

1. Project Title:
Adaptation of US Undergraduate Research Schemes for Mainstream Development in the UK and other International Contexts: Principles and Policies

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2. Keywords

undergraduate research, curriculum, mainstreaming; all disciplines, policies

3. Summary

Undergraduate research schemes, where students learn in ways that incorporate or enact the research process, are a feature of many US institutions. But they are often for selected students in selected institutions. This project investigates how to adapt these principles and practices for UK and other international contexts: in particular how to develop policies which ensure that all (or most) students in a wide range of Higher Education institutions benefit. A related question was how such undergraduate research schemes can be 'mainstreamed' into the UK university curriculum in a sustainable way, and in the immediate context of Brookes and Warwick how this process might be embedded after external funding for the CETL ceases.

The project included an investigation of a range of selected and broadly representative undergraduate research programmes in the US. This involved meetings and interviews with their designers, directors and teachers, against a background of relevant documentary evidence at programme, institutional and national levels. These insights and sources of information were related to examples of current practice in the UK with a view to establishing appropriate principles and encouraging the refinement or redirection of present policies, again at programme, institutional and national levels. This has been done and the results are being widely disseminated in the UK and internationally. With colleagues at Brookes in particular, a range of policy proposals have been formulated for 'mainstreaming' undergraduate research at Brookes. These have been accepted and are now being enacted in the Brookes Modular Course.

Because this is a broadly 'theoretical' project, chiefly concerned with changes in understanding and policy, it is by its long- as well as short-term impacts that it must be judged. Dissemination and feedback to date confirm that it is already making a contribution. It remains to be seen whether it will eventually make a big difference. At any rate, the project has helped articulate the essential principles that must inform the policies if the experience and expertise of US 'selective' undergraduate research programmes are to feed into the design and delivery of UK programmes built on partly different, potentially more 'inclusive' lines; and in turn shape developments internationally including in the USA.

4. Activities

This project grew out of a long-standing commitment to linking teaching and research and must be seen as part of that ongoing process. Institutionally, it was part of a response to a senior management strategy at Oxford Brookes that placed increasing emphasis upon developing a strong research culture in what had previously been a teaching focussed institution. Nationally, it must be seen in the UK context not only of changing policies with respect to 'quality' in higher education but also the impact of the UK Research Assessment Exercise on staff commitment to research without necessarily a corresponding commitment to student research. This change in institutional management and national culture led to my involvement in a range of investigations (and interventions) to help bring teaching and research together: a range of research studies on the student experience of staff research; the FDTL Project LINK in Built Environment based at Brookes (<http://www.brookes.ac.uk/schools/planning/LTRC/>); a national project with the LTSN Generic Centre on Linking Teaching and Research in the Disciplines (<http://www.brookes.ac.uk/genericlink/index.htm>); and an FDTL project built around Boyer's 'scholarship of engagement' (<http://www.politicsinaction.ac.uk/>). Building on these and similar initiatives, the Reinvention Centre for Undergraduate Research as a Centre for Excellence in Teaching and Learning, has been the crucial cross-institutional focus where international (especially US) perspectives on undergraduate research could best be brought to bear on the policy dimensions of the developing UK experience in this area.

The main activities of this Reinvention Fellowship have been:

- Systematic (re-)reading of the widening scholarship and research on US undergraduate research.
- A review of UK-based undergraduate research programmes and selective discussions with those centrally involved.
- Extended discussions in the US with leaders of research councils – in particular the National Science Foundation – on their perspectives on undergraduate research.
- Preliminary discussions with leaders of UK Research Councils and other UK national and institutional organisations on the value and possibilities for developing undergraduate research in the UK.
- Participation in a cluster of key US conferences related to this investigation: Transforming the Culture – Undergraduate Education and the Multiple Functions of the Research University, The (Stony Brook) Reinvention Washington DC (November 9—10, 2006) The International Conference on the Scholarship of Teaching: Washington, DC (November 10—12, 2006); and, in my linked role as HE Academy Consultant, arranging for the invitation of a representative of the National Science Foundation as a key participant in Bringing Teaching

and Research Together, London, Higher Education Academy, November 24, 2006 (http://www.heacademy.ac.uk/events/176_4752.htm).

- Organising (with others) visits from US specialists in aspects of undergraduate research to give seminars at Oxford Brookes (see listing of internal seminars below). These helped staff at Brookes, Warwick and elsewhere in the UK to better understand the thinking behind such programmes and discuss how to adapt them to our contexts.
- In October 2006 a study tour of selected US institutions nationally (some internationally) recognised for their programmes in undergraduate research, community-based undergraduate research and/or scholarship of engagement. Most of these were institutions which had moved towards integrating or ‘mainstreaming’ undergraduate research and which seemed to offer models for Brookes to adapt. This visit was made with two colleagues from Brookes, both of them well placed to advise and lead on how to implement proposals for ‘mainstreaming’ at Brookes and elsewhere: David Scurry, Dean of the Undergraduate Modular Programme; and Richard Huggins, Chair of the Institution-wide Curriculum Implementation Group and Director of Widening Participation as well as Assistant Dean Social Sciences. (See Huggins, Jenkins and Scurry 2007 for a full report on this visit www.warwick.ac.uk/go/reinvention/resources/ug_research_in_us.doc). The institutions visited were as follows:

Institution	Who	Date (2006)	Web address
Penn State University	Alan Jenkins	4-6 October	http://www.publicscholars.hip.psu.edu/
University of Michigan	Alan Jenkins Richard Huggins	9-10 October	http://www.umich.edu/
Tufts University	Alan Jenkins Richard Huggins Dave Scurry	12 October	http://activecitizen.tufts.edu
MIT	Richard Huggins Dave Scurry	13 October	http://web.mit.edu/
Boston University	Alan Jenkins	13 October	http://www.bu.edu/urop/
Bates College	Alan Jenkins Dave Scurry	16-17 October	http://www.bates.edu/x109400.xml

