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Recontextualising work into academic practices

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Globalisation and the related changes in social and economic practices have impacted strongly on teaching and learning in higher education; 'Education is being set up as a critical element in economic well-being and competitiveness'. The particular economic practices examined here are those codified as the so-called new work order practices. However, what happens in the workplace is qualitatively different from what happens in higher education classrooms, and there are inherent difficulties in integrating the two in any productive way. Some of the responses to workplace integration into the academy are examined and I argue for the recontextualisation of work into the academy.

Keywords: Higher education; work integrated learning; new work order competencies; recontextualisation; globalisation

Globalisation, higher education and changing work

In 1994 (Gibbons, Limoges & Nowotny, 1994) and again in 2001 (Nowotny, Scott & Gibbons, 2001) coined the now familiar term 'mode 2' and 'mode 2 society' in an attempt to pin down a move from a more regulated society of separate entities, a mode 1 society, to one in which boundaries were continually being crossed and new knowledge, mode 2 knowledge, was being produced in the context of application.

> In mode 1 problems are set and solved in a context governed by the largely academic interests of a specific community. By contrast, mode 2 knowledge is carried out in the context of application. Mode 1 is disciplinary while mode 2 is transdisciplinary ... mode 1 is hierarchical and tends to preserve its form, while mode 2 is more heterarchial and transient ... mode 2 is more socially accountable and reflexive. It includes a wider, more temporary and heterogeneous set of practitioners, collaborating on a problem defined in a specific and localized context (Gibbons *et al*., 1994:3).

One aspect of an emerging mode 2 society is that of economic globalisation. The characteristics of globalisation in terms of what is new in the world towards the end of the millennium are: the easy transfer of knowledge and practices about techniques across geographical boundaries; the interdependence of financial markets, particularly within economic blocs or trading zones (such as the EU); the rise of transnational corporations (TNCS) as complexly networked units; and systems of networking between large and small businesses. In terms of labour there is a greater demand for flexible workforces which can be 'self-programmable' and hence responsive to fast knowledge influx and change (Castells, 2001). On the downside is increasing unemployement which forces many potential job seekers in developing countries into the informal economy and puts pressure on welfare states in more developed economies (Castells, 1996).

As Stromquist and Monkman (2002) and Gibbons (1998) outline, universities will have to become different sorts of places in response to globalising influences. Firstly there is an imperative to form alliances with industry in research projects so as to better serve the need of knowledge development for economic advantage. Then there are changes in undergraduate courses which begin to reflect the sorts of integrated knowledge and qualities needed in new, highly competitive workplaces (for example, the integration of personal development plans into the UK higher education curriculum and integrated programme development at the University of Cape Town, described by Moore (2003)). 'Education is being set up as a critical element in economic well-being and competitiveness' (Stromquist & Monkman, 2002).

Changes in the south African HE landscape have been complex in that changes to the education system in response to globalisation occurred at the same time as the advent of a new democratic government, with strong equity and redress imperatives. Thus the Education White Paper of 1997 directed change towards both meeting global economic and internal political ends, with mode 2 knowledge debates being influential (Kraak, 2000).

During the period 1989–1994 there was an awareness by policy makers from the ANC and the trade union movement of the impacts of globalisation on the development of South Africa. For these policy makers globalisation signalled the need for a high skills approach to economic development if South Africa was to compete in the world market. Successful economic development was also understood as the driving force to enable social development and the creation of a more equal society (Kraak, 2001; 1999). Thus outcomes -based education (OBE) and a national qualifications framework (NQF) were seen as breaking with past educational systems and as engines for both economic and social upliftment (Kraak, 2001; Allais, 2003). The advent of the National Qualifications Framework in 1995 under the SAQA Act of the same year allowed for working knowledge to become a legitimate and equivalent form of knowledge with traditional academic theory (SAQA, 2000).

The perceived need to create a more skilled workforce in response to recent globalising influences has led to the convergence of higher education and new economic needs being treated with greater urgency in the last ten years or so. Evidence of this urgency for higher education can be found in the Dearing report (1997) and the UUK (2000) in Britain, for example, and in our own New Academic Policy (2001) and Council on Higher Education (CHE) documentation (2003). For example, the Higher Education Quality Committee (CHE, 2003:19-22) has accentuated the need for programmes to be responsive to potential employers and the community, to offer opportunities for the contextualisation of work through (amongst other initiatives) project work and to have an impact on job opportunities. Higher education practices in other parts of Europe have been strongly influenced by the UK Dearing Report and the related European Network for Quality Assurance in Higher Education, and in Australia through the West Report (1998).

