

Meaning and rationale: placing concepts in context

David Kent and Peter Towse

Abstract

Education Business Partnerships (EBPS) present students with a wonderful opportunity for seeing concepts in a relevant contextual setting and so, although there are various interpretations of EBP activities, the focus here is on the workplace as a site for learning in the initial training of teachers. Two examples are given which have led to the development of teaching resource materials for use with secondary students, followed by a discussion of the factors which influence the establishment, successful implementation and evaluation of EBP activities. Finally, we reflect on the way we have approached such activities and on the reaction of student teachers, experienced teachers and business partners with whom we have collaborated.

Introduction

Businesses are increasingly abandoning centralized and bureaucratic operating systems, often based on the principles of mass-production, in favor of decentralized, flexible ones which enable them to respond rapidly to changing market needs. This requires not only the integration of new technologies but a flexible work force, and employers now demand significantly more of their employees than in a mass-production system, regardless of whether they are scientists, technologists, technicians, craftsmen or mere operators. In the old system, employees had a clear understanding of the demarcation of their duties and of the control/support systems to monitor and/or assist them. By contrast, demarcation is anathema to businesses operating flexible systems, and the onus is on the employees to monitor, maintain and self-regulate their work and performance. To operate successfully in this environment, employees require not only task knowledge and skills, but also personal qualities such as self-motivation, self-discipline, versatility, initiative, the capacity to solve problems, and the ability to be a team player and accept collective responsibility.

By definition, the flexible employee must exhibit a mixture of vocational and personal knowledge, skills and attributes which are acquired and devel-

oped through a number of informal as well as formal sources: home, school, vocational training and workplace. Despite the commonly held belief that one of the fundamental aims of schooling is to prepare young people for the rigors of adult life, there was a growing concern throughout British society that the educational system was failing miserably to achieve this. Critics focused on the apparent bias towards the liberal function of education at the expense of the utilitarian function. In addition, schools considered themselves aloof from the communities they were supposed to serve. These concerns were succinctly expressed by the Royal Society for the encouragement of Arts, Manufactures and Commerce (usually referred to simply as the Royal Society of Arts or RSA), one of the UK's oldest and most prestigious institutions, in its 1979 *Education for Capability Manifesto*. Highlighting what it perceived to be an increasingly artificial divide between education and training, and the cultures associated with 'knowing that' and 'knowing how' in schools and higher education, the RSA considered that education should promote the development of young people who 'can do' as well as 'know about'. In particular, the RSA was keen that the educational system should: place a considerable onus on learners to take responsibility for their learning and subsequent personal development, prepare young people to meet the challenges they would face in their personal and professional lives after leaving school, and promote the need for learners to strive for, and maintain, excellence in the acquisition and application of knowledge and skills (Stephenson, 1992, p. 1). The aim was an amalgam of subject knowledge and 'creative skills, competence to undertake and complete tasks and the ability to cope with everyday life; and (do) all these things in co-operation with others' (RSA, 1979).

The RSA's vision gained significant support from politicians and industrialists, and formed the basis for a plethora of educational and training reforms, focusing initially on the secondary school (11-18 year olds) through the introduction of vocationally-orientated programs of study which included a work-experience component. In 1988, the Education Reform Act introduced a National Curriculum for all 5-16 year old students. The National Vocational Qualifications (NVQ) and General National Vocational Qualifica-

* Centre for Studies in Science and Mathematics Education, University of Leeds, UK.
E-mail: P.J.Towse@education.leeds.ac.uk

tions (GNVQ) were competency-based and assessed courses which offered post-16 students a structured route to employment and higher education which was an alternative to the traditional, academic 'A level'. As a result of these reforms, and criticisms that higher education was failing to prepare graduates properly for employment, universities have been forced to review their *modus operandi*. In particular, the Advisory Council on Science and Technology (ACOST) confirmed what many employers had been saying for years, namely that higher education courses in science and technology were becoming less popular and that:

For many students they provide an unsatisfactory intellectual and educational experience and an inadequate preparation for future jobs. The factual content which has been added over the years has become excessive, leading to rote learning and insufficient understanding of fundamental principles (ACOST, 1991, p. 1).