5. Outcomes

The outcomes of this project, as its subtitle indicates, take the form of *principles* and *policies*. Insofar as they are more or less theoretical, ethical and essential premises, they may be thought of as *principles*. Insofar as they are more or less applied, pragmatic and adaptable procedures, they may be acted on as *policies*. Either way, the distinction is as convenient as the connection is vital. It is for the reader – as generally interested educational theorist or specifically motivated programme designer or policy maker – to decide which is which, when and where for her or his particular purposes. That said, this report moves broadly from ‘principled’ beginnings to ‘political’ ends. Key aspects are summarised and discussed under three main headings, with supplementary propositions and questions:

5.1 *The nature of undergraduate research*

5.2 *Principles into policies: strategies and tactics*

5.3 *Recommendations for course and programme designers on modular (and other) degrees*

(A fourth aspect, ‘Further implications for institutional and national policy’, will be treated in the next section.)

5.1 *The nature of undergraduate research*

What is undergraduate research? As with the practice of ‘research’ by university staff (Brew 2001), there are contested meanings of the word ‘research’ at undergraduate level. In the US much practice and policy sees ‘undergraduate research’ as students having to produce ‘original’ perhaps ‘cutting edge’ knowledge, suitable for publication in (external) refereed journals. This is particularly the case in the sciences, where through strong national financial support by organisations such as the Howard Hughes Institute and the National Science Foundation, undergraduate research is significantly more established than in the humanities and social sciences. Others, however, define or conceive undergraduate research as students learning through courses which are designed to be as close as possible to the research processes in their discipline. The focus then is on the student learning and on being assessed in ways that parallel/mimic how research is conducted in that discipline. In these cases, what is produced/learned may not be new knowledge *per se*; but it is new to the student and, perhaps more significantly, transforms their understanding of knowledge/research. An example of this tension can be found on the web site of the Council for Undergraduate Research (<http://www.cur.org/about.html>). This site mainly supports and services undergraduate institutions *outside* the U.S. research elite institutions : it focuses on supporting ‘learning through research’; but also offers this definition of undergraduate research: “An inquiry or investigation conducted by an undergraduate student that makes an original, intellectual, or creative contribution to the discipline.” (this definition was conceived by Thomas Wenzel, a chemist at Bates College, an institution we visited; see <http://www.bates.edu/faculty-wenzel.xml>).

Is undergraduate research really any different from well-designed course work? Or from 'Inquiry-based learning', or 'Problem-based learning'? The short answer, sometimes, is no. Much of what was seen and talked about in the US, some UK colleagues have already made an integral part of the way they design and deliver undergraduate courses, particularly through assessed courses involving field work, work placement and more or less 'real world' consultancy (e.g. in Geography, Business and Publishing). To press this point further – a recent well publicised and received publication by the (US) Council on Undergraduate Research "*How to design, implement, and sustain a research-supportive undergraduate curriculum*" (Karukstis and Elgren, 2007) is in large measure an account of student investigative course work that, while no doubt good practice, would be now current in many UK courses/institutions. The same applies to the fundamental connections – for all the finer distinctions – between 'undergraduate research' and 'Inquiry based learning' (IBL) and 'Problem based learning' (PBL). This is a question a number of us internationally are now working on (see the review in Spronken Smith, 2007, 5). Preliminary answers suggest that, even if not identical or to be casually confused, Undergraduate Research and IBL and PBL are certainly complementary and mutually reinforcing.

What about the UK dissertation? Isn't that undergraduate research? The short answer, often, is yes. In fact, perhaps surprisingly, one can find many US institutions – including the research elite – that don't have any such requirement; though many of these, in part inspired by the Boyer Commission, are now mandating such 'capstone' courses. More innovatively, however, Portland State University (for example) requires that final year 'capstone' courses involve students in applying and developing their learning on issues of community concern (http://www.oirp.pdx.edu/portweb/published_pages/prototype/themes/cp/capstone/). In any event what current US experience seems to confirm is the importance of UK universities holding onto the widespread dissertation requirement/expectation. Hitherto this has been traditional for single subject honours, though it is now under pressure because of class sizes and competing demands on staffing and supervision caused by *postgraduate* expansion and commitment to the RAE. What cross-Atlantic comparison also suggests is that the UK would do well to be more imaginative and develop alternative forms to the dominant individual written dissertation: to extend and diversify dissertations/synoptic research experiences so that they more creatively relate to research processes in the disciplines and professional areas, not least in 'applied' research in, with and for (not just of) the local and wider communities. (For possible prototypes, see the Brookes University-wide Course Redesign project, which included alternative final-year 'dissertations/projects' such as putting on an exhibition in Fine Arts, and research-based consultancies in Business (Huggins, Jenkins, Colley, Price and Scurry 2005; and consider the Bioscience Subject Centre's (2003) national event on alternative final year projects <http://www.bioscience.heacademyspans.ac.uk/events/reports/finalman.htm>). The focus of the Reinvention Centre is sensibly on the 'research-starved' years one and two; but there is clearly scope for it to extend to further cross-disciplinary and perhaps community-based innovations in the final year

'dissertation/project'. (The range of nomenclature – allowing for more flexible forms of *project* rather than the *dissertation* conventionally conceived – is a slight yet significant shift in this area.)