The characteristics of changing work: the new work order competencies

The work of Gibbons (1998) and Castells (2001) gives some pointers to what is involved in the 'new work order' competencies. For the purposes of this article it is important to attempt to pin down what these competencies actually are by reviewing and synthesising the ideas of a variety of authors currently writing in the fields of workplace learning and the characteristics of new workplaces.

I have drawn on the work of Wenger (1998) on communities of practice and the need for members to have contextual knowledge and collaborative abilities; on Schon (1991) with the idea of collaborative reshaping of knowledge between master and learner; from Harvey (2003) on current employability skills in the UK; from the International Labour Organisation's (Ashton & Sung, 2001) description of new, highly productive workplaces and the sorts of skills such workers require, and Teichler's (1998; 2000) descriptions of new workplace requirements and possible HE responses; from Boud (2001) on enhancing workplace learning in Australia; from Gee (1996) on operations of the Silicon Valley firms in the US; and reports from a leading Western Cape industry of graduate skills deficits. The following new

work order competencies were identified:

- Be able to understand the organisational culture and recontextualise knowledge brought in from outside within this organisational culture
- Collaborate with others in multi-hierarchical and multi-disciplinary groupings in order to produce new knowledge for the purpose of effecting change in the organisation
- Know one's own knowledge and ability and hence what one's alterity is; what needs to be developed to close gaps and how this may be done
- Note similarities and differences between new and previous problems in order to frame the new problems and develop novel approaches to them, through mobilising knowledge all at once, both theoretical and practical
- Influence decision making in companies through persuasive, evidence-based reports
- Create one's own database of relevant, updated information which can be easily accessed when needed.

Taken one-by-one, these are not necessarily new phenomena. For example some flattened hierarchy phenomena, such as quality circles or total quality management, have been around for many years (Ashton & Sung, 2001) but have only recently gained increased force through their co-location and symmetry with the needs of globalised capital (Gee, 1996).

Though inexact and fluid, and partially transformed through codification, there is some construct here which we could term 'new work order competencies'. Bernstein (1996:67) is critical of the identification of such competencies, which supposedly underlie successful work performance, in that they 'silence' the role of culture and context in their enactment and are really a '*jejeune* trainability'. Reading between the lines, the inability of certain classes to be professionally successful at work would then be their own fault as they have failed to master these competencies, which they cannot because they lack the cultural capital to do so. However, it may be possible through appropriate teaching towards these competencies to enable the development of this cultural capital in pre-employment learners, particularly when recontextualising and developing knowledge, and not acquiring isolated skills, is the focus. But, as we shall see, the integration of these competencies into the academic curriculum is not straightforward.

If this construct does in some way represent the new work order competencies then how are these transformed into current classroom practices? The question will be addressed firstly, theoretically, by examining the nature of work and academic knowledge and knowledge change. Secondly, it will be examined empirically by looking at examples of work issues' integration into classroom practices here and abroad, and thirdly again theoretically through the lens of 'recontextualisation' (Van Oers, 1998).

The integration of the new work order skills into the HE curriculum

Higher status academic curricula tend to high levels of literate ability, individual assessment, abstractness and unrelatedness to the world. Lower status, more vocational curricula tend to oral presentation, group work and assessment, concretisation of knowledge and relatedness to the real world (Young, 1998). As Young again (1998) points out, creating new knowledge which is useful, which is essentially what is occurring at the work/academy interface, necessarily involves incorporating the lower status version of knowledge with the higher. But there is a problem here in that the one does not easily fit in with the other and the reasons for this are best described by recourse to Bernstein's (1996) idealised distinctions between different sorts of knowledge structure.

Knowledge change

One aspect of work/academic curriculum interactions is that there is an attempt to somehow integrate knowledge from the one world into the other. There is an immediate problem here that academic and non-academic knowledge may have different modes of realisation and are governed by different rules such that the one does not easily insert into the other (Young, 1998; Hazendal, 2004:pers.comm.). In schooling there is empirical evidence to back up this claim. Whitty (1994) examined teachers' and pupils' understandings of new, integrated subject 'personal and social education' which drew in segments of real life and found they did not realise it as a subject like, for example, science or history; Lave (1988) showed that school mathematics and the mathematics of shopping and buying were not transferable as their contexts of realisation, again, were different. However, we are not only dealing with everyday knowledge versus more abstract codified knowledge in work/academic interactions. Work knowledge, such as complex procedures, may be both abstract and procedural.