It recommended that greater emphasis be placed 'on teaching strategies that enhance understanding, investigative learning and the development of originality' (ACOST, 1991, p. 20). The impetus for the reform of higher education has come from two sources: through support from professional bodies such as the Royal Society of Chemistry, the RSA's Higher Education for Capability initiative and government-funded initiatives; and by coercion through changes in the funding of higher education.

Higher education is now based on the notion of 'fitness for purpose' rather on the aspirations of the elitist few. Reform has meant the development of courses and programs of study which prepare graduates for employment rather than for academic research, leading to greater breadth and enabling students to develop competence both vocationally and personally. Changing the content of undergraduate chemistry courses has not been as difficult a task as was first thought, for a combination of institutional autonomy and research profile has significantly influenced undergraduate programs of study. According to Weil and Emmanuel (1992, p. 128), 'the common content of honors chemistry degrees in UK universities amounts to no more than 30 per cent of what is taught in any one of them'.

Reform at all levels of the educational system has been implemented by central government under the twin tenets of greater public accountability in education and market forces to improve standards

and the overall quality of provision. To further strengthen their control of education and training, the ministries traditionally responsible for education and training have been amalgamated, the accreditation of national examinations standardized, and an integrated system of pre- and post-16 examinations established. Over the years, the government has received overwhelming support for reform from what Jamieson (1985, p. 1) describes as the 'schools industry movement', a diverse group of employers, trade union and charitable organizations united in their aim of supporting schools, students, teachers and administrators, by providing access and/or physical or human resources, or more generally by providing a conduit through which to lobby local and national government.

In targeting schools, the movement has focused on three specific themes: economic awareness, the culture of the workplace, and the workplace as a site for learning. Economic awareness is concerned with such issues as the way in which the capitalist economic system operates, the relationship between capital and labor, and the interactions between business and the community. Learning about the culture of the workplace often involves some form of work experience in an attempt to prepare students for entry into the labor market, or to sensitize teachers to the needs of employers and thereby influence classroom teaching and the advice given to final year students. The aim of the workplace as a site for learning is to emphasize the relevance of what is to be learned, i.e. to place the 'content in context', in order to enhance student motivation and understanding. Relevance is one of the principal justifications for educational reform, but while textbooks provide content they generally fail to give a suitable contextual stimulus to interest and motivate the majority of students. In the past, many businesses tried to fill this gap by producing resource materials based on their industries. However, as these tended to be written by technical authors rather than by those familiar with the demands of the classroom, their value in curricular terms was limited. The current trend is towards the appointment, or at least secondment, of experienced educators to produce materials more specifically matched to the ages, abilities and needs of the students for whom the materials are intended. The term 'business' is used here to encompass not only conventional industrial or commercial enterprises but also community resources such as science museums.

What's in it for business?

The claim that businesses participate solely out of a sense of altruism would be viewed by most observers with at least a measure of skepticism, so why do they do it? Roberts (1994, p. 80) describes a 'spectrum of motivation from the sharply commercial at one end to a genuine concern for education at the other'. At the sharply commercial end, Harty describes the scene in the USA, where she claims that 'today, educators have sold out our children to the modern-day Pied Piper-Big Business' (1994, p. 91) and quotes example after example to illustrate how business corporations, pushing everything from Q-tips to jeans, have invaded the classroom and the captive audience it represents. She even cites an advertisement in *Advertising Age*.

Kids spend 40 per cent of each day in the classroom where traditional advertising can't reach them. Now, you can enter the classroom through custom-made learning materials created with your specific marketing objectives in mind.

