



CENTRE FOR

bioscience



Enterprise teaching in bioscience units in Higher Education

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OVERVIEW

Of the 145 units surveyed some 56 responded. Of these 15 were currently providing some 38 enterprise related modules/programmes which met the criteria for inclusion (mainly (>75%) orientated towards enterprise related learning objectives). 9 units were proposing to introduce new modules/programmes. Most provision used teachers from within the bioscience unit though, particularly in universities in which an enterprise CETL was based, CETL staff, careers services or specific enterprise units also made a contribution or the provision was joint with e.g. the school of business.

With regard to the nature of the provision of enterprise teaching the most obvious feature was its diverse nature both in what it encompassed, its extent, the students involved, how it was accredited and how it was delivered. Some institutions had major provisions while some had none. Responses from many institutions emphasised that enterprise was integrated into their modules throughout the bioscience courses. Thus while the totality of the provision of enterprise elements was significant, in no module did it involve >75% of the learning objectives and therefore was not returned in the survey. A second feature was the disjunction between enterprise teaching provided by the bioscience unit and that which might be provided by the institution as a whole. In many institutions respondents simply did not know the nature or extent of any institutional provision which might be available to the students to supplement that provided within the unit.

INTRODUCTION

This report describes the outcomes of a survey of the teaching of enterprise within bioscience units in Higher Education. The survey was commissioned by the National Council for Graduate Entrepreneurship (NCGE) in order to correlate the information obtained previously from institutions and provided at institutional level, with that obtained from teaching units at discipline level. The commissioning process leading up to the running of the survey was difficult in that there were many delays for a variety of reasons. Communication was

difficult and the outputs expected by NCGE changed substantially between the initial commissioning and the writing of this final report. It would be beneficial to all concerned if the commissioning process was more closely defined and clear written agreements were in place and signed at the highest level in a timely manner before the work commenced so that all parties were fully aware of what was expected and the associated time scales. The identification of a single point of responsive and reliable contact by both parties would also be helpful.

METHODS

Development of survey instrument.

It was decided to use a web-based survey for a variety of reasons:

- A web based instrument would provide data directly into a suitable database without the cost, time delay or data corruption associated with transcription of paper-based surveys.
- The web format would facilitate completion and return by departmental contacts who are used to working in this way.
- The instrument could be made available from the web sites of the Subject Centres involved, thus increasing the likely response rate as the instrument was clearly associated with the web sites of the Centres with which contacts in departments were already familiar.
- Web-based is less expensive to carry out than other alternatives.

The questions and accompanying text in the form of a letter to contacts inviting them to participate was developed by an iterative process involving all the commissioned Subject Centres and NCGE. Once the content was agreed it was converted to a web format by the Centre for Bioscience. The final version was trialled internally and then made available to the other commissioned Subject Centres. Copies of the invitation letter and the survey instrument are appended at appendix A and B respectively.

It was agreed to collect information on both programmes and modules mainly directed towards enterprise outcomes. Since there is a potential for

misunderstanding regarding the meaning of the terms 'programme', 'module' and 'mainly' these were defined pragmatically to ensure all participants were clear about the use of these terms.

It was agreed that the survey would elicit information only on modules or courses which were 'mainly' directed to enterprise objectives. This was defined as having 75% or more of their learning outcomes/objectives involving enterprise objectives directly. An understanding of this point is crucial to the interpretation of the data obtained because of the way much generic material (i.e. not discipline specific knowledge or skills) is taught in bioscience. In many (but not all) circumstances generic material is best fully integrated into discipline related teaching. Thus teaching relating to enterprise objectives may form a small part of several modules and would therefore NOT be included in the returns of the survey data. Information only on those modules or programmes mainly (>75%) related to enterprise was returned. The total return therefore will substantially underestimate the amount of enterprise related teaching to which students on bioscience courses are exposed.

Data categories and coding were agreed with NGCE so as to be compatible with the required formats. Note that in the data return not all fields were completed by all respondents which accounts for some small discrepancies in the data. The lack of complete data in all cases also detracts from the strength of the inferences which can be drawn from the data.

Administration of the survey instrument.

