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School-based CPD Networks

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Abstract

This paper outlines Bath Spa University College's innovative school-based Continuing Professional Development programme that enables professionals and institutions to use Masters-level programmes to promote school improvement. The Flexible Content Courses accommodate a range of professional pathways and school needs: Work-based Action Enquiry models are used as a vehicle for curriculum, whole-school, cross-phase or school improvement projects. Team-based project work provides a framework for implementing whole-school policies or cross-phase projects, and also includes teachers working with teaching assistants to develop their competences to meet HLTA Standards, mentoring PGCE students or supporting NQTs. The whole thrust of the programme is to develop an institutional learning network.

Rationale and Pedagogical Design

This scheme developed out of a range of problems facing universities wishing to offer relevant professional development programmes with accreditation at Master's level. The traditional MA route for teachers was to sign up for accredited in-service modules offered as twilight evening class sessions, so as not to interfere in the school's normal working day. The assessment mode offered was usually of the academic essay/dissertation format, with university tutors marking this relative to the scheme's academic criteria targets. Both of these factors have effectively created access barriers to most teachers attempting this kind of professional development. Indeed, Bath Spa University College (BSUC) recently identified to the TTA as part of its Postgraduate Professional Development (PPD) funding application (2004), the typical pedagogical constraints and social reasons for teacher professional development access barriers:

1. These typical access issues identified by BSUC have also been documented in national research e.g. Ofsted reports, Soulsby and Swain (2003), EPPI Review, OECD (2002).
2. Feedback evidence to BSUC project management teams comes from a variety of channels which include:
 - i) evaluation returns from individual participants.
 - ii) evaluation / project reports from headteachers, school CPD co-ordinators and LEA colleagues.
 - iii) partnership working with other providers e.g. private trainer organisations such as SERCO and Head Teachers in Industry (HTI).
 - iv) Reconceptualisation of Teacher Education (RTE) project research findings.
3. Access barriers to Higher Education Institutions (HEIs) include:
 - a) Lack of flexibility of many HEI accredited CPD programmes, limited assessment methods, insufficient tutorial support for learning, all contribute to poor completions or avoidance by most teachers in the first place.
 - b) Unsociable nature of many HEI CPD opportunities, e.g. evening and weekend classes.
 - c) Other barriers include a lack of career-based recognition performance targets linked to achieving postgraduate Master's and Doctoral level awards.
 - d) Low self-esteem of many teachers towards their perceived academic and time management abilities to cope with M-Level professional development activities.
 - e) Problems of funding created by varying prioritisation for CPD across schools and LEAs and great variation of scale of funding streams across urban/inner-city and rural local government areas.
 - g) geographical isolation and small size of many schools makes CPD release practically difficult.

BSUC has recently implemented a range of innovative solutions by rethinking the instructional design and provision requirements of its entire Master's level pedagogical framework. Indeed, the Professional Master's Programme (PMP) at BSUC was introduced as a restructured former Master's programme from October 2003, in order to try to remove/reduce the above barriers for potential new teacher participants. The key reforms have included:

1. Redefining the purpose and locus of a professional development Master's degree from the university into the community of schools.
2. Developing the new PMP MA/MTeach Professional Learning awards across 16 separate career-based track titles, e.g. Professional Practice for work-based learning activity and Special Educational Needs for those engaged in inclusion issues in schools.
3. Introducing 5 new assessment modes (Coombs, Murphy & Penny, 2003) that accredit a wide range of teacher relevant professional learning tasks.
4. Offering a wide choice of both regular CPD In-service courses as well as flexible content elective modules.
5. Providing a total work-based learning Master's programme option for those teachers 'locked' into schools.
6. Continued production of professionally produced flexi-study learning aids.
7. Providing teacher participants with critical thinking scaffolds to improve the quality and recording of reflection upon practice via experiential learning.
8. Providing a better system of learning support, especially on-the-job supervision via work-based mentors, partners and verifiers of such activity. Use of professional learning contracts to link credit to performance management targets.
9. Offering access via whole-school accredited CPD projects through our new CPD consultancy model that attaches field-consultants to a specific school or cluster of schools within a defined partnership project.
10. Extensive web-based provision (intranet and VLE developments) to extend and support teachers' learning.