Undergraduate research as tacit practice: osmosis, imitation, apprenticeship, collaboration. Many colleagues in the US and the UK have observed that forms of undergraduate research have long existed, though perhaps only as 'tacit' practices. Such practices may be more or less tacit because they run on a continuum: from 'osmosis' (just being alongside, observing and absorbing the example of a teacher who researches); through conscious 'imitation' (whether or not supported by formal training); and so onto the full-blown 'apprenticeship' model with some training in research methodology (traditionally reserved for MA level or research degree); and even – but not necessarily ultimately – full-blown student-lecturer 'collaboration'. Two examples from Brookes. The early research that fed into the formation of the Reinvention Centre owed much to research by Rosanna Breen, initially as a second year psychology student doing a dissertation on student motivation and staff research in part shaped by Roger Lindsay's (then a psychology lecturer at Brookes) research on teaching /research relations. That undergraduate research did lead to a high level external refereed publication (Breen and Lindsay, 1999); also eventually to a research degree and an academic career for Breen. Meanwhile, Rob Pope, another Reinvention Fellow, also reports how he worked with a second-year student, Elaine Hunter, on an Independent Study module designed to collect and review first-year exercises in critical-creative rewriting for representation (with commentary and tips) to first-year students taking the same course next year. This was turned into a joint refereed publication for SEDA the following year, before the student had graduated and well before she went onto postgraduate training as an English teacher in school. (Hunter and Pope, 1999). No doubt there are countless similar examples from many institutions, particularly the major research universities, of undergraduates moving in the worlds of research guided by staff. Thus David Good one of the leaders of the Cambridge MIT Institute <http://www.cambridge-mit.org/> – an organisation which involves Cambridge University adapting to its culture and practices aspects of the MIT educational culture, including establishing at Cambridge an Undergraduate Opportunities Program (UROP) – commented in an e-mail:

One thing that struck me when we put the programme together was that we had, in various ways been doing summer UROPs for a very long time. Every year, there are many students who work in the field on projects alongside experienced researchers and have the UROP experience (as opposed to the prescribed final year project experience). This is overwhelmingly in areas where field work is possible but ranges from volcanology to animal behaviour, coral reefs to economic development, and the Kalahari to Iceland. We just never called it UROP. I suspect the same is true of many other HEIs (Good, 11 May 2007, personal communication).

In fact one of the attractions of developing *undergraduate* research opportunities is that they go with the traditional culture of much effective academic practice. So while most academics readily recognise (because they themselves early experienced) the drawing power of ‘osmosis’ and ‘apprenticeship’, they may just need a nudge and some support to help their students along to ‘apprentice’ and even ‘collaborator’ stages well before ‘grad school’ and full-blown postgraduate research programmes.

Is undergraduate research just for more able students?

“Attending a top-20 public research university has its advantages. You are able to utilize the facilities that hundreds of millions of dollars in annual research funding provides. At The Honors College you will benefit from all these resources while experiencing the nurturing climate and elite peer group typical of a small liberal arts college. University of Arizona.” (nd)

That undergraduate research is for the most able students is certainly part of the culture of many US research-intensive universities. These are also the students that the UK Research Councils (RCUK) are likely to target (see below). Clearly the issues here are both ‘political’ and ‘educational’.(Jenkins and Healey 2007a), and they are complicated by their national contexts. Thus in the USA a central reason that ‘research intensives’ such as Arizona and Pennsylvania State develop such programmes is that they face major competition for the most able students (and their parents’ dollars) from high quality liberal arts colleges such as Bates. For the latter can guarantee undergraduate students (and their parents) – right from year one – small classes taught by highly scholarly teaching-focused faculty. That is competition the UK research intensives do not face; which may in fact mean they do not feel the same pressure to develop undergraduate research programmes.

To complicate matters further, much of the growth in undergraduate research in the US (including programmes supported by the National Science Foundation), has been in junior colleges (Ellis 2006, Rameley 2006). In UK terms this would mean developing undergraduate research as a central component of ‘higher education’ in ‘further education’ in years one and two. The research-intensive University of Michigan has pioneered very successful undergraduate research programmes aimed at first generation minority students entering in years one and two. The Reinvention Centre has funded a project led by Christine Simm in which mature students at Ruskin College Oxford explore the relations between theory/knowledge and social work practice. Preliminary ‘results’ are positive as to the impacts of this research experience on student development. There needs to be a note of caution, however. Many able students in the US will actively avoid undergraduate research programmes. Students seeking entry to medical schools (for example) may prefer ‘safe’ high grade courses not risky undergraduate research programmes with uncertain outcomes. For research projects that go ‘wrong’ can seriously affect your grade; though this can be largely prevented by regular monitoring and compensated by processes of proper record keeping and critical reflection (see: www.warwick.ac.uk/go/reinvention/fundingopps/fellowships/fellows/).

So what is undergraduate research after all? This investigation reinforced my initial reluctance to venture a one-size-fits-all definition of ‘undergraduate research’. Partly this is because US and UK ‘undergraduate’ experiences turned out to be as different and varied as the ‘research’ cultures of staff/faculty. But mainly it is because I think that the unpacking and repacking of what *can* be meant by the whole package ‘undergraduate research’ is something that course teams, departments, disciplines, institutions must do for themselves. That is, to reinvoke the key terms in the project title, it is up to each one of us for ourselves and all of us in our various communities to manage the relation (ongoing dialogue, negotiation) between essential *principles* and workable *policies*. In fact, it is the very process of working out this dynamic relation (perhaps particularly if students are centrally involved in the process) that is itself a powerful way to assist the embedding of undergraduate research. For example, in developing its own approach to developing undergraduate research, the University of Gloucestershire have produced the following (interim) definition of undergraduate research as “student engagement from induction to graduation, individually and in groups, in research/inquiry into disciplinary, professional and community-based problems and issues, including involvement in knowledge exchange activities” (Childs *et al.*, 2007; Healey 2007). That definition is clearly designed in and for that context. But I still wonder whether it would be too inclusive or vague for some people, and disciplines and institutions (is ‘research’ the same as ‘inquiry’? is ‘knowledge exchange’ weaker than, say, ‘knowledge change’?). So here is an alternative expressly *working* definition. Above all it invites us to work at and in the spaces between ‘principles’ and ‘policy’: what we feel ideally ought to be done and what practically can be. (Though this in its turn others may find too inclusive or vague – and are therefore invited to rewrite or replace as they see fit.)