The invitation letters were sent by email to 'bioscience contacts'. These individuals (145) are formally appointed with the agreement of their head of unit to be a primary channel for information both from the Centre for Bioscience to teaching units and vice-versa. These contacts are used periodically by the Centre for Bioscience for a variety of purposes and have built a relationship with the Centre over the years. It was decided to use these individuals in order to maximise the return rate of survey information. While these individuals feel a responsibility to the Centre it is also true that the Centre has a responsibility to

these individuals not to overload them with requests for data. Because of this the Centre was not prepared to undertake repeat, subsequent or additional surveys in this area.

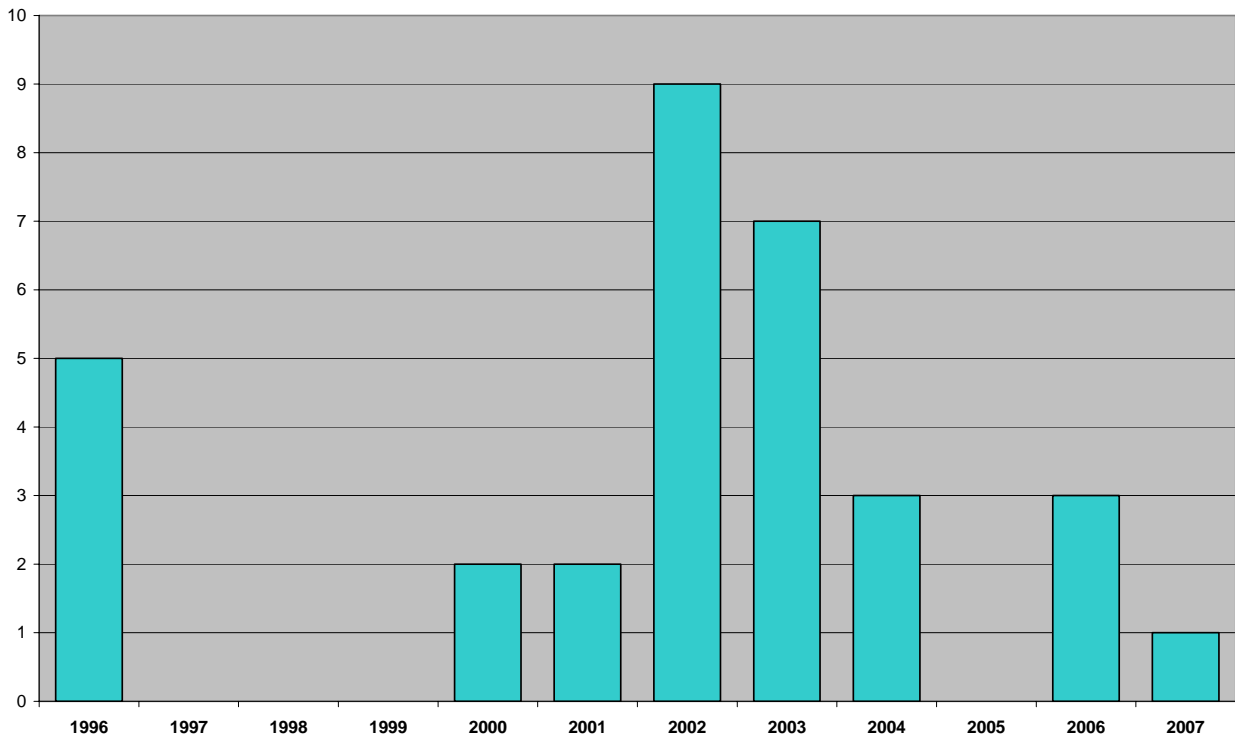
The timing of sending out the survey was designed so as to arrive at a time when respondents would be under less pressure than at other times and therefore more likely to provide data. The initial letter was sent out on 29 November with a completion date requested for 15 December. A reminder was sent out on 13 December. -

