)
- The proposed Research Development Foundation Grant will stimulate research in lower rated departments.
- The proposed Strategic Research Development Grant will be targeted to eg building Scottish based research facilities which would help all rating levels.
- Additional funds would be allocated through ministerial guidance subject to the science strategy of the Scottish Executive.

Committee Meeting of 12 June 2001

83. At this meeting the Committee heard evidence from three scientific entrepreneurs with hands-on experience of company spin-outs and start-ups based on exploitation of the science base. They were:

Professor Sir David Lane, Founder, Executive Director and Chief Scientific Officer) of Cyclacel Ltd. a biotechnology company using cell cycle biology and rational drug design chemistry to develop novel cancer therapeutics;

Mr Brendan Hyland, Founder and former Chief Executive of Kymata a successful optoelectronics company;

and Professor Steve Beaumont, Director of the Institute of System Level Integration (the Alba project) which was established by four Universities and Scottish Enterprise to increase the output of graduates with electronic design skills and to conduct research and development in partnership with the universities and the electronics design industry.

84. The following points emerged from their written submissions and from oral evidence:

Commercialisation

- Confusion and delay derives from multiple players in the commercialisation process. The commercialisation process is unnecessarily lengthy and costly. Universities require a set of common guidelines on commercialisation.
- Commercialisation of technology from universities by a third party can be delayed by academic staff and their commercialisation officers.
- Global success requires a product of outstanding quality that requires input from the best academics.

RAE Measurement

- Patenting requires much effort by academics, delays publication and is not sufficiently recognised in the RAE.
- Existing measures are wrong. Much more emphasis and investment should be placed on application of research.

Identifying opportunities

- Academic entrepreneurs must be nurtured by universities.
- Universities are not well enough aligned to venture capitalists.
- Technology often comes from various sources, both in industry and academia.
- Scotland needs to adopt a 'smart' technology approach i.e. to focus on applicability and commercial opportunities.
- The Funding Council should be encouraged to "focus on a smaller number of research fields in which there is a defined balance between pure research, applied research and technology transfer".
- "There is a huge difference between the sort of research that is going on in universities and the sort of research that would really make an impact in Scotland." A different type of body is needed.

International experience

- England has a substantial pool of pure and applied research centres in the private sector that complement university based research. Scotland's private sector research base is limited.
- US venture capitalists have generally had direct involvement in building technology companies. In Europe their background is more likely to be in banking and finance
- In other countries intermediary research bodies are often the principal vehicles supporting industrial research.

Successful models

- The Funding Council's support for the Institute of System Level Integration is a good model. The total investment has been £2m under different headings.

Funding

- "The Funding Council and Scottish Enterprise need to establish streams of recurrent research funding which can be used for demonstrator projects aligned to ... the needs of industry".
- Joint academic /industry posts should be funded. At present there is tension between academic and commercial research in terms of career development.
- "Scottish Government should take a much more dirigiste approach at Parliament level ... with Scottish Enterprise or SHEFC... it should focus its limited resources on certain key strategic technologies."
- "Scotland must get hold of a pot of money that it can direct for strategic development."
- Additional public investment must take account of the extent of risk. The venture might not be successful.

University approach

- Universities demand excessive equity and royalty.
- Academics respond to carrots and sticks. At present the carrot is - Publish as many papers as you can

SECTION C: SUMMARY AND RECOMMENDATIONS

Teaching Funding

Introduction

85. This inquiry began due to the substantial concerns expressed by Higher Education institutions and others regarding SHEFC's proposed changes in relative allocations, which was intended as a consultation exercise.

86. There was considerable support within the sector for a reduction in the number of subject areas and other measures which would simplify the system and make it more transparent. However, one of the main concerns expressed by those critical of the proposals was the lack of an evidence-base for the proposed reduction in the number of subject areas from 22 down to 6. Under these proposals departments of medicine would be considerable winners at the expense of other subjects, including some that are central to the development of the Scottish economy. The proposal that 'fees-only' students were to be built into available funding was also criticised as reducing unit costs and further advantaging particular institutions and courses, with no particular rationale.