There follows a list of *principles* that have been generated by the comparison and contrast of UK and US practice and policy in undergraduate research. It is therefore suggested that, *in principle*, programmes that seek to encourage or support undergraduate research should actively address all or most of the following. In their own terms and on their own conditions, they should:

- Expressly engage with ‘undergraduate research’, ‘community based undergraduate research’, or some such, and recast their understanding of ‘student-centred’ or ‘inquiry-’ or ‘problem-based’ . . . ‘learning’ accordingly.
- Adjust the philosophy/values of their programme so as to actively bring undergraduate students (along with others such as librarians and community activists) into the worlds of research.
- Encourage and enable students to learn in ways that parallel or reflect the ways faculty/staff themselves research/learn in their discipline/professional area.
- Build research opportunities into the formative processes and summative outcomes of course assessment for students in ways that retrace and register how faculty/staff develop and disseminate their own research/learning in their own discipline/professional area, e.g.

- through undergraduate research journals, student research conferences, exhibitions, recordings and broad/narrow casts.
- Ensure that the programme is clearly visible and recognised as ‘undergraduate research’ by the university communities (in particular students) and parents, the local community, and possible external sponsors and stakeholders.

Finally – if not first – the evidence of the impact of undergraduate research on student learning and success, staff commitment and identity Discussions with senior staff at the National Science Foundation and the Howard Hughes Institute confirmed that they now want to see hard evidence that undergraduate research works and is value for money; as for some time they have invested strongly in this area . The evidence is steadily forthcoming that it does and is; though as yet there have only been systematic studies of student learning of US undergraduate research programmes for selected students (Baxter Magolda, 1999; Seymour 2006, 2007). Whether this would also be the case in those programmes – such as hopefully Brookes and Warwick soon – that seek to have ‘mainstreamed’ undergraduate research itself remains to be researched. So does the relative impact on student learning of the various disciplinary and institutional contexts in which such undergraduate research would take place. This should arguably be central to the agenda of the research/inquiry based CETLs. An outcome of the recent Higher Education Academy funded international colloquium on Academic Inquiry <http://portal-live.solent.ac.uk/university/rtconference/rtcolloquium/home.aspx> has been the development of an international research group to develop research designs and seek funding for such investigations. In the meantime, it is for each of us individually and all of us in our various communities, to develop the research/inquiry/problem-based learning appropriate to our particular contexts and, in effect, *not* to privilege “a single approach to the integration of research, teaching and learning” (Zamorski, 2002, p. 417). That is, conversely, we need to develop flexible, plural and heterogenous approaches in these and across all these areas.

5.2 Principles into policies: strategies and tactics

In a recent address to the Association of American Colleges and Universities the following perspective was offered that opens up valuable new frameworks to view undergraduate research. Hodge et al (2007, p. 2), in part shaped by the work of Baxter Magolda, argued that :

“Unfortunately, the undergraduate research experience is often viewed too narrowly as an isolated component of the student’s education, or as suitable for only some of the most advanced students. In this paper we argue that undergraduate research should, in fact, be at the center of the undergraduate experience, that undergraduate education should adopt the “Student as Scholar” Model throughout the curriculum, where scholar is conceived in terms

of an attitude, an intellectual posture, and a frame of mind derived from the best traditions of an engaged liberal arts education. With this framework, not only each research project, but also each course, is viewed as an integrated, and integrating, part of the student experience.

Developing the Student as Scholar Model requires a fundamental shift in how we structure and imagine the whole undergraduate experience.”

Such a model of ‘student as scholar’ may be readily rewritten for ‘the undergraduate as researcher’. For that too ‘requires a fundamental shift in how we structure and imagine the whole undergraduate experience’ such that ‘not only each research project, but also each course, is viewed as an integrated, and integrating, part of the student experience’. To this the critical research- as well as skills-minded reviewer might add ‘and expertise’; while the creative research- as well as knowledge-transfer-minded reviewer might also insist upon ‘. . . and knowledge transformation’. But these are adjustments that need to be made within and between disciplines and institutions. The need for transatlantic translation is simply a further complication. For all these reasons the following suggestions are made in as simple and common – though no doubt still contentious – a way as possible:

Change the name of the game This may seem a small cosmetic point, but it can be foundational. The strength of the term *undergraduate research* is that it clearly signals it is the student who is doing the ‘research’ and potentially embraces all undergraduates (not just those in their final year). Such a shift of attention also throws up very critical questions about what can count as ‘research’ when done by undergraduates (and by staff) and what is appropriate in particular disciplines. Indeed this is particularly important in the UK where the RAE has arguably ossified or severely restricted what ‘counts’ as ‘research’ in institutional thinking and policy.

Focus on the student as an active producer of knowledge / learner / researcher / scholar. The term and the values and practice implicit and explicit in ‘undergraduate research’ shift the focus from the student as recipient of knowledge to student as learner, producer, researcher (Neary 2005). In terms of curriculum design it pushes staff to thinking how to develop students’ learning through active involvement in research. It is student-centred learning with research attitude.

Make students stakeholders in staff/faculty research One of the central conclusions of our research on undergraduate perceptions of (staff) research at Brookes was that “we were struck by how often students felt that research was something quite separate from them, an optional extra and certainly not something over which they were consulted or informed. In contemporary political parlance, they did not perceive themselves as stakeholders in that research”(Jenkins et al 1998, 170). Research in other institutions internationally has revealed similar conclusions (Jenkins 2004). Undergraduate research programmes offer students the opportunity of seeing

themselves actively entering and participating in these disciplinary/professional communities of research practice.