RESULTS

1. Requests to complete the survey were sent to 145 contacts and 56 returns were obtained (34%). We believe this return rate is high in comparison with some surveys but there is still a substantial proportion of missing information. The data must be interpreted with this in mind. It should also be noted that conversations with non-responders suggest that they may disproportionately represent units which do not have specific enterprise teaching comprising >75% of a module i.e. the returns are skewed towards those having enterprise modules. It cannot be assumed therefore that the returns are representative of the higher education sector as a whole.
2. 15 out of 56 units (27%) indicated that they provided modules/programmes which met the criteria to be included in the return. In total 38 modules/programmes were provided, 11 programmes and 24 modules (3 unspecified). The length of the programmes varied (3 of 1 year, 3 of 3 years and 1 of 4 years; remainder unspecified). The credit rating associated with modules had a median value of 15 but some smaller and larger modules were available (10 at 15 credits; 4 at 20 credits; 5 at 10 credits). Some units provided a single module while the most provided by a single unit was 7. Provision is therefore at best patchy and may be influenced by a variety of factors including the type of student intake, the university mission, its research involvement as well as the existence of local champions.

3. The year in which the teaching was first provided is shown in figure 1. While the data are sparse there has perhaps been a fall off in the rate of introduction of new modules in recent years. This observation should however be read in conjunction with the modules planned (see 9 below).

Figure 1. Year first taught



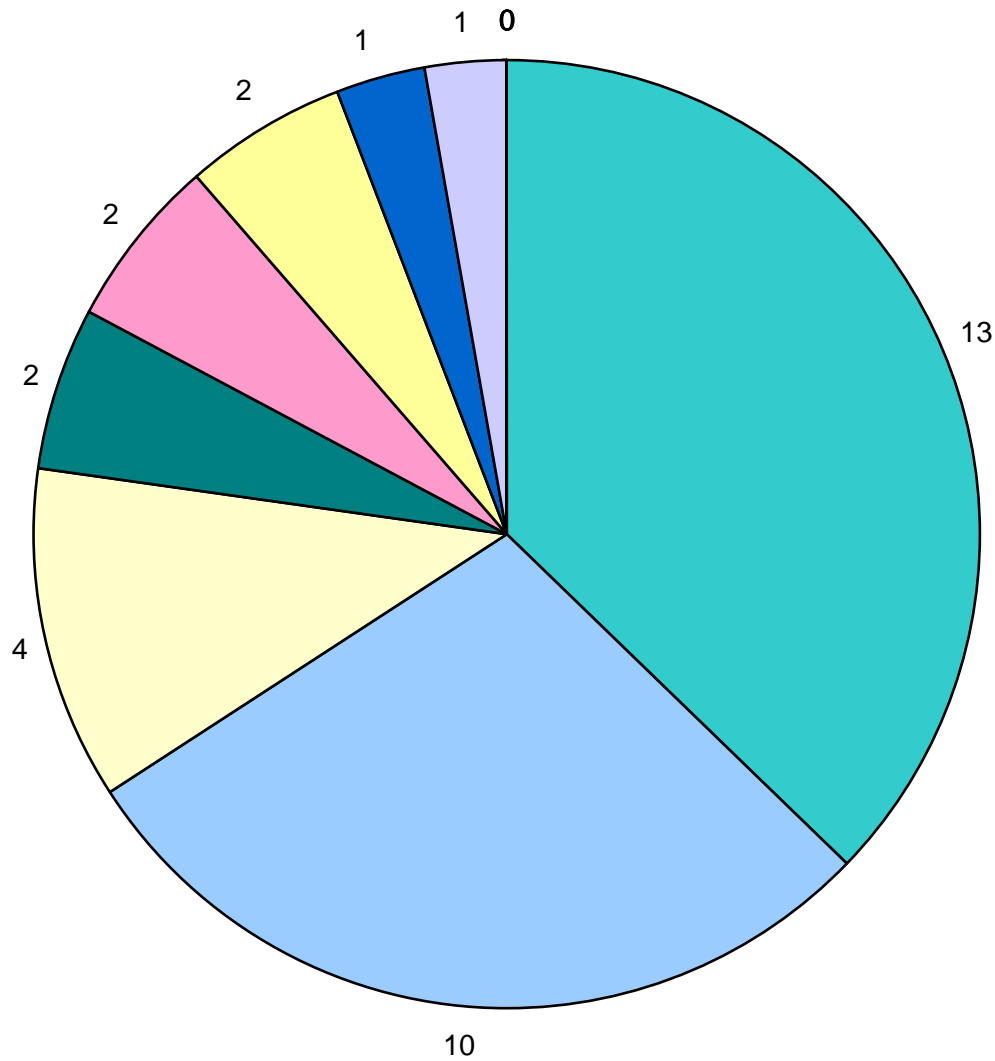
4. Teaching was provided to different types of students with modules/programme being specifically directed predominantly at undergraduates (26) with some at postgraduate level (5).
5. The numbers of students participating in the individual teaching provisions varied from 20 to 80. In total 833 students were involved in the modules returned in the survey.
6. The level of award to which the provision contributed was most commonly at Bachelors (25) and occasionally at Masters (7) level. 2 units utilised other levels.