Experience in the UK is currently less controversial. Although Roberts (1994) describes a couple of examples of business involvement purely for profit, he also quotes the example of BP (British Petroleum) whose 'primary social responsibility will continue to be towards education as we believe that the most important resources a nation possesses are the skills and knowledge of its people' (1994, p. 80). Referring to a study of business sponsorship by Bridges (1993), he maintains that 'the concept of obligation to serve the community still survives in many firms and flourishes in some' (Roberts, 1994, p. 86). This view is confirmed by, among others, Miller *et al.* (1995, p. 19), who express the aims of the business people they interviewed as:

- a better educated society, providing both a higher-quality pool of potential recruits and well-informed customers and clients,
- improved community relations, in terms of attitudes to the particular firm involved and its products, and to industry more generally, and
- staff development.

They identify the benefits to business in terms of enhanced employee capability, increased awareness of how business operates within the community, and the promotion of a scientific and technologically public. In looking to the future, a senior executive of Cortaulds adds a further dimension to the rationale (Giachardi, 1996, p. 7):

Previous generations have given us the knowledge and understanding of how to make our lives greatly better. Sadly they have given it a small proportion of the population. The key challenge for the future is to ensure that a much broader span of the population understands the benefits of science-based industry, and the excitement and interest that understanding the science behind the world around us for intrinsic intellectual satisfaction. That is the challenge that industry and education must look forward to in partnership in the future.

Education-Business Partnerships

Kent and Towse (1998) have described many of the UK partnership initiatives established since the mid-1960s which have primarily focused on the secondary/tertiary education sector. These tended to concentrate on: work experience for students and teachers; the development of management skills for teachers; and, more latterly, institutional management training for school administrators. These themes have evolved into partnership activities between the education and business communities to their mutual advantage. Constructive dialogue and an awareness that each has something to learn from the other have contributed to a reduction in long held beliefs and misconceptions. Other benefits include the development and production of resource materials aligned to the needs of the National Curriculum and national examinations, and the opportunity for teachers to inform employers of changes to the educational system, with possible implications for future recruitment. Too often what was lacking was the opportunity for teachers to develop the concept of relevance through classroom materials based on business activities in their localities.

This prompted us to initiate an EBP scheme through which our student teachers (referred to by the government as trainees) were encouraged to develop professional competence by placing 'concepts in context'. In offering them the opportunity to collaborate with businesses, our intention was neither to inculcate them or their students in the culture of the workplace (although in certain instances specific references were unavoidable, e.g. when aspects of a process are illustrated), nor to unduly promote the businesses, either overtly or covertly. Instead, our aim was to equip them with the knowledge and skills to work effectively with businesses to develop classroom resources, and to contribute to business's un-

derstanding of current educational issues and the development of community policies. Because we are training secondary teachers, our emphasis was on the production of resources at the secondary level. However, the scheme can easily be adapted to the undergraduate level and, in our own university, similar models have been used in a number of undergraduate courses, including chemistry.

Beginning in 1992, with joint funding from the Enterprise Awareness in Teacher Education (EATE) scheme and Unilever, a group of technology trainees undertook a pilot project with Elida Gibbs (now Elida Fabergé) which resulted in a range of classroom materials, including software simulations, hard copy and artifacts. Initiated by the Department of Trade and Industry, EATE was the first national program specifically aimed at promoting education-business links in initial teacher education. Changes in teacher education led to the temporary demise of this component from our one-year Post Graduate Certificate in Education (PGCE) course, although activity was briefly resumed in 1995 with funding from both the Enterprise in Higher Education (EHE) initiative and Unilever. This time participation was open to trainees from all subject areas, resulting in a variety of cross-curricular partnerships to produce a wide range of materials, some of which were designed to support teaching and learning in the classroom, while others were aimed at a more general audience. Some of these materials may be visited at <http://education.leeds.ac.uk/~edu/initial/ebpintro/intro.htm>.