11. CPD Programmes arranged at times and locations to suit client schools' needs. Majority of CPD work is school based using a mixture of school training days, released time and twilight sessions.

Progress to date with implementing the new PMP has included the design and development of a range of flexible content and delivery modules offered to either individual teachers operating within a school-based context or to a school as part of a whole school improvement programme.

These flexible content and delivery modules are summarised below:

Module Title (Code)	Module Description	Delivery Type	Accreditation
Work-based action enquiry (TT380)	Action enquiry is where an educator/trainer identifies a subject of professional concern and then carries out a study on the topic that improves practice through change.	Work-based Learning. This flexibly negotiated course is designed to support education and training professionals who wish to lead development of their institution through action enquiry	Flexible enrolment throughout the year from 15 to 60 credits (in 15-credit jumps) at either H or M level. All assessment modes are available and can be flexibly negotiated by the teacher to suit local requirements. Minimum award of PG Cert in Prof. Learning requires 60 credits.
School-based CPD framework (TT500)	A formal CPD accreditation framework that allows the design of bespoke partnership projects with LEAs and/or networks of schools. BSUC has developed a range of CPD derivatives under this framework based upon regional and local emerging needs,	Work-based Learning (WBL) framework. Either an individual WBL distance learning design format for individual teacher participants or linked into an organisational CPD schedule of workshops.	As above, except for fixed derivations of TT500, e.g. the TT500M school-based mentor award registers teachers for 60 credits and requires submission of a professional learning portfolio of evidences for assessment.

	e.g. the various school-based mentor modules etc.		
Team-based Project Work for teachers and teaching assistants (TT501)	Classroom-based teamwork is investigated in the context of delivering innovative curriculum project work through using ICT tools to support core curriculum core skills areas. Classroom support assistants are recruited into pedagogical delivery arrangements in order to manage student project work teams and act as a learning support coach.	Work-based Learning (WBL) framework. Either an individual WBL distance learning design format for individual teacher participants or linked into an organisational CPD schedule of workshops. TAs can use their work-based evidences towards an HLTA portfolio and/or university Foundation Degree, e.g. ED1550.	Flexible enrolment throughout the year from 15 to 60 credits (in 15-credit jumps) at either H or M level. All assessment modes are available and can be flexibly negotiated by the teacher to suit local requirements. Minimum award of PG Cert in Prof. Learning requires 60 credits.

School-based and individual teachers' needs

As part of our reformed PMP BSUC has developed a new school-based consultancy strategy to determine school-improvement projects based upon a dual mutual needs analysis:

1. Needs analysis of the school via its school improvement or development plans.
2. Career and professional interests' needs analysis of the individual teacher.

The rationale for this new way of determining CPD projects has called for an alternative type of HEI academic staff appointment. BSUC has led the way by appointing a full-time CPD senior lecturer as a CPD Field Consultant. The CPD Field Consultant is responsible for negotiating and developing the following areas of work with schools and LEAs:

Leadership and Management programmes, including accreditation of NCSL work;

Individual School Improvement Projects with BSUC accreditation;

Larger LEA and/or Cluster School projects.

Our CPD research team identified a number of key school-based professional development questions that we have provided solutions for:

- **What do we offer?** A professional partnership and personal consultancy service including project management evaluation. We also provide unique solutions for workforce reform initiatives within your school.
- **Can you help our school to obtain new funding?** Yes, we can provide help with making new collaborative funding bids to external agencies on behalf of your school, i.e. to the DfES, TTA, EU etc. for unique projects.
- **Is it school-based?** Yes, we organise staff and speakers to run unique workshops and events, tailored to your school's educational development needs.
- **How much will it cost my school?** We offer outstanding value for money, with special whole-school CPD partnership packages to minimise costs and even waive all fees in cases where participation levels are high enough. We save on supply cover costs by negotiating workshop sessions for staff on either designated staff development days during the year and/or as late afternoon 'high tea' sessions at the end of the timetabled day on site.
- **What benefits will my staff gain?** We design and provide on-going flexible university accreditation of customised school-based CPD, in line with your school's educational action plan needs using our TTA grant money over a sustained period of time (up to 3 years and longer depending on your long term needs).
- **How will it impact on students'/pupils' learning and other school-based performance management targets?** Our CPD consultancy projects can help provide you with evidence to support school management targets such as:
 - a) Ofsted school CPD evidences *via* project portfolios and programmed school events.
 - b) IIP CPD evidences and school improvement projects through Memoranda of Understanding (MoUs) agreements with the school that schedule commitments that seek Ofsted evidences of learning impact on the school, teaching and support staff and the students/pupils.
 - c) Staff appraisal evidences, using CPD courses and/or projects designed to link into staff performance management goals.
 - d) School action plan evidences for LEAs via accredited and supported school-based improvement projects.