87. The Funding Council responded to this criticism by indicating that:

- the proposals were intended as a basis for consultation;
- problems of transition could be dealt with separately if the new model of funding was accepted;

- analysis undertaken by the Herald newspaper was misleading in that funding was increasing overall and therefore no institution would lose out in absolute terms;
- where there were specific problems, for example with the small specialist institutions (principally art colleges), they would be dealt with separately.

88. SHEFC has further responded to these criticisms from stakeholders by accepting the offer of Universities Scotland to discussions on the proposals. At the time of publication it is not clear what the outcome of these discussions will be, but it is likely that there will be some significant changes. Nevertheless, the Committee believes that, whatever the outcome of this process, the analysis outlined in this report remains valid and requires to be taken into account if a robust funding system is to be established.

Conclusions

89. The Committee believes that SHEFC profoundly mishandled the Teaching Review. It underestimated the difficulty of developing an evidence-base, but worse, it failed to appreciate that any major change in funding allocation must have an evidence-base. The lack of a system for establishing prices for teaching is a fundamental issue for higher education (albeit one that is not easily solved). At the very least the issue of an evidence-base should have in itself been the starting point and openly discussed.

90. The Funding Council did commission some extensive research on the relative costs of delivering effective and efficient higher education from JM Consulting, and this work could have been much further developed to provide a sound empirical basis for a new funding model. It was not. Why this process was abandoned is not entirely clear to the Committee, but it believes that this was a major error.

91. What is currently proposed by the Funding Council is not a thorough pricing system. As pointed out by many witnesses, it represents a major correction for medicine plus a weighted averaging system of allocation across a very broad and unrelated group of subjects. In particular the Committee was concerned about the effects on those subjects taught in small groups, many of which may be technology-based and important for economic development. Whilst the Funding Council has belatedly acknowledged the impact on small specialist colleges, it has so far failed to recognise the funding difficulties of, for example, language courses which require intensive small group teaching methods.

92. One of the major changes contained in the proposals is an increase in funding for the teaching of medicine. This arose from the awareness of the Funding Council's Advisory Group on Teaching Funding that there was a significant difference in the level of funding for clinical medicine in Scotland, compared to that in England. Whilst there is some evidence to support this case, the Committee is surprised that no parallel analysis appears to have been undertaken for other subjects, even other related health-based subjects.

This anomaly leaves the impression that the recommendations for the increase in funding for medical departments had been driven by lobbying from the medical establishment. The Committee notes that in assessing the costs of teaching medical students there is also a need to address other income streams from the Education and Health Departments from which they benefit.

93. The Committee does support the principle of simplifying the model used to fund the teaching of higher education in Scotland, and a reduction in the number of funding bands which are used to calculate it. This is likely to be of assistance to higher education institutions, and to reduce unnecessary bureaucracy.

94. However, there does not appear to be a strong basis for the rationalisation of 22 funding bands into 6, as presently proposed. It is possible that 6 bands is the optimal number for the allocation of teaching resources, but in the absence of a clear and transparent process to arrive at this breakdown, it is not possible to reach an informed view.

95. The Committee further disagrees with the SHEFC proposal for fully incorporating some 'fees-only' students into the mainstream funding model (as originally proposed in the consultation document HEC 08/00). There was no rationale evident in the evidence given by SHEFC for this change. The Committee therefore concurs with written submissions that the effect would be to reduce the level of funding per full-time equivalent student (FTE) resulting in uneven and unfair effects across institutions and subjects.

96. The Committee also believes that this funding review represents a real opportunity to radically reassess the way in which public resources are used to finance higher education teaching. Whilst it is important that resources are available to ease any transition from one model to another, the Committee is not convinced that the historic funding base is the best starting point for such a review. The Committee feels that the use of an historic funding base, with too much attention paid to what has gone before rather than what the system should be trying to achieve, has resulted in a funding strategy which appears to be at odds with the higher education strategy. The Committee hopes to address this aspect in its forthcoming Lifelong Learning Inquiry.