The four broad aims of our EBP scheme remained unchanged throughout:

- to raise awareness of the potential of workplaces as sites for learning,
- to enhance the professional knowledge and skills of the trainees, the teachers with whom they are working in schools and colleges, and the mentors ('industrial tutors') with whom they are working in business,
- to foster lasting links between trainees, between teachers and mentors, and between schools and colleges and businesses,
- to erode the traditional barriers and cultural attitudes which hinder a greater understanding between education and industry.

For us, the development of information and communication technology (ICT) skills has always played an important role in the development of

personal and professional competence. The increasing emphasis which the UK government has placed on ICT in teaching and learning led inevitably to the specific inclusion of a wide range of cross-curricular ICT knowledge and skills in 'computers, the Internet, CD-ROM and other software, television and radio, video, cameras and other equipment' in the recently-introduced National Curriculum for initial teacher training (DfEE, 1998, p. 17). From 1999, it is mandatory for every teacher training institution to formally teach and assess these skills as part of the procedure for awarding qualified teacher status. Those engaged in our EBP scheme invariably developed a personal or professional competence far in excess of anything required by the National Curriculum.

The model

EBP activities involving our trainees have been structured in five phases. In the *executive* phase the university tutors drafted the program, arranged the trainees into groups (we favor threes or fours), and then identified, approached and visited prospective partner organizations. In the *inductive* phase, the tutors accompanied the trainees on introductory visits to the businesses to stimulate the trainees' interest and help them identify areas on which to focus. The tutors then facilitated trainee discussion of various aspects of the work with the business management and mentors. In the *elaborative* phase, the trainees drafted their ideas for developing the resource materials and presented a plan to the business management and mentors. The tutors played three roles in this and subsequent phases: as teacher, providing instruction in new techniques such as multi-media authoring; as supervisor, providing assistance in the structure and form of the resource materials; and as facilitator, providing access to various sources of information, providing resources, etc. In the *productive* phase, the trainees undertook initial in-business placements of about three days to develop a thorough understanding of the areas which would form the focus of their materials production. The materials were then developed and evaluated in collaboration with business mentors and teachers, trialled and refined in schools, and formally presented to an invited audience of industrialists, educationalists and others interested in the activity. Finally in the *evaluative* phase, the activity was closely monitored and evaluated, both formatively as the program was constantly appraised, and decisions made to ensure that goals were achieved, and summatively through diag-

nostic semi-structured interviews to ensure that lessons were learned when planning the following year's program.

It is difficult to quantify the time trainees, mentors and university tutors spent on this activity, but conservative estimates would be the equivalent of: 25 days for the trainees, 3-4 days for the mentors and about 35 days for the university tutors, depending on the number of trainees participating in the scheme.

Examples of our EBP activities

We developed a total of 29 partnerships with 18 different business organizations, involving about 100 trainees and 55 business employees. Two examples of chemical interest will, perhaps, give a flavor of our experience. Elida Fabergé is a part of Unilever involved in the production of toiletries and two educational packages have been developed in collaboration with them. The first, *Bubbles*, simply consisted of a set of hard-copy materials and slides through which 11-14 year olds could follow the various stages in the production and testing of shampoos. The second, *Shampoo*, was a set of multi-media materials which concentrated on practical activities through which 14-18 year olds could follow the three areas of: production and testing of shampoos, systems management and control, and product design. Since it would be extremely difficult for the students to prepare some of the ingredients used in the production of shampoos, the company supplied kits of samples so that the students could simulate in the school laboratory some of the stages in the industrial manufacture and compare the efficiency of their product with that of the manufactured products. The 14-16 year olds investigated some of the properties of water, including hardness of water and its removal, and the action of detergents on hard and soft waters. The 16-18 year olds were introduced to the concepts of surface activity, the theory of detergency, and the use of thin layer chromatography to separate the fluorescers in shampoo. Their experiments included the preparation of a simple detergent such as sodium alkylbenzene sulphonate, the determination of the total hardness of water using di-sodium EDTA in the presence of a buffer solution of pH 10, the removal of dirt from hair, and the effect of shampoos on the contraction of hair.