The theoretical background to distinctions between different types of knowledge derives from Bernstein's work on discourses and education. Bernstein (1996; 1999) distinguishes between vertical and horizontal discourses. Vertical discourses are characterised as having distinct and broadly accepted guiding theories, being systematic in that there are interlocking concepts, specialised language and they operate in a context independent arena at a high level of abstraction (Cooper, 2003). They are furthermore highly coherent and explicit. Within vertical discourses there are also two main types, hierarchical and horizontal knowledge structures. The former is hierarchically organised as in the sciences and the latter consists of a number of parallel, competing and equivalent specialised languages, modes of enquiry and rules for the realisation of texts (Bernstein, 1999:159) as in arts and social science subjects. There is, too, a further sub-division of horizontal knowledge structures into those with weak and those with strong grammars. Horizontal structures such as linguistics and psychology would be classified as having strong grammars whereas fields such as sociology and perhaps education as having weak grammars. The difference would be that fields with strong grammars would be immediately recognisable as such whereas with weak grammars students would not be certain whether they are operating in any particular field.

Vertical discourses tend to be insulated in differing degrees from other forms of knowledge, whether everyday knowledge or other vertical discourses. There are furthermore explicit rules for the transformation of outside knowledge so that it counts as vertical discourse. What Bernstein alludes to is that there are 'rules' of transformation whether we are moving between vertical discourse types or between horizontal and vertical discourses. Horizontal discourse on the other hand is likely to be 'oral, tacit, local, specific to particular contexts, multi-layered and contradictory across but not within contexts' (Bernstein, 1999:159). Central to this discourse is its segmented nature such that what type of discourse is brought to bear depends on the ways a society divides up its activities (hence contradictory as ways of doing in one segment are seen as non-cognate with other segments).

Where horizontal discourses are mobilised within educational discourses in order to make them more accessible and real they may be so transformed so as not to be activated in students' minds as 'real' (as was previously pointed out by Whitty, 1994). Conversely, where elements of vertical subject discourse are recontextualised in everyday, horizontal knowledge systems they too may be transformed and unrecognisable, dumbed-down to mere procedures (Bernstein, 1999: 169).

Some, but by no means all, work practices may be in the form of segmented, horizontal discourses and much disciplinary knowledge may be vertical in nature. Where this is the case there is likely to be difficulty integrating the two. Even where knowledge in both contexts is of the same type, mutual insulation may again make integration difficult, or result in the one being changed into being more like the other.

Differences between work and academic knowledge are not, however, only because they may be differently structured discourses. Boud (2001) observes that issues raised at work are likely to be novel to a greater or lesser degree and one cannot, as is often possible in academic teaching, simply transfer and apply an algorithmic method or

received knowledge to implement a solution. Boud's contention is supported by research reported by Brown and Duguid (1986) on problem solving and repair amongst photocopier representatives and technicians. In their descriptions there is a complex, situated process of exchanging narratives of past experiences of problem solving which develop from incoherence to coherence as they are re-mixed in innovative ways. Furthermore, the notion of different types of knowledge in the academy and at work may also be a question of the different purposes that knowledge is put to. At work knowledge is essentially to enhance the productivity, innovativeness and skills base of the firm whereas in the academy it is concerned with the mastery of disciplines and their (possible) application in the world.

The point being raised here is that, firstly, there are differences between work and academic knowledge. Secondly, when the one is realised in the context of the other there is likely to be change in that knowledge.

Methods of information gathering and sites of work integration

Although work integration into the curriculum, e.g. through case study approaches, has been around for many years, what is new is the increasing pressure from Government and stakeholders to increase levels of responsiveness. Information was gathered by reviewing the international literature on the integration of new work order competencies, or, in the case of South Africa, identifying suitable practices through knowledge of the higher education community. In all cases except for the Satakunta polytechnic in Finland, broad questions were then posed to the academics and these were followed up with interviews and in some cases further e-mailed questions of clarification. The academics involved were mostly heads of department or in two cases researchers/lecturers who were responsible for designing and teaching on the work integrated projects. The question posed to informants in higher education institutions was 'how have you responded in your teaching and learning practices to the changes in the workplace over the last few years?'.