97. One of the issues that has been raised with the Committee is the degree of flexibility that individual institutions should be allowed in allocating resources internally. The Committee accepts the basis of the current funding model – that SHEFC has a responsibility to allocate teaching funds on a rational basis and that once allocated it is entirely reasonable to expect Governing Bodies to allocate within institutions – subject to the academic plans agreed with SHEFC. The Committee is not convinced that any further flexibility for institutions within the existing framework would improve the pattern or accountability of funding.

98. The principle of additional funding for 'wider access' and for disabled and part-time students, included in the proposals, is fully supported by the Committee. It hopes to explore the most effective way of using these funds in

its Lifelong Learning Inquiry. In this inquiry, the Committee has been struck by the stark comparison between the mechanisms for distributing public funding for teaching on the one hand and research on the other. In allocating teaching funds, which is by far the largest component of university funding, the Funding Council relies upon very simple formulas, lacking a firm evidence-base. The allocation of research funding by comparison is subject to a thorough, if burdensome process of peer review, utilising over 600 assessors spread over 65 individual assessment areas.

Recommendations

99. The Committee believes that the Scottish Higher Education Funding Council should go back to the drawing board on the funding of teaching. The current proposals do not have a strong enough evidence-base to command support within the sector, or beyond it.

100. The Committee recommends that the Minister establish an independent review body from outwith SHEFC with a remit to examine the costs of teaching, taking into account UK comparators across all subjects, and to make proposals. Consideration of the costs of teaching medicine should be tackled as part of this review so that it is dealt with on an equitable and fair basis.

101. The object of the independent review should be to identify a formula for allocation with a strong evidence-base. It should address how the 'fees only' funding should be dealt with in the longer term.

102. It is proposed that the review be carried out over the course of the next year to allow implementation at the earliest reasonable point - academic year 2003-4.

103. In order to minimise uncertainty a clear statement should be issued about the tapered introduction of any new system to avoid unnecessary turbulence in the higher education sector. Any new proposals should also be modelled on the existing higher education sector in advance to determine impact.

104. The Funding Council, Universities Scotland and the Higher Education Institutions will be expected to play a major role in this review, building on the important work which has been undertaken since the original consultation was announced. The principles of openness and accountability must however be followed, and agreement must be reached for the benefit of Scottish society and the Scottish economy as a whole. It is important that the discussions involve bodies beyond SHEFC and Universities Scotland.

105. The Committee did not accept the proposal by the Royal Society of Edinburgh for greater expenditure discretion by institutions. Under any new system of funding it is proposed that institutional discretion must remain within limits to ensure continuity of accountable development.

106. It was correct of the Funding Council to undertake a review of teaching funding, as a review is clearly needed. The Committee has no desire to turn back the clock or retain the status quo. However, the Committee does not believe that the current proposals are strong enough to form the basis for funding in the immediate future, and an interim arrangement is therefore necessary.

107. **The Committee recommends that in general the current arrangements should continue until the results of the Independent Inquiry are reported. However, it recommends that a number of the positive aspects of the proposals, where there is a consensus in the sector, should be taken forward in the interim arrangements.**

108. These elements include:

- the adoption for the next academic year of the proposed 5% additional cost per FTE student for providing higher education to 'wider access' students.
- The adoption for the next academic year of the proposed additional funding for disabled students within the main teaching grant.
- The adoption for the next academic year of the proposed additional support for part-time students.

Research Funding

Introduction

109. The Committee has a strong interest in the funding of research in Scottish higher education. This interest derives not only from its remit and responsibility for higher education, but also because the sector has a crucial role in developing ideas that can be commercialised, and promoting enterprise and economic development.

110. We have therefore examined not just the specific proposals of the Funding Council to support research, but also some of the wider issues related to the commercialisation of research and support for Scotland's economic development.