Offer undergraduate research as a pervasive and even early – not a localised and late – factor in the curriculum The UK dissertation has come to be something done in the final year. Undergraduate research is potentially something that can culminate in a capstone course but that can start on entry or even before entry to the university. (See the discussion of our visit to the University of Michigan at: www.warwick.ac.uk/go/reinvention/resources/)

Support – and ‘sell’ – undergraduate research for student employability If the concept of a ‘knowledge economy’ has any validity then undergraduate education for all has to include some understanding of and ability to do or use research. Calling this ‘undergraduate research’ and making explicit to students the fact that this may well aid their employability, can both help them to better appreciate the role of research in the university and support their future employability. (One way to do this is through schemes such as Warwick Skills Certificate <http://www2.warwick.ac.uk/study/undergraduate/living/skills/>)

Recognise that undergraduate research can support the involvement of all or many staff in research / advanced scholarship. If undergraduate research is for all or many students, then implicitly it should be in some way for all or many teaching and ‘support’ staff. While the focus on the RAE is in effect moving many academic staff out of the worlds of research that are important to their identity as academics, ‘undergraduate research’ offers them a ‘way back’ into research in their discipline. Certainly in the USA, for many staff outside the research elite, involving students in (their) research can be an effective way for faculty to maintain a research career, and to make more effective the links between their roles as teacher and researcher.

Challenge ‘internal firewalls’ between teaching and research One of the main conclusions of the research on departmental and institutional policies is the effective policy separation between teaching and research. (Jenkins 2004). Undergraduate research in name and in substance challenges these policy fractures or disconnections.

Challenge ‘external firewalls’ between teaching and research. We have now long operated in the UK with both policy and funding separation between teaching and research. Undergraduate research offers possibilities for challenging those firewalls and making claims on the research budgets of institutional and national systems to support undergraduate research, albeit selectively. The example of the US National Science Foundation’s support for undergraduate research (Rameley 2006) is clearly one factor prompting the UK research councils to demonstrate their interest in undergraduate research (Llyne 2006, 2007, Jenkins and Healey 2007 b). Support from the Research Councils will clearly be targeted at the most able students and those seeking research careers, but it can still make the national and institutional firewalls between teaching and research safe to pass wearing the right apparatus.

Attract support and participation as well as sponsorship, from those with many kinds of expertise and experience as well as financial funding. The evidence from the USA is that undergraduate research can attract external donors and institutional support – including community groups/businesses that need research to shape their policies and address their needs. There are also many kinds of people with highly valuable yet relatively under-recognised kinds of skill and knowledge, from bus-drivers and retailers to carers and park-keepers. These can become part of and subjects in – not just objects of – the research and learning process; they may in the process become associate students and as a result themselves become part- or full-time students.

5.3 Recommendations for course and programme designers on modular (and other) degrees

The immediate focus is the modular degree at Oxford Brookes. But these recommendations can be adapted for many kinds of modular, joint and combined programme, as well as those (like Oxford Brookes itself is tending to) that emphasise single honours and relatively linear progression.

At a meeting held 3rd April 2007, the (Oxford Brookes) University Learning and Teaching Committee minuted: The Committee resolved to endorse the principles in the proposal. The Reinvention Centre was asked to develop the ideas outlined in the paper. The Committee resolved to forward the paper to School Learning and Teaching Committees ... The Committee resolved to forward the paper to the Mode of Delivery Task Group for consideration.

The key aspects of these proposals are summarised below. (The full text can be found at www.warwick.ac.uk/go/reinvention/resources/developing_ug_research_at_brookes.pdf)

A: Audit and Celebrate! Recognise that course teams and the Modular Course implicitly, in some cases explicitly, already have key aspects of 'undergraduate research' in place, e.g. structures for independent study in many fields /programmes. One strategy for Schools is to audit /celebrate what is already in place, as has the Schools of Built Environment and Social Sciences & Law (eg the Geography (Research) Expedition Module <http://ssl.brookes.ac.uk/sslonline/resources/23/GP%20field%20guide%202006.doc>).

B: Rename Modules. Schools or fields could rename as 'Research Modules' all modules in which undergraduate research already takes place (for example Research Methods Training, Independent Study Modules, Project and Dissertation Modules). This would raise the visibility of this activity and ensure immediate embedding across the university.

C: Introduce Research Courses at Year One. The introduction of a Year One, Semester Two, basic cross-disciplinary module (in Schools or clusters of subject areas) would encourage initial engagement with research, the activities and objectives of academic staff and the disciplines they pursue, methods and scholarly devices and protocols. This module – perhaps called Academic Literacy and Practice or something similar – would encourage the development and understanding of academic skills through early immersion in the practice (research/enquiry/action) of academic activity. The crucial thing is to involve students, probably in small groups, in small-scale research activities- in year one.

D: Sustain Research Methods in Year Two. These modules (compulsory or optional) would be directly linked to a range of optional or compulsory modules that progressively build on the research skills and activities of students and allow them to engage directly in their own and/or staff research activity, either individually or in teams. For example, this might include modules such as: *Research Practice One* – which could be a taught, class/lab- based module, or feature activities based on staff research, team research, or be a more “stand alone” research activity designed and developed by staff and student(s) working together; and *Research Practice Two* – which would build on work already undertaken and could take the form of an Independent Study Module, a research-based placement, volunteering within a community (or other) research-based project or, again, an activity directly linked to staff research.

This pathway could be capped with a reconceived final-year dissertation/project. Thus

E: Refashion the Final Year Dissertation or Research Project. This could be designed to build on work undertaken in the previous modules. Such a destination for and culmination of the pathway in year three could mark a clear delineation for honours modules as proof of advanced independent learning.