Examples of school-improvement consultancy projects

We have recently setup CPD school improvement projects at a large number of separate institutions. The following table shows some case study examples of this CPD initiative:

School	Project Title	Project Aims	Learning Network
Castle View	The Castle View School Improvement Project	School-improvement project achieved via a work-based action enquiry module for on-the-job accreditation. The CPD coordinator to act as a field tutor attached to the school and will negotiate, deliver, assess projects as part of PMP. The CPD field tutor to organise and evaluate a series of support workshops as part of a school-based training package.	Staff development team running individual curriculum development projects within the school improvement plan.
Moorlands Infant School	The Moorlands critical thinking project.	Planning, implementation and evaluation of a whole school project: 'Taking Flight'. Staff to attend a series of in-service sessions based on thinking skills. As a result every class to take part in a cross-curricular project. An evaluation of this initial trial project will help in planning future projects.	A staff development team engaged in a common whole-school CPD project using the TT380 action enquiry project management module.
Working with STEPS PD (UK) across 4 schools in the UK.	The TT380STEPS work-based action enquiry module	The action enquiry research projects will evaluate with the schools : <ol style="list-style-type: none"> 1. The impact of First Steps professional training in reading on teacher's classroom practice 2. Which aspects of First Steps class teachers have started to incorporate in their daily classroom practice? 3. The next stage of implementation (Sept –Dec 2004 and Jan – July 2005). 	Network research project across 4 schools working with a private educational foundation.

Individual contexts: individual needs

Four very different projects can be examined in the light of developing learning networks. Two are school-based; two bring together professionals with similar interests and needs. One of the school-based projects is in the North East of England, the other in the South East. The catchment areas draw from very different communities, and yet they share many similarities. Both are 11-16 schools; both face the challenge of transforming an aging fabric to accommodate the needs of 21st century education. In both schools the Head Teacher and senior managers are committed to a whole-school teaching and learning programme to enhance the opportunities of their students.

The other two projects are very different. One consists of teachers from a supply agency, who have been brought together to explore innovative ways in which supply teachers can on the one hand improve their status and professional image, and on the other hand engage in CPD when there is no institutional funding or framework available for teachers who are not permanent staff in a school.

The other consists of a group of teachers who are members of MirandaNet, an innovative online community of practice founded in 1992 to span national, cultural, commercial and political divides and provide an innovative and inclusive forum for professionals. Partnership with industry and Government is at the heart of the research, development and evaluation processes that underpin and support good practice. Individual learning patterns are celebrated through action research strategies and peer e-mentoring. Dissemination and publication are central to the Fellowship process. Fellows share their experience and expertise to build a professional knowledge base about the use of advanced technologies in transforming teaching and learning. Many of these Fellows are key members of their own institutions: the conjunction of Bath Spa accreditation and the MirandaNet community provides a rigorous framework within which innovation in learning and knowledge technology can be evaluated and disseminated.

Many participants express initial concern about time commitments: they work long hours outside the school day on development projects, most have family commitments and all face a daily commute at peak traffic times. Conventional part-time postgraduate study has proved extremely difficult for many of these teachers to fit in to a crowded professional and personal life. Indeed, a number have dropped

out of courses because of their workload and commitments. A flexible school-based programme is an ideal solution, because it becomes part of the professional work of individuals. Indeed, this is an integral part of the various strands of the restructuring of the teaching profession.