111. The approach that SHEFC has taken to research funding has been broadly welcomed in oral and written evidence. That approach being to maintain funding of high quality basic research on the one hand, and to promote the application of research and development of new research areas through a number of specific earmarked 'Development Grants' on the other, e.g. the Research Development Grant

112. The main element of the SHEFC proposals which raised opposition initially was the warning that university departments rated at level 3 might not receive funding in future if the improved ratings of departments overall meant that all resources were absorbed by departments rated at level 4 and above.

This was seen as particularly divisive as all research by post-1992 universities falls into this category. It is also contrary to what is proposed in England.

113. In evidence the Committee heard a range of views on this subject and there is a heated debate emerging on the extent to which basic research delivers for economic development in Scotland. In most cases a number of perhaps predictable positions have been adopted depending on the standpoint and sector of witnesses.

114. The issues which were raised with the Committee, and which it has taken into account in coming to its view include the following:

The Research Assessment Exercise and Excellence

- Level 4, 5 and 5* rated research must be supported because Scotland must compete on a world level in these areas.
- Scotland's best research is definitely world class - benchmarks show this.
- Institutions which are accorded RAE excellence are also good at working with companies and have developed commercialisation strategies.
- However, the RAE overvalues pure research (e.g. research papers) as against applied research (e.g. registration of patents).

Impact on New Universities

- Many departments rated at level 3, including those at the level 3-4 boundary stand to lose the bulk of their research funding.
- Level 3 rated work is more meritorious than at present recognised. It can be practically based, and may be valuable at the Scottish level.
- The new universities and level 3 rated departments are not adequately supported for their potential to work with businesses, especially the small business sector – SMEs.
- Without a reasonable share of research funding new universities will fail to recruit and develop staff or retain them on reasonable contracts, threatening their long-term future.
- The £5 million Research Development Foundation Grant proposed by the Funding Council is inadequate when compared to the £22.5 million currently distributed to level 3 rated departments and unlikely to make a difference.

Commercialisation

- The capability of some Scottish universities to commercialise research has increased markedly in the last 10 years and pockets of expertise now exist.
- However, commercialisation structures vary very much between institutions and are not generally well understood in the commercial world.
- Whilst there are examples of successful practice (e.g. commercialisation of Scottish-based research by Scottish Equity Partners), the venture capital sector in Scotland has poor links with universities. Complaints made of universities include 'No front door', 'Too complex', 'Too slow', and 'Not interested'.
- There is also a concern that Universities seek to commercialise to their own benefit rather than to the benefit of businesses or the wider community.
- Whilst exceptions exist, academics are not natural entrepreneurs and are not usually trained to, for instance, write business plans.
- There is a debate over the ownership of research-generated Intellectual Property Rights (IPR), with some arguing that they should be publicly owned given public financing of universities, and others that they should remain with the universities given the level of non-Government support (c.40%).
- The level of spend overall on research appears to be lower than in competitor countries. This is accentuated by the lack of investment by Scottish-based companies, whose input is well below the average for the UK.
- Scotland also currently lacks Institutes of Applied Research and Development closely linked to industry, which do exist in England. The main exception is the very successful Scottish Agricultural and Biological Research Institutes (SABRIs) which do benefit biomedicine.
- In some aspects other countries e.g. Ireland, Finland and Australia represent better practice in commercialisation from which we can learn.

Conclusions and Recommendations

The Research Assessment Exercise

115. From this evidence the Committee has drawn the following conclusions and recommendations. For ease of reading the main recommendations are highlighted in bold.

116. The longer-established universities in Scotland have been good at research for many decades, and continue to produce world-class activity. They currently attract 11% of UK Research Council resources, as against 9% that one would expect on a per capita basis. Several groups in excellent departments have very close links with industry, although often not in Scotland, and are highly regarded by major companies. In these areas they make a real difference. This high quality international research is a valuable capability, which must be retained if a 'knowledge economy' is to be developed in Scotland.