F: Complement with linked Activities. The above could be complemented with a range of additional research-based activities including, for example:

- The Reinvention Undergraduate Research Scheme.
<http://www2.warwick.ac.uk/fac/soc/sociology/research/cetl/projectfunding/urssbrookes/>
- Externally Funded Projects which involve student research
- Community based independent research placements based on the experience of the FDTL 5 funded project: ‘Politics in Action – The Scholarship of Engagement’ <http://www.politicsinaction.ac.uk/>
- Community Based Research as a designated programme or pathway at field, School and/or University levels
- Undergraduate Research Days at School and University levels
- Summer Undergraduate Research Programs: perhaps linked to Service Learning and/or Volunteering
- Personal Development Planning (PDP): helping students (and staff) to explicitly recognise undergraduate development of research skills, as

does the Warwick Skills Certificate
<http://www2.warwick.ac.uk/study/undergraduate/living/skills/>

6. Further implications for institutional and national policy

“In these active learning situations, history teachers devote less class time to transmitting a synthesis of the products of historical scholarship and more to modelling the process by which historians come to make research-based knowledge claims and critically appraise the contributions of other historians to a growing body of historical knowledge. Instead of lecturing extensively, these teachers work side by side with their students in a collaborative investigation of historical problems, much as masters and apprentices in a craft.” (Roth, 2005, 3)

In looking at an overall student degree programme there are further meta-questions that need to be asked, and further implications that can be identified. The following questions are recast for the present project and purpose from Jenkins and Healey (2006):

- How do introductory courses introduce students to the complexities of knowledge in their disciplines?
- How does the overall programme develop this initial understanding; equip students with the research methodologies appropriate to their context; and provide a range of opportunities for them to investigate particular issues?
- How does the programme ensure that all or selected students have an opportunity for an extended research experience and/or a capstone course that supports their understanding of knowledge complexity in their discipline(s).

By way of response to these questions, the following implications are here recast from Jenkins and Healey (2007a). They address the issues of ‘How what counts as knowledge is organized and determined’, and they depend upon a useful distinction *and potential connection* between ‘Research Intensive’ and ‘Research Informed Institutions’. Along with the areas of overlap and interchange that they open up, these distinctions/connections, applied in principled yet flexible ways, offer far more than the current crude division between ‘Research’ and ‘Teaching only’ institutions.

Implications for ‘Research Intensive’ Institutions

Undergraduate research as here conceived and proposed entails:

- University policies for appointment, staff development and, in particular, promotion, that explicitly value those staff whose central function is supporting student learning.
- Curricula that integrate staff discipline-based research with teaching, including: recognising the particular needs of year one and two undergraduate students and bringing them into the research world of the university; and ensuring that all

undergraduate students receive opportunities to learn through research (cf. Kinkead, 2003).

- Policies and structures that enable undergraduate students to benefit directly from the research resources of the university.
- Those graduate students who are likely to go on to teach in universities, being supported in their graduate studies to become effective teachers as researchers, while also recognising that many of them will go on to teach outside research-intensive institutions.
- Research policies which ensure that the knowledge generated by staff and students is communicated and shared with the wider society.

Implications for 'Research Informed' Institutions

Undergraduate research as here conceived and proposed entails:

- All academic staff are supported in being involved in some form of advanced scholarship.
- University policies for promotion explicitly value those staff whose central function is supporting student learning.
- University research policies are in part targeted to support students' understanding and abilities as researchers and the currency of staff's knowledge in their discipline or professional area.
- If university policies support high-level research (and/or consultancy), institutional and department leaders ensure as a minimum that such research does not have an extra value that undermines the institutional focus on student learning; and the institution seeks ways to ensure the wider dissemination and involvement of staff and students in that research.
- University research and promotion policies explicitly value those staff whose research focuses on broad integrative scholarship, research that is directly engaged with the needs of society, and, in particular, scholarship that focuses on support for student learning.

Conclusion

This investigation has shown that, with due allowance for differences in 'undergraduate' experience and what counts as 'research', an understanding of US undergraduate research programmes has much to contribute to the development of similar programmes in the UK in general and at Oxford Brookes University in particular. In return, the experience at Brookes offers to feed back into and enrich other international contexts – including those of the United States. It has also been argued that this should be done so as to *mainstream* such learning for all or many students over the course of their degree and in many ways – not just a relatively few, selected students/ towards the end. The emphasis has been upon generalised principles and adaptable policies; this project therefore complements those of a more practical or discipline-based nature supported by the Reinvention Centre. For Brookes this is an opportunity to build on its pioneering adaptation of US credit schemes to UK educational values and structures. Institutionally, this will require strong central and School based leadership, and targeted funding through the Reinvention Centre and through institutional teaching *and research* strategies. Such principles can be debated and such policies adapted in educational cultures, institutions, disciplines and departments

world-wide. They have been presented so as to be readily transformable rather than merely transferable.

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http://www2.warwick.ac.uk/fac/soc/sociology/research/cetl/ugresearch/coppola_presentation.pdf May 2005

Developing an Undergraduate Research Journal; Reinvention Centre, Oxford Brookes, May 18 2006

Researching the Impact of Undergraduate Research; External Speaker Elaine Seymour, University of Colorado, Reinvention Centre, Oxford Brookes, May 18 2006
http://www2.warwick.ac.uk/fac/soc/sociology/research/cetl/ugresearch/seymour_presentation.pdf

Adapting Undergraduate Research to Brookes – Questions to Guide US Visit (Oxford Brookes) Sept 2006

Undergraduate Research at Oxford Brookes University – Models for Future Development, Oxford Brookes, February 5, 2007

Developing the Scholarship of Engagement; External speaker; Carol Colbeck: Pennsylvania State University
http://www2.warwick.ac.uk/fac/soc/sociology/research/cetl/ugresearch/coppola_presentation.pdf Oxford Brookes University, April 26th

External conference and journal organisation (as one of small team)

Institutional Strategies to Link Teaching and Research; Higher Education Academy; London November 8 2005

Research- Informed teaching ;developing action plans for TQEF Funding, Higher Education Academy, York, May 17 2006