Examples of projects

Music, Technology & Creativity

The Head of Music at Castle View School, Sunderland, has linked his interactive whiteboard with all his music technology, so that pupils have both a visual and aural input through the lesson. When they play their own compositions the board can show the score being created, and the Wave files that is generated. Pupils are able to interact with the board as individuals, with small groups or as part of whole-class activities. The focus of the project is to assess the impact of different forms of input on the learning of music both within Castle View and, using the same resources, across other schools. This project focuses on ways of raising attainment: interim results so far show a significant improvement in GCSE grades.

Changing the expectations of under-achieving boys

Initial research into factors that motivated underachieving boys identified PE as the subject that they liked best, despite the fact that none of the boys surveyed could be considered talented in terms of sport. Such elements of the PE lesson as movement, competition, being able to talk, co-operative activities and lack of writing all contributed to the subject being one of the few these boys enjoyed at school. As part of the Work-based action enquiry the teacher developed a new framework for Geography lessons for this cohort of under-achievers. She explored the affordances of interactive whiteboards with infra-red voting technology to devise a lesson format that included competitive quizzes as starter and plenary activities, group work to produce video debates; presentations and internet resources within the scaffold offered by the IWB. Pupils provided their own materials to fit into the frame.

There was significant improvement in attainment and in affective factors: motivation levels improved enormously and disciplinary problems became non-existent. Unfortunately there was no transfer to the rest of the lessons in the boys' timetables. Whilst the group would go into the room at break, lunchtime, before and after school to work, or show their friends what they had achieved the more conventional format of the rest of the curriculum failed to engage them. Further work is being undertaken to develop inclusive strategies for other subjects.

Emotional Intelligence, the Mathematics Curriculum and Boys

This project was based on the considerable literature relating to emotional intelligence and applying it to boy' under-achievement. Strategies were developed to support an environment in which boys were encouraged to discuss mathematical problems and their possible solutions. This moved thinking away from the expectation that Mathematics was a binary subject with right or wrong answers, in which these learners would inevitably choose the wrong answer. In terms of GCSE results the scheme appeared to be highly successful. The strategy is now being applied by other members of staff to evaluate its effectiveness.

Changing and Developing Concepts in Science

The work of Ros Driver at the University of Leeds in the 1980's, and the development of the CASE programme for Science teachers formed the starting point for this project. The question of how and why pupil concepts in Science were formed, and how these translated into effective learning, was related to an investigation into the how teachers framed the development of concepts in pupils and applied it to their own teaching. This investigation ran in parallel with research by another teacher into assessment for learning in Science.

A School Learning Policy

All of the projects at Castle View School formed part of the work of the group who were developing the School Learning Policy. One key project, therefore, was the Policy. This project, by the Learning and Teaching Co-ordinator, provides the meta-narrative that frames the other studies.

Added Value at Key Stage 4: Selecting a Mathematics Syllabus

At a time when public perception of the effectiveness of schools is predicated almost entirely on the percentage of students achieving GCSE grade in the range A* to C, senior management are keen that departments choose examination syllabuses suitable for their pupils – in other words, ones that will deliver the optimal results. This longitudinal study examined the added value created by the school for all subjects across a number of cohorts, then related those to the performance of pupils and groups within the Mathematics department. On the basis of the analysis a range of GCSE examination syllabuses were examined. This project is ongoing.

Assessment for Learning

The Assessment for Learning project uses elements of DfES literature to devise assessment structures that can be used to involve pupils in the formative process,

and to provide staff with simple models they can use to optimise the effectiveness of their teaching. This project is linked with that of Changing and Developing Concepts in Science.

Transforming a School: Challenges and Outcomes

This project, undertaken by the Head of the School, is an interesting one. In many ways it can be seen as a resounding success: one third of his staff are actively involved with the implementation of the school Learning and Teaching policy; almost twenty per cent are engaged in M-level CPD work with Bath Spa University College; the school is perceived by Ofsted as 'good' and improving. Parents elect to send their children to the school. And yet. The challenges form a considerable obstacle to the completion of the work for the course: Responding to DfES and LEA demands for information; applying for funding; dealing with all of the minor crises endemic within schools all mean that the development of this project is a very piecemeal affair. The question that this experience poses is this: is successful completion of the project to be determined solely in terms of written outcomes that can be assessed, or is the project successful if it achieves its goals? And if so, how do we assess it?