117. The RAE is a thorough, if burdensome system of peer review. The Committee supports the current proposals with regard to RAE insofar as they maintain real excellence, which is beneficial, and leverage substantial funding from the Research Councils.

118. The Committee believes that there are advantages in allowing Scottish universities to continue to be able to compete on the UK playing field through the RAE, and that this system for the allocation of funds should continue.

119. The current funding model, however, does not necessarily reinforce the links between academia and Scottish economic development and this is something that is increasingly desirable.

120. It does not appear on present trends that the main universities will become powerful drivers of the knowledge economy, as is happening for instance in the USA. Some effort is being made in this direction, but it is doubtful whether that effort will substantially change Scotland's economic landscape.

121. Given the potentially beneficial role that they can have, the Committee believes that an onus should be placed on those institutions that benefit from the RAE to demonstrate the benefits of their work to the Scottish economy prior to the next RAE.

122. There are also a number of weaknesses in the way that the RAE currently operates to which the Committee would wish to draw attention.

123. It appears that, despite some movements in this direction, practical outputs from research, such as patents and spin-outs are not as highly valued as, for example, papers in academic journals. **The Committee recommends that the RAE process should go further in recognising practical research outputs equally with academic ones, and that new measures should be put in place to assess them.**

124. The Committee also concurs with a number of wider points made in evidence by the Director of the Research Councils, in relation to research funding:

- understanding high value-added, high tech and high growth potential of research is an urgent requirement for those funding

research – the strategy that the Committee has proposed should help to address this;

- **the capabilities of the Office of Science and Technology, the Research Councils and the Funding Councils in researching how to measure research attainment need to be combined;**
- **new performance assessments, five-year horizon scanning and a focus on key targets and solutions are essential;**
- **mechanisms have to be improved to allow research ('science-push') to be linked through an early route to market to potential users ('industry pull') – the RAE does not adequately capture this technology integration at present.**

The New Universities

125. The Committee does not support the SHEFC proposal to exclude level three departments from the receipt of RAE funds.

126. It is clear that the loss of RAE support to the post-1992 universities, without any other input, would have a significant detrimental effect on new universities. Moreover, these universities are often well placed to work with SMEs and in emerging technologies on research that is likely to have impact on the Scottish economy. The Committee judges that their lack of track record in research to date is more to do with their new-found status than their potential.

127. The withdrawal of RAE support would also have significant knock-on effects on teaching. The new universities teach 35% of our graduates, but academics must do more than teach. Research is a critical element of the development of their teaching function, and in permitting them to achieve their potential.

128. In addition, the current SHEFC proposals will not permit the allocation of significant new funding to new universities to allow them to start up new research specialisms. This is undesirable as the short timescale that has elapsed since their creation has not allowed sufficient time for the new universities to show their potential and the benefits of their contribution in the field of research.

129. It has been argued that the proposed Research Development Foundation Grant will address this point. However, the Grant with a value of £5m represents a cut in real terms when compared to the £22.5m currently distributed via the RAE based grant to departments rated at levels 3a and 3b. In this context, the Committee also noted the evidence from Heriot-Watt University which highlights that over 50% of Research Development Grant monies currently go to university departments rated above level 3.

130. The Committee further notes that the proposed switch of the funding of postgraduate education from the teaching to the research funding mechanism is also likely to disadvantage the new universities.

131. The Committee is concerned therefore to ensure that practical research of benefit to the Scottish economy and society continues to be supported and that the newer universities are not unreasonably disadvantaged by the new funding mechanisms.

A Research and Development Strategy

132. Looking at the issues from the perspective of Scottish economic development, it is clear that Scotland desperately needs a national Research and Development Strategy. **The Committee recommends that the Minister establish a Research and Development Strategy for Scotland.**

133. The Committee is encouraged by the launch of 'A Science Strategy for Scotland' by the Minister for Enterprise and Lifelong Learning on 27 August 2001, and believes that the strategy could be developed to incorporate research and development.