Bringing Teaching and Research Together, London, Higher Education Academy, November 24, 2006,

http://www.heacademy.ac.uk/events/176_4752.htm

International policies and practices for academic enquiry: an international colloquium, Marwell, Winchester, UK, 19–21 April 2007 http://portal-live.solent.ac.uk/university/rtconference/rtcolloquium_home.aspx

Member of Bioscience Horizons Academic Consortium producing “Bioscience Horizons: The National Undergraduate Research Journal”. A consortium of UK Universities working with Oxford University Press to produce an on-line journal to showcase the best of UK undergraduate research. Two issues to be published in March and May 2008 as a pilot study

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<http://www.heacademy.ac.uk/rtnexus.htm>

International advisory roles on teaching / research links

University of Cork; The Irish ‘National Academy for the Integration of Teaching and Research’ (NAIRTL) based at the University of Cork.
<http://www.ucc.ie/en/SupportandAdministration/ServiceandAdministrativeOffices/QualityPromotionUnit/DocumentFile,33835,en.pdf>

Griffiths University; Australian Carrick funded project on the Teaching Research Nexus
http://www.griffith.edu.au/centre/qihe/aboutus/klk_publications/TRN.pdf

University of Gloucestershire; Leading, promoting and supporting undergraduate research in the new university sector, successful proposal to National Teaching Fellowship Project (2007)

University of South Australia; Submitted bid to the Carrick Institute; Creating the Research Imagination: Strategies for embedding research into the undergraduate curriculum through the scholarship of engagement

Consultancies

Providence College, USA
Murdoch University, Australia
Roehampton University, UK
University of Staffordshire, UK

Conferences / presentations October 2005 to December 2007

All of the workshops/presentations listed here were either explicitly on undergraduate research or were more generally concerned with teaching and disciplinary research linkages. The precise titles varied and they ranged in length generally from c. one hour to a day –but here just the country, institution and date is listed.

AUSTRALIA : University of South Australia; Divisions of Health Care ; Social Sciences; Arts and National Conference on 'Teaching and Research: making the connection in the Health Sciences'
<http://www.unisa.edu.au/health/teaching/conference2007.asp> November 5-9
Griffith University November 12; University of Queensland November 13; The Carrick Institute (Sydney) November 15; University of New South Wales November 16

IRELAND: Launch of the National Academy for the Integration of Teaching and Research (NAIRTL)
<http://www.ucc.ie/en/SupportandAdministration/ServiceandAdministrativeOffices/QualityPromotionUnit/DocumentFile.33835,en.pdf> Cork University (May 2, 2007)
Trinity College Dublin (May 28-29, 2007) University of Galway (May 30, 2007)

USA: Department of HE Studies, Pennsylvania State University (October 10, 2005); Providence College (October 19, 2005); Massachusetts Institute of Technology (October 21, 2005)
November 9-10, 2006 Presentation at The Reinvention Center: Transforming the Culture: Undergraduate Education and the Multiple Functions of the Research University, Washington DC

November 10 - 12, 2006 Presentation at The International Scholarship of Teaching and Learning Conference: Washington, DC

AUSTRALIA: Murdoch University (November 23, 2005); University of New South Wales (December 5, 2005): Sydney University (December 3, 2005).

NETHERLANDS: University of Leiden, March 1, 2007

PORTUGAL: University of Aveiro (March 14, 2006); University of Aveiro (May 11, 2007)

SWEDEN: Stockholm University (May 4, 2006); Stockholm Economics University (May 10, 2006); Stockholm School of Education (May 11, 2006)

UK: Bioscience Subject Centre Conference (York, October 25, 2005); Portsmouth University (November 3, 2005): Higher Education Academy Conference (London, November 8, 2005); Portsmouth University (March 20, 2006); Plymouth University (March 21, 2006): Nottingham Trent University (March 30, 2006): Brunel University (April 20, 2006); Pro Vice Chancellors Network, HE Academy, Nottingham (April 27 2006); School of Business,

South Bank University (May 15, 2006); Scholarship of Teaching Annual Conference (London, May 19, 2006); University of Northampton, May 25, 2006; Edge Hill June 6, 2006, Lincoln University June 29, Community Based Research, Birkbeck College July 7th, Middlesex University September 13, 2006, Lincoln University 26 September 2006, NEWI, Wrexham, October 31, 2006, Sheffield University, 22 November, Heythrop University College, London, November 24, University of the Arts, London, November 25, 2007, University College London December 13 2007, HE Academy Internal Conference, Manchester March 7, 2007; Scottish Quality Assurance Agency Annual Conference, Edinburgh, March 8-9 2007, Scottish Association for Marine Science, Oban 12 February; Bioscience Subject Centre Napier University, 14 Feb 2007; Hospitality Subject Centre, Bournemouth University March 28; Social Work and Policy Subject Centre Conference, Aston University, March 29, 2007; University of Staffordshire April 2, 2007. Southampton Solent , HE Academy R and T Colloquium, http://portal-live.solent.ac.uk/university/rtconference/rtcolloquium_home.aspx April 19-21; University of Wales Aberystwyth June 5-6; Faculty of Education University of Worcester June 7; Bolton University June 14; Middlesex University June 26; School of Education and Sports Liverpool John Moores University June 29th; Life Sciences Annual Conference 2007, Glasgow July 9; Languages , Linguistics and Area Studies Annual Conference , Southampton University July 10; University of Reading Learning and Teaching Conference 11 July; Essex University , September 20; CETL in Inquiry Based Learning , University of Manchester, October 3 <http://www.campus.manchester.ac.uk/ceeb/ceeb/events/archive/teachingresearch/>; Arts Institute at Bournemouth ; Sheffield Hallam University October 24; School of Design, Engineering and Computing Bournemouth University December 5 ; University of Wales Institute Cardiff December 6; Higher Education Wales Pro VC Learning and Teaching pre –meeting, Cardiff December 6

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APPENDIX

The Reinvention Centre for Undergraduate Research

ACADEMIC FELLOWSHIP APPLICATION

Applicant:

ALAN JENKINS

Emeritus Professor, Westminster Institute of Education, Oxford Brookes University

Fellowship Project title: The effective adaptation of USA undergraduate research schemes to the UK context.