What is a lesson plan? What are they for?

A team of teachers is examining the whole question of lesson plans, and whether there can be a standardised framework that can be adopted that will be effective, and reduce workload. This investigation relates the initial question to the ways in which teachers teach, and pupils learn, and how these can work together.

The Challenge of Citizenship

Citizenship is a new subject in the school curriculum. In secondary schools its introduction has created a number of problems. These range from logistical – how can you fit another subject into an already crowded timetable; to organisational – who can be deployed to teach Citizenship; to philosophical – how can the *active* ethos embodied in the Citizenship syllabus mesh with what is essentially a content-driven Key Stage 3 and Key Stage 4 curriculum? This action enquiry examines the tensions and explores some solutions.

Classrooms or Learning Spaces?

In primary schools the classroom is a key learning space for the pupil. On transfer to secondary the learning space changes. Classrooms become seen as temporary and temporal fragments of the day. Some subjects and teachers take on a peripatetic existence, moving from one teaching space to another. Teachers who are fortunate

enough to be based in one room for the majority of the timetable still have to share the space with others. The classroom has become a teaching space, rather than a learning environment. This study explores ways in which classrooms in a number of subjects in one secondary school can be rescued from this and become a learning space.

Supply Teachers, ICT and e-learning

At a time when DfES initiatives and government funding are promoting the adoption of e-learning supply teachers find themselves in an invidious position. They do not form part of a permanent staff and so they have few opportunities for CPD. In many cases there is no expectation they will need, or want to, utilise ICT and e-learning as part of their supply cover. School organisation often means that supply teachers are not provided with appropriate access to school ICT networks. All of these factors combine to reduce the effectiveness of much supply cover and to reinforce the perception of supply teachers by many pupils as 'second-class teachers'.

The Use of Online Forums for CPD

A number of teachers across a range of schools have been collaborating in MirandaNet online forums. These provide discussion boards, an e-journal, peer reviewing and mentoring, discussion boards, resources and the opportunity to work in a communal-constructivist environment. Many of the Bath Spa University College CPD projects have used these forums.

God Online

The integration of ICT with Religious Education has transformed expectations and outcomes for one Religious Education teacher in a London comprehensive school. This is the first stage of a project to provide personalised learning for pupils.

A Different Way of Being: Supply Teaching in Special Schools

The role of a supply teacher in a special school is very different from that of one in a mainstream school. Expectations on the part of staff, pupils and the supply teacher are in a constant state of flux, and the very nature of interactions and change, based on the long-, rather than short-term, means that outcomes for supply teachers are often unsatisfactory. This study explores the existential reality of supply teaching in this context.

Exploring Professional Issues: Teachers and Online Forums

At a time when the issue of workforce reorganisation in teaching is leading to changes in expectations for CPD a number of teachers are concerned that their CPD needs will be determined by the requirements of their institution. If teachers are to take control of their own professional; development then it is imperative that peer discussion and collaboration form part of it. Professional interests are not restricted to phase, subject, sector or institution. Online forums offer additional collaborative spaces for professional development, and schemes such as those implemented by BSUC provide an accreditation framework otherwise missing from traditional CPD provision. A number of studies are based on work in the online forums of the GTC, TES, Select Education as well as the e-Journal environment provided by MirandaNet.

Asking Questions: a Psycho-linguistic Guessing-Game

When a teacher asks a question many pupils struggle to guess the answer they anticipate the teacher wants to hear. Yet interactive dialogue lies at the heart of much learning. The challenge is to integrate one teacher's questions with the minds of the whole class, and to produce answers as a dialogue with as many pupils as possible. This study explores approaches and considers theories of knowledge construction in the framing of questions. Bloom's Taxonomy is seen as central to the evaluation of answers.

Impact on the curriculum and institution

In all of the schools that have committed themselves to the school-based programme the climate has been changed. Teachers discuss questions of learning and teaching from wider perspectives than their own subject focus. The emphasis on learning as a process, and the role of pupils as partners in this, has changed attitudes and expectations of many pupils. The net result is that the curriculum and the teaching has become more dynamic, and staff see the role of the school in a much more cohesive light than previously.