7. Provision utilised a variety of delivery methods though it should be noted that data are incomplete. Of 11 responses, provision involved distance learning (3), part time study (7), full time study (2), was work based (1) and campus based (1).
8. The learning outcomes associated with the programmes/module are shown in figure 2. It is difficult to be certain of the meaning attributed to many of the terms used and their exact interpretation in different institutions. This makes comparisons or general statements difficult to make with any degree of certainty. However, it is interesting that there were no instances where learning outcomes were specified to involve: 'start a new business'; 'exploit institutionally owned IP'; 'prepare to become a freelancer or self employed'; 'embed entrepreneurial values and beliefs'; or 'develop empathy with an entrepreneurial way of life'. This would suggest that such outcomes were either part of a hidden agenda or that the provision was directed mainly towards enterprise rather than towards entrepreneurship.
9. New modules/programs were under consideration/planned for introduction in 11 units where there was already provision and in 1 unit where there was no current provision. The certainty and time frame of these plans is unknown. Clearly the area of provision is growing at a significant rate since 20% of responding units plan to increase provision.
10. With regard to participation of academic staff 19 of the 38 programmes/modules utilised unit staff, 23 utilised staff from other units and 12 utilised institutional enterprise staff, some utilising more than one category. Clearly staff of different levels of seniority are utilised to provide enterprise teaching though staff at lecturer level are probably under-represented (bearing in mind the distribution of staff between academic levels in universities as a whole) suggesting it is the more senior staff responsible for this provision.
11. Responses to the questions regarding access by students to various enterprise facilities (e.g. start up funds, incubator) were as follows. Some 63% had access to an institutional student enterprise unit and encouragingly only 14% of staff did not know if such a unit existed in their university. Some 42% had access to enterprise awards while only about 25% had access to

an enterprise club, start up funds or an incubator. An interesting feature of these data is the number of units (up to 53%) which did not know if such facilities were available to their students. There is clearly a disjunction between the facilities provided at institutional level and communication of the availability of these facilities to staff. It is not known if the lack of information in staff is mirrored by an equal lack of information in their students.

12. Unit staff had been trained in enterprise issues in only 26% of units and it is not clear if this training was provided as part of a new lecturers programme or separately though the distribution of staff among the various categories suggests few would be new lecturers.

Figure 2: Learning Outcomes



- to raise awareness, knowledge and understanding about enterprise/entrepreneurship concept and practice (13)
- None of the above (10)
- to develop key business 'how-to's (4)
- to develop individual enterprising/entrepreneurial skills, behaviours and attitudes (2)
- to develop personal self-confidence and capability (2)
- to understand venture creation processes (2)
- to motivate and inspire students toward an enterprising or entrepreneurial career or life (1)
- to develop generic entrepreneurial competencies (1)
- to develop empathy with an entrepreneurial way of life (0)
- to embed entrepreneurial values and beliefs (0)
- to develop personal relationship and networking skills (0)
- to prepare for becoming a freelancer or self-employed (0)
- to start a new business (0)
- to exploit institutionally-owned IP 0

GENERAL DISCUSSION

Detailed discussion of the data is presented above. In general however the overall impression from the data is of the degree of diversity of the provision of enterprise teaching as defined by the survey questions. Some universities made considerable provisions, some made none. The type of provision was also very different between units.

The data are subject to the various caveats already discussed. Particularly it should be emphasised that they cannot be taken as representative of the university system as a whole and that they will under estimate significantly the quantity of enterprise teaching to which bioscience students are exposed.

Comparisons between the data provided at institutional level and that provided through this survey are not part of the remit of this report.