The higher education institutions examined were two technikons, one industrial academy and one university in South Africa, three hogeschools in Holland, one polytechnic in Finland, three universities in Britain and a representative from the UK government Teaching and Learning Support Network and one university of technology in Australia. The disciplinary areas examined were health and medicine, business studies, geography, education and engineering.

Interviews were recorded electronically or in writing and emergent patters of practice were identified. Further information was gathered from the institutions' websites and individual publications.

Five short case studies have been chosen for analysis as they highlight issues of reconciling different knowledge forms.

Human Resources management in South Africa

As future Human Resources managers first-year students need to know how to design written materials for use in the company for whom they will eventually work.

The first newsletters were created in the classroom; students (or more often staff) would make up a company and construct a newsletter accordingly. In so doing they would integrate knowledge and skills from management subjects, communications and using computers for writing and basic design. The first teaching activity was for students to collect examples of newsletters and to brainstorm different approaches to design and content. They were also taught how to lay out pages, scan photographs and use different formatting devices. Students were assessed on their ability to mimic the layout of a given newsletter. The next teaching and activity was to teach students how to design questionnaires and to conduct interviews for use in an imaginary workplace. Finally students were taught about the different structures, types and aims of organisations and were asked to construct an academic essay which reflected this knowledge, with a particular focus on their own imaginary organisation.

But lecturers were concerned that, rather than re-creating reality in the classroom, they were taking something real and making it unreal; learners were not necessarily sensing reality out there in the workplace, and this was reflected in student evaluations of their newsletter work; for example, some students felt that the lecturer was 'just finding something for them to do' or 'being creative'.

To remedy this problem the focus of the newsletter changed from an imaginary to a real organisation. Students were asked to investigate organisations in their environment, particularly smaller community organisations and NGOs, as these would be less likely to already have their own newsletters; for example, students chose sites from early learning centres, old-age homes and drug and alcohol abuse organisations. Students were then tasked with creating a newsletter which the organisation could use to promote itself by showing the community what it had to offer. Part of the evaluation of the newsletter would be whether or not the organisation it was written for would be able to use it.

The newsletter also had to be part of the teaching and learning activities and outcomes of the first year Human Resources Management course. It involved applying skills and knowledge from three subjects namely communications, management and end-user computing.

Students, working in groups, had to research these aspects of their host organisation and write this information up individually in the form of an academic essay. The final stage was for the groups to transform the essays into articles, including an editorial, in newsletter style. The prototype newsletter was then handed over to the community organisation for their comments and use.

Emergency medical services training in South Africa

Emergency medical services training is a typical 'skills'-based course offered at a higher education institution in which learners have to apply their theoretical and skills knowledge to emergency situations such as road accidents, shootings and stabbings. Although much of the work is routine, and practitioners have to follow strict medical procedures, they also have to work with diverse groupings (doctors, nurses, drivers, and press officials) and react quickly and appropriately in life threatening situations. In addition there will always be situations which are new and they have to think on their feet to respond appropriately. To meet these needs classroom practices are often hinged on real-life experiences of students on weekend emergency work, something they do with their lecturers as volunteers with the provincial ambulance services. The reflective part, which occurs alongside normal lecturing and skills training, takes the form of 'what happened; why was it done this way; and how could it be done differently or better?'

In the real situations there is little room for reflection as speed is essential so reflection occurs later in the classroom. However, simulations do provide space for learners to engage in on-the-job reflection. One example given was an all-night 'rescue' of a dummy buried in a ditch with a wall and a car on top of it. As this was an entirely new situation, learners had to devise rescue methods on the job and to reflect on what they did the following day.

However, the reflective part does not necessarily impact on subject teaching, the two occurring at separate points both outside and inside the classroom.

Engineering project work in South Africa

The engineering project was an attempt to simulate real life engineering in that students would need to work co-operatively on a work related problem. The project was to have the following characteristics:

- Cuts across discipline boundaries by including the critical cross field outcomes and sections of other subjects
- Simulates complex occupational roles. In other words it reflects the sorts of problems students would be expected to deal with in the workplace.