134. **In terms of the implementation of the research and development strategy, the Committee accepts the evidence that was presented to it on the need to increase the total research spend within Scotland. The Committee therefore recommends that the Scottish Executive examines options for extending research funding, both public and private.**

135. One of these options should be the creation of a global fund and funding body for practical research. Resources for this fund could come from a variety of sources (some existing, some new) and would accumulate over a period. For instance: the Scottish Executive (Scottish Enterprise funds and some SHEFC funds), the Treasury (through increases in the Scottish Consolidated Fund as a result of the 2002 Spending Review and transparency review of HE funding), private investment (venture capital, the Scottish diaspora), and the European Union (such as the EU Innovation 2000 Fund).

136. A fund of this nature could bring together the significant number of smaller initiatives, currently managed in different ways, including the Proof of Concept Fund, Challenge Fund etc. under a single funding umbrella.

137. In August the Minister announced the creation of a Scottish Science Advisory Committee, which will provide independent advice on strategic scientific issues. **The Committee proposes that the remit of the Scottish Science Advisory Committee be extended to cover research and development, and that it be responsible for producing the research and development strategy.**

138. Responsibility for the strategy would thus be under the control of an independent high-level group containing heavyweight figures with an international dimension. Peer review would therefore be central to design and implementation of the strategy, and perhaps in due course the allocation of

resources. It is proposed that the strategy should incorporate 'horizon scanning' of, say, five main areas.

139. The strategy should be designed to link research and development with Scotland's economic objectives. The remit of the Advisory Committee would be to identify research problems that are central to the strategy and ensure that academic links with business are strengthened.

140. The Committee contends that the Funding Council and Scottish Enterprise have a clear role to play in this, but neither is well placed on its own to develop that strategy.

141. The real challenge is to create a set of longer-term strategic research and development objectives to which Scotland commits. This requires a level of consensus and political commitment across the Parliament in order to help ensure continuity in the delivery of the strategy, which must, of its nature, be long term.

142. Recent violent oscillations in the fortunes of technology-based companies underline the need for a longer-term strategy which can counteract shorter-term market conditions. An example of this type of work may be The Grid project, involving Edinburgh and Glasgow Universities in the design of the next generation of the internet.

143. The suggestions outlined above represent the Committee's initial thinking on a research strategy and funding. The proposals do echo those of the Minister when outlining the Science Strategy. **The Committee invites the Minister to consider how its proposals, if acceptable, might be integrated with the implementation of the Science Strategy.**

Commercialisation

144. There are a number of other issues, which have emerged during the course of this inquiry in relation to the commercialisation of university research on which the Committee would wish to comment. They do not necessarily relate to SHEFC's funding review, but they are all issues that will need to be dealt with by the Executive and the higher education sector if the commercialisation of Scottish research is to be maximised.

The Business-Research Interface

145. There does not appear to be an adequate and consistent interface between business and university research in Scotland. There may be scope for developing a more coherent 'front door' for venture capitalists and businesses seeking to work with universities, and the development of user-friendly databases on current research, which the Committee notes SHEFC has initiated.

146. The mechanisms for sharing best practice, which do exist at some institutions, need to be strengthened. This may help to overcome some of the resistance to this type of work, reported by some.

147. The Committee is attracted to the Irish approach to this problem, outlined by Scottish Enterprise in its evidence. Current approaches under consideration in Ireland include:

- knowledge transfer – for example establishing a database of research results and technical expertise for use by companies;
- the provision of a technology brokerage service by Enterprise Ireland;
- research and marketing alliances to be established among universities;
- R&D clubs to be established by universities and companies;
- industry to utilise, or where appropriate establish, research "user" groups or networks;
- research institutions to provide appropriate and regular training for their staff to enhance interfacing with industry.