Summary

This Fellowship is firmly grounded at Oxford Brookes but also clearly strengthens links across the two participating Universities. It also supports the Reinvention Centre's research and dissemination activities and promotes its involvement in developing national and international understanding of policy/practice interventions in teaching/research relations.

Aims and Objectives

The Reinvention Centre's intellectual origins in part stem from USA thinking – in particular the work of Ernest Boyer and the Carnegie Association's view that research and teaching should be brought together through progressing 'undergraduate research' where undergraduate students learn through research investigations often guided by the research interests of staff. A related intellectual perspective of Boyer et al is that universities need to engage with their (local) communities but in clearly scholarly ways –the 'scholarship of service engagement.' One central way this has been developed in the USA is through research partnerships with local communities –such as the University of Michigan's Arts of Citizenship Program www.artsofcitizenship.umich.edu/about/program.html

In the USA such undergraduate research /community based research is often extra –curricula and reserved for selected more 'gifted' students.

The perspective taken here is that these intellectual ideas and USA structures are potentially of considerable value to UK practice and policies – but need to be adapted to the UK context; to be firmly integrated into the mainstream curriculum ; to be available to many students and if possible to benefit all students ; and the value of this transference of USA practice to the UK to be critically appraised, investigated and researched.

Oxford Brookes as a pioneering UK institution in adapting modular credit based undergraduate courses to the UK context is ideally placed to be a leader in this area; while also drawing on the experience of other UK

institutions that have already gone in part down this road, in particular its Reinvention Centre partner, Warwick University.

This Fellowship therefore is therefore designed to:

- investigate and research USA experience of undergraduate research schemes
- investigate and research how best to adapt USA undergraduate research schemes, including those involving community based research, to the UK context;
- draw up guidelines for policy and practice in this context suitable for adoption by UK higher education institutions;
- support the development of a URSS at Brookes that is informed by a detailed and current review of USA practice so ensuring that the Scheme is well grounded and connected to effective USA and international practice and research evidence.

Outcomes and dissemination

Some firm deliverables can now be anticipated and these are listed below: others will necessarily be developed in the context of investigating the issues. Dissemination will be achieved through the deliverables and sustained through a dedicated section on the Centre website. The main findings will be embedded in the future development of the URSS at Brookes.

November 9-10, 2006 Presentation to The Reinvention Center: Transforming the Culture: Undergraduate Education and the Multiple Functions of the Research University, Washington DC

November 10 - 12, 2006 Participation in The International Scholarship of Teaching and Learning Conference on the: Washington, DC

Spring 2007: External conference presentation

February 2007: PDF Report suitable for Centre website and presentation to internal Committees at Brookes and Warwick

April 2007: Article for external refereed journal

April 2007: Article for THES

Spring/summer 2007: Provision of resources to establish “Adapting USA Undergraduate Research to the UK context” as a dedicated section on the Reinvention Centre website that could then be updated (this builds upon earlier work carried out successfully for the FDTL LINK project – see references listed below).

Spring/summer 2007: Paper for BeJLT (potentially a joint paper with another Brookes Fellow depending upon how Fellowship projects develop.)

This Fellowship project therefore reinforces the Reinvention Centre’s working principles through:

1. Encouraging and enabling the Academic Fellow to build upon his acknowledged international reputation as a leader in the field of investigating the relationships between learning, teaching and research;
2. Consolidating the links between learning, teaching and research through enhanced understanding of undergraduate research practice in the national and international context;
3. Encouraging undergraduate research activities within the curriculum through the facilitation of the development of undergraduate research in UK higher education institutions:
4. Disseminating knowledge about research-based learning across the HE sector through the project outcomes.

Timeline and milestones

Fellowship timeframe: January 2006 – July 2007

1. January – December 2006 Investigative Research Methodology: Document study, website analysis and email discussion.

- January –December 2006: Investigating US Experience; Literature survey and email discussions supplemented by visits to and interviews with key staff and selected students at key institutions who are prominent for Undergraduate Research, in particular
 - the University of Michigan re both its undergraduate research programme and the Arts in Citizenship program ;
 - Bates College, Maine and the Harvard Center for Community Partnerships (The Director there is David Scobey who founded the Michigan Arts and Citizenship Program and moved to Bates in 2005 to establish a new community based research programme)
 - The Council for Undergraduate Research (Washington DC) The Reinvention Center at Stony Brook
- September 2006 Paper for BeJLT
- November 2006: Participation and presentation at conferences in Washington
- January –October 2006: Investigating UK Experience: literature survey and initial discussions with some of the various UK institutions so far where it has been adapted. (Chester, Cambridge, Warwick and where it is now being developed including other Research /Inquiry CETLS in particular Reading University).
(Note that this activity will complement the investigation into Glasgow, Imperial College London and Warwick being undertaken by Richard Huggins as part of his Fellowship.)

2. January – July 2007 Review and evaluation: Preparation and writing of deliverables

Presentation and publication of deliverables:

- Spring 2007: External conference presentation

- February 2007: PDF Report suitable for Centre website and presentation to internal Committees at Brookes and Warwick
- April 2007: Article for external refereed journal
- April 2007: Article for THES
- Spring/summer 2007: Provision of resources to establish “Adapting USA Undergraduate Research to the UK context” as a dedicated section on the Reinvention Centre website that could then be updated (this builds upon earlier work carried out successfully for the FDTL LINK project – see references listed below)
- Spring/summer 2007: Paper for BeJLT (potentially a joint paper with another Brookes Fellow depending upon how Fellowship projects develop)