Examples of problems set, which varied according to the year of study, were the design of cycle racks for cars, the design of a cooling system

for a room and the design of a safe paraffin stove.

Students were expected to apply their classroom knowledge to the problems, manage themselves as a project and record their findings and approaches in a project report. Although the primary purpose was work simulation the project tended towards satisfying the needs of the individual subject lecturers so that each felt that their content needs were being met. Furthermore, real workplaces and their staff were not involved. In addition, staff complained that students were over-reliant on lecturer guidance rather than attempting to manage the projects themselves.

Although the projects set out to introduce learners to group problem identification and solving and self-management, the problems tended to be quite structured rather than open-ended and there was a strong element of subject domination.

Problem solving approaches in a South African medical school

The new work order pressures being brought to bear here are those of the need for doctors who can work in uncertain situations and deal with a wide variety of ailments and who can acquire new knowledge as old methods are rapidly replaced.

The corresponding problem in the undergraduate curriculum is that of many content- heavy courses taught by a variety of medical and scientific research specialists. The knowledge is, however, poorly related to real situations and much of it may be superfluous.

The response is to set up teams involving general practitioners and subject teachers in the design of real life medical scenarios (approximately 20 such scenarios in total in the first year) which cover many of the typical situations a graduate doctor would have to deal with. From these typical situations learning objectives are derived and these are matched to the core learning objectives of medical training and constituent subjects. The scenarios are then either extended to include the core subjects or are just augmented with more traditional teaching. The process is very cyclical in that information from the cases is continuously adjusted and fed back as they are delivered.

There are also practicals and tutorials separate from the scenarios but which may be directed towards supporting them.

As with engineering, there is a tension here between subject lecture teaching and the problem-solving scenarios and the two are not necessarily suitably integrated. The problem solving situations may happen as an add-on rather than an integral part of the curriculum.

Context studies in Britain

The British university context studies (Kneale, 2003:pers.comm) are drawn from the world of work and illustrate new work order competencies, particularly networking and creative thinking, within an environmental/geographical context. Lecturers start with the sort of work they are interested in and approach industries in their area which they think are relevant to their new work order needs. The cases are written up by academics but are returned to the business source before they are used, to ensure correctness. The focus is on conscientising and developing in students transferable, new work-order skills (work context scanning, collaborative innovation and networking) rather than preparing students for a particular workplace or making academic subjects more relevant to work. The two examples chosen here are interesting in that they are conducted within the academic classroom but sit outside of the mainstream curriculum, though they may serve to satisfy a module requirement when changed into a research essay format. Both examples involve approximately one day of focused group work from students.

The first example is that of parks ranger/education officer who investigates the needs of schools and develops innovative programmes to draw them into the activities of the park. The focus is on how the ranger uses the available resources of the park and her/his co-workers to come up with innovative ideas, so called 'intrapreneurial' [*sic*] work. Students are asked to do pre-reading on the 'theory' of intrapreneurship, then to match this to the park ranger case study presented. The theory involves the main characteristics of intrapeneurship, which are about customer focus, planning, experimenting, boundary crossing and the empowerment of cross-hierarchical groups in the business. Students are asked to compare what the park ranger did with other ideas they may have generated. Finally, students attempt to critique what they have studied, and relate it to their own social activities or part-time work, in this way extending what they have learnt to their own situations.

The second case study is clearly focused on simulating the advantages and needs of networking in green businesses. Each group of students is given the description of a different small, 'green' company, e.g. a cardboard collection or a wool industry waste scheme, and has to work out, through discussion with the other groups, the sort of co-operative projects they could do together (in this case a mixture of cardboard and wool waste produces a good fertilizing mulch). Students share their ideas, critique them and reflect on the idea of networking. As these were real initiatives and real networking occurred, students were asked to compare what they came up with in the simulation with the actual projects undertaken in the real world. Again knowledge learnt is extended to help learners complete skills sections of their CVs.

The cases are strongly boundaried from the workplace in that students are not actually running companies but are doing their work in a once-off workshop in the academy. But the boundaries are weakened as students are asked to reflect both on what actually happened and also on how they might use the skills learnt in their own workplace/social activities. There is a degree of working with uncertainty in the second case study as there are no set ways to network projects. The cases derive from the workplace but are transformed into academic workshops which draw out the new work order competencies.