148. In general there appears to be scope for the Funding Council and Scottish Enterprise to work more closely together to foster Scotland's economic development. **The Committee recommends that Scottish/Highlands and Islands Enterprise, Universities Scotland, SHEFC and the Royal Society come together to produce guidelines for institutions and mechanisms for improving the business/research interface at a national level. They should also strengthen the dissemination of best practice.**

Institutional Issues

149. The Committee recognises commercialisation should not of course be the only driver of university activity. Nevertheless, **the committee believes that universities need to examine some of their own internal rules and structures to see whether they militate against the effective commercialisation of research.** These include:

- ensuring that academics can more easily move between academia and business;
- ensuring that the incentives that exist in the current system do not work against commercialisation, i.e. the way in which staff are valued;
- speeding up and rationalising internal processes of decision-making on commercialisation ventures;
- taking a more enlightened and long-term view of their IPR;
- assessing whether institutional re-structuring may be required to achieve the best possible outcomes from university research;

- exploring whether there is unexploited potential for entrepreneurship by students and alumni, as well as staff on which energies have tended to concentrate to date.

Other Issues

150. **The Committee considers that in the longer term there may be a case for establishing more intermediary research bodies**, along the lines of the Institute for System Level Integration. The Committee notes that the Executive has made some moves in this direction.

151. The issue of finance for patents is also an important one. Whilst the instances of successful patents in Scotland have been relatively rare, the question of budget constraints in the application of patents should be addressed. However the Committee does take on board the point made by Dr. Taylor, the Director of Research Councils that spin-outs and start-ups are more likely to be productive for universities than the licensing route.

152. The Committee finds that the case for giving more discretion to Vice Chancellors to enable them to direct research investment within universities to develop the stars of tomorrow in lower rated departments is not proven. There is already a degree of flexibility as they have the discretion to apply strategic top slicing to promote development. The Committee does not agree that any further flexibility should be incorporated at this level.

153. The Committee does believe that there is scope for exploring other potential sources of research funding, which may not have been seriously examined to date, e.g. the Ministry of Defence, the National Health Service etc.

154. **The Committee recommends that the issues outlined above should all be addressed within the proposed Research and Development Strategy for Scotland.**

155. **The Committee will return to these and other strategic issues in relation to higher education, during the course of its inquiry into lifelong learning.**

Appendices

Appendix 1: A Science Strategy for Scotland published 27.8.01

Announcing the strategy, Wendy Alexander, in her role as Minister for Science, said it will:

- Promote Scotland as an international centre of scientific expertise
- Join up science policy and investment decisions through specialist fellowships and Proof of Concept funding
- Make Government smarter in its work with the science community
- Create a Scottish Science Advisory Committee under the umbrella of the Royal Society of Edinburgh
- Recognise the importance of developing science in schools, colleges and Universities and HE provision
- Build international bridges with other leading universities worldwide
- Promote public awareness, appreciation and understanding of science
- Create a pipeline of support to carry science from Scottish laboratories into the creation of global companies

A Science Strategy for Scotland identifies five key objectives for the Executive:

- Maintaining a strong **science base**;
- Increasing the effective **exploitation of scientific research**;
- Ensuring that enough people **study science** to meet the future needs of Scotland;
- Promote the **awareness, appreciation and understanding of science** across society; and
- Ensuring the **effective use of scientific evidence** in policy formulation and resource allocation by government.

Appendix 2: RAE Rating Descriptions

5* (5 star)	Quality that equates to attainable levels of international excellence in more than half of the research activity submitted and attainable levels of national excellence in the remainder
5	Quality that equates to attainable levels of international excellence in up to half of the research activity submitted and to attainable levels of national excellence in virtually all of the remainder
4	Quality that equates to attainable levels of national excellence in virtually all of the research activity submitted, showing some evidence of international excellence
3a	Quality that equates to attainable levels of national excellence in over two-thirds of the research activity submitted, possibly showing evidence of international excellence
3b	Quality that equates to attainable levels of national excellence in more than half of the research activity submitted
2	Quality that equates to attainable levels of national excellence in up to half of the research activity submitted
1	Quality that equates to attainable levels of national excellence in none, or virtually none, of the research activity submitted

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