Formerly a public utility, Yorkshire Water is one of the country's leading privatized businesses charged with providing clean water to homes and businesses in the area and with the treatment of

sewage. Again, two projects have been undertaken with them, both for use with 11-14 year olds. The first, *Water Works*, a highly successful cross-curricular resource pack consisting of software, slides, and hard copy materials, won a National Council for Educational Technology multimedia award in 1994. The emphasis was on the collection, storage and treatment of water and on such important factors as design and quality control. The materials were cross-curricular in terms of subjects, linking chemistry to technology, geography, art, etc., and also in terms of such themes as economic and industrial understanding, health and safety, and environmental awareness. Among the interesting projects was one involving the design and evaluation of an automatic device to monitor the water level in the reservoir. However, it is not just the quantity but the quality of the water collected which is important, and the company has to ensure that the streams from which it extracts the water are clean. The company is experimenting with electronic systems which detect dirty water in streams and rivers, particularly after heavy storms have washed soil and peat into the rivers and turned them brown, and so another project involved the design and evaluation of a device which allows the company to divert dirty water and collect in the reservoir only water that was reasonably clear. The second, *Yorkshire Water*, was built on the foundation of the earlier one, the completed resource being an interactive computer program which enabled the students to follow the various stages in the collection, treatment and distribution of water and thoroughly tested their knowledge and understanding of the various processes involved. The product was so highly regarded by the company that they decided to use it in their purpose-built education center and in schools in preference to one professionally developed at a cost of over US\$80,000!

Benefits of EBP activities

Evidence from extensive interviews we have conducted among trainees and business mentors suggests that the aims of the scheme have been achieved and are broadly consistent with the findings of Miller *et al.* Trainees were very positive towards these activities, acknowledging short-, medium- and longer-term benefits. In the short-term, they regarded the production of the materials as their main focus, concentrating on producing a package of computer software and, usually, about 200 pages of hard copy (teachers' notes, pupils' activities and support mate-

rials). They were sensitive to the need for quality products, aware that quality will stimulate and motivate teachers and students and make them want to use the materials. Moreover, working towards second rate products when they have first rate ideas will lead to reduced levels of their own commitment and motivation. This places considerable onus on the university tutors to ensure high quality resources are available to the trainees. Medium-term, the trainees realised that the many personal and professional skills developed through the activity improved their employment prospects for, at job interviews, prospective employers repeatedly remarked on the value placed on such experience and on the confidence it engendered. These skills have much in common with those identified by the National Advisory Board (1991):

the ability to analyze complex issues, to identify the core of a problem and the means of solving it, to synthesize and integrate disparate elements to clarify values, to make effective use of numerical and other information, to work co-operatively and constructively with others, and, above all, to communicate clearly, both orally and in writing.

Longer-term, a follow-up study has revealed that many newly qualified teachers who have previously participated in the scheme have successfully used, and indeed developed, the materials generated through the scheme and a number have also initiated further partnerships of their own.

Comments from company mentors alluded to a much broader benefit than had been targeted as mentors acknowledged an improvement in their professional skills and also raised their awareness of the changes to have taken place in schools recently. Again, this is consistent with the views of Miller *et al.*

It is ironic that just as this scheme had become an established forum for developing life-long professional skills and attitudes, and had begun to attract wide support from outside our own institution, Government, through the Teacher Training Agency, should impose further changes on teacher education which leave insufficient time for us to continue the EBP scheme as part of our PGCE course. However, this need not prevent it being included in the four year Bachelor of Education program which some institutions offer.

Identifying different types of teacher, Poppleton and Riseborough (1990, p. 117) describe as extended professionals those who show a commitment to a broad range of professional roles and practices, vocationally-committed teachers whose open-ended contributions set teaching and learning in as wide a context as possible. Our experience prompts the question: What other aspect of initial teacher education could nurture a balanced concept of the world of work and the extended professionalism of Poppleton and Riseborough? ■

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