Even though there is critique and reflection, it relates to extra-disciplinary activities rather than to subject knowledge.

The Finnish industrial design polytechnic example

The Finnish Polytechnic example (Miettinen, 2002) involves third-year students in an engineering department, the department of industrial design, working in partnership with a truck cab industrial firm. The idea here is to move from simulation with no consequences to involving learners in consequential, creative, exploratory work in the zone of development beyond that actually practiced by both the firm and the institution. In so doing both workplace and academic theoretical knowledge would be developed. The project derives from academic staff's dissatisfaction with both imaginary academic simulation (students tend to 'see' through this) and pure work problems which staff see as too limited as they essentially recycle workplace knowledge without much in the way of new insights.

Students are divided into four groups within the institution, each group representing the different functions of the truck cab firm (production, finance, logistics and accounting). Each group is asked to step outside the institution and do an in-depth analysis of one function of the firm. This involves limited experiential work, observations in the firm, interviews with the firm's members and reading up on the firm so that they really come to know that part of the firm. Once they really know how one of the functions of the firm works, they are asked to identify dilemmas or issues which arose.

The next step is to ask the question 'if this is what the firm is currently doing, and this is the issue that is arising, how can they extend their current practices to deal with it?' In identifying the issue and in suggesting ways in which it may be dealt with, learners are asked to mobilise what they have learnt in the institution in new and innovative ways — new because they have never seen these problems before and innovative because they have to bring their academic and work knowledge to bear all at once to the problem in order to come up with a creative solution. Much of this work involves interacting with their institutional tutors.

The solution the groups come up with are not 'pie-in-the-sky'. They are required to write these up and present them persuasively to the company; they have to say why they think the company could be-

nefit from such changes. Evidence as to whether or not their ideas are good comes from the type and level or critique from the company, as well as through examination by their tutors.

What is interesting, in terms of the new work competencies in this example, is that learners are asked to move between the context of work and the institution and back again; knowledge from the workplace is reproduced as institutional knowledge and then reproduced again in order to illuminate and explore work issues.

The boundaries of the institution are weakened in that students do their research and present their work outside of the institution. However, much of their work is about applying disciplinary knowledge and working with fellow students and multidisciplinary tutor groupings. This is not so much a simulation as a sort of consultancy, but with a strong focus on students using academic resources to augment their problem-solving skills (disciplines, tutors and fellow students). The locus of quality and control seemed to be within the academy in that this is predominantly a learning experience, albeit to do with a real situation. However, whether or not the company accepts these recommendations is a measure of quality control.

Discussion

All the case studies examined attempt to cross boundaries between the academic world of subjects and assessments and the work world of cost effectiveness, purpose and consequentiality, amongst other issues. All of them attempt to do this through making more vivid the new work-order competencies (problem recognition, cross-disciplinary group decision making and so on), expressed earlier. The following patterns can be identified.

Degree of simulation

This refers to whether or not the task set and the competencies animated in students occur in artificial settings limited to and judged in the academy, or whether they have consequences in the workplace. The latter is best represented by the Satakunta engineering case study, in which students' work was both purposeful and potentially consequential outside of the academy. The newsletter development case study was another example of this external impact of the academic. Conversely, the other case studies were fairly strongly bounded and assessed within the academy by academics. Linked to simulation is the degree of embeddedness.

Degree of embeddedness

Embeddedness points to the extent to which work knowledge is part of the mainstream subject teaching. The context materials are a good example of skills-development workshops which, at first glance, appear to be quite disembedded, occurring outside of the mainstream teaching. Similarly, the EMS case study of simulations and real work also appears to be disembedded form subject teaching. Linked to embeddedness is the concept of 'subjectification' which Boud (2001) uses to describe the manipulation of work knowledge in order to fulfil subject teaching and assessment needs. For Boud subjectification results in the loss of the reality, immediacy and novelty of many work issues; this sort of process can be seen where the fitness of a work problem in medicine or engineering is partly adjudged on the basis of the inclusion of different subjects and their components.

In all the cases cited there is an element of recontextualisation of work practice into the academic classroom. In many cases the work practices act as an axis for integration of subjects and may lead to the exposure of and practice in the sorts of employability skills required from young graduates (Harvey, 2003). This sort of horizontal recontextualisation is undoubtedly useful but at the same time falls short of enquiring into and developing both subject knowledge and work practice. It is here that the idea of vertical recontextualisation (Van Oers, 1998) may prove to be instructive.

Vertical recontextualisation

A version of subjectification is that workplace knowledge becomes increasingly decontextualised as it is represented in the curriculum; that certain essences are excluded. Bernstein's (1996) vertical knowledge structures are essentially those of decontextualised subject areas. A different approach is to see the representation of workplace in the curriculum not as decontextualisation but as 'recontextualisation', or as a series of recontextualisations (Van Oers, 1998). In this model knowledge is moved from the context of work to the context of the academy and undergoes certain changes, which recreate it in the new context in which it can be examined in new ways. Van Oers describes two axes of recontextualisation, horizontal (hr) and vertical (vr). In horizontal recontextualisation the workplace activity would be relatively unproblematically inserted into the curriculum. For example, learners may perform mathematical calculations of real situations. The workplace here serves to connect different strands of mathematics to one another in order to solve a problem, or to specify particular aspects of mathematics and exclude others. This only becomes vertical when the process opens up new avenues of thinking or new ways of doing things and becomes more generative, often applying theoretical subject knowledges in new ways to do this.

The Finnish Polytechnic's industrial design innovation and improvement project illustrates vertical recontextualisation well (Miettenen, 2002). Groups of students worked with individual firms, firstly studying what the firm does and how they do it. At this level the work is mostly horizontal in nature in that students are simply researching and identifying the structures of the organization; the organizations themselves are specifying and connecting the different strands of academic work but there is no extension or changes suggested yet. In the next stage students critically analyse the workings of the organization, and through mobilizing their subject knowledges and brainstorming in groups, attempt to extend and improve on the organisation. The improvements are then further presented and negotiated with the organisation itself.

In the British context studies, the work issue is reworked around a generic skill, for example 'networking', but there is only a limited attempt to embed the work knowledge in the subjects and there is not a conscious extension or development of knowledge. Learners are essentially directed to reproduce the new work order skills engaged in by innovative workers through the structure and wording of the case studies. On the surface it would seem that there is depth added to the workplace study, but in the absence of any substantive theoretical articulation with the problems put forward this is probably more a case of horizontal articulation. It would not, however, be too hard to move this approach towards being more vertical by analysing the context study in terms of current subject teaching and at the same time presenting the solutions to the relevant workplaces. Similarly, the newsletter example could be extended so that students analyse and critique the current curriculum, based on their at-work experiences.

Conclusions

Young (1998) discusses the need to develop the vocational sector in British education. He refers particularly to the difficulty of the positioning of vocational knowledge as being of lower status than the more disciplinary traditions and hence it is often sidelined in favour of the epistemologically more powerful traditional disciplinary cultures; vocational education is still seen as too light on subject matter.

The emerging reality of the new work order in developing countries, particularly in northern Europe goes some way to shifting the focus on vocationalism from mundane tasks and processes to cognitively complex and demanding work. New work order competencies could provide the bridge between work and the academy through raising the status of work. This reality is graphically summed up by the requirements for T-shaped graduates, first raised by industrialists at the European Science foundation (ESF, 2002) and further developed by Rip (2003). T-shaped graduates are those who have a strong disciplinary ability, as represented by the vertical stroke of the T, but are also able to use and adjust this knowledge in different scenarios with different stakeholders, as represented by the cross-bar of the T.

But the new work competencies may be sidelined in the academy and not integrated into the main curriculum. Or, if they are integrated then they may be absorbed and subjectified (Boud, 2001) such that the immediacy and complexity of real life situations is essentially lost. The alternative Boud puts forward is that they can only be developed organically in work experience. There are obvious difficulties here in that the question of the development of subject knowledge is conveniently side stepped, or at best seen as unimportant.

The holy grail of new forms of vocationalism, it would seem, would be to develop and extend both subject content and pedagogy in the academy as well as practices and knowledge in the workplace. It seems that the model developed by Van Oers (1998) of vertical and horizontal recontextualisation provides direction for more appropriate curriculum design and pedagogic practices. Through mobilising the new work order competencies in both knowledge application at work and developing subject knowledge in the academy the separation and stratification (Young, 1998) of these two knowledges may be bridged and the development of a new and productive vocationalism enhanced. A difficulty, however, which needs further exploration, is how to convince workplaces of the usefulness of engaging in recontextualisation practices with students.

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