Many of these initiatives are in their early stages, and traditional quantitative measures – key stage levels, examination grades, league table standards, Ofsted evaluations – cannot be applied. What is apparent, though, are qualitative indicators, particularly affective ones such as pupil involvement, time spent on task, positive attitudes and engagement with the learning process, show that there have been changes.

At a time when teacher retention is an issue for many schools this innovative CPD approach has seen teachers become focused and engaged with their own professional development, and their commitment to their schools has increased.

Impact of school-based CPD upon teachers' careers

We believe that the future of most CPD programmes for teachers will be located within the school work place and linked into peer-based network learning opportunities supported by technology interfaces. Work-based accredited professional learning activities have gradually become the new form of CPD entitlement for all teachers. Currently, only the General Teaching Councils (GTC) of Scotland and Wales have secured a CPD entitlement policy for all teachers. There is no doubt that the GTC for England would also like to see a similar policy of CPD entitlement for all teachers in English schools, which is why it is currently pioneering career recognition and advanced status for well-established school teachers. The GTC England sees societal recognition of teachers in the form of various tiers and grades of a professional Fellowship GTC membership award. Evidence would relate to CPD school-based research and training, especially for work accredited and awarded by outside HEIs. The Teacher Training Agency (TTA) for its part has reviewed the CPD award-bearing funding system for postgraduate in-service training in HEIs and has launched the new Postgraduate Professional Development Programme (PPD) and invited HEI providers to its first bidding round this October 2004. The TTA funded CPD emphasis for award-bearing programmes within the new PPD will continue to support innovative providers that accredit professional learning so as to achieve:

- ☞ Impact of Learning – relative to all learners within the school community, i.e. pupils/students, teachers and learning support assistants, school leaders, governors and parents.
- ☞ Network learning – to be achieved via local or regional consortia-based partnerships, e.g. CPD programmes across a set of cluster schools.
- ☞ Meeting of the TTA priority areas – such as integration of ICT within and across the curriculum.
- ☞ Research-based CPD – the linking of relevant field literature to CPD practice, e.g. informed practice activity via the use of relevant Ofsted, DfES and other relevant educational literature sources.
- ☞ Assessment methods commensurate to the accreditation of work-based (or related) professional learning tasks – e.g. the design and evaluation of teaching resources, sharing of best practice via public domain network

learning resources, e.g. accessible CPD Websites using common Virtual Learning Environment (VLE) interfaces.

The school as a Learning Organisation

The key question to be answered by school Leaders is 'what is a good CPD school policy to adopt and develop'? We suggest that teacher quality can be enabled through positive leadership and the movement of schools' towards becoming a Learning Organisation. This suggests that school improvement can be achieved if schools' initiate professional development policies that move all staff towards becoming members of a Learning Organisation. Peter Senge and others (1994) have given Leaders' strategic rubrics, tools and ideas on how to develop appropriate *learning-led* policies that lead institutions upon the pathway toward becoming a Learning Organisation.

From these Leadership assumptions we recommend the following key policies that require CPD to be both tailored to local needs and also to work towards achieving the following learning organisation goals:

- All the staff in a school need to become 'managers' of clearly identified working 'tasks' and these need to be set against ongoing annual performance management objectives. Hence, the concept of stakeholders as 'Task managers'.
- Task Managers are considered as responsible stakeholders in charge of steering and achieving their particular performance targets, which should be agreed through mutual negotiation and common understanding.
- Task managers share problems through appropriate teamwork – i.e. networked learning communities etc., perhaps through 'Action Learning Sets' as recommended by Reg Revans (1980), who published some case study examples in his book 'Action Learning: New techniques for management'. Network Learning Groups and Communities is something also being sponsored by the National College of School Leadership (NCSL) as a means of developing best practice amongst teachers *across* institutional barriers.
- Tasks need to be identified and clarified by all managers and should define the main underpinning needs to achieve the school educational action plan. We also recommend that school leaders adopt a project management approach toward delivering school improvement CPD projects as designed within our work-based action enquiry module – TT380.

When schools can involve all stakeholders in the process of learning a significant change will have been made to societal expectations. The development of learning frameworks for all school staff – administrative, support, maintenance, learning support, staff, pupils and parents – should lead to the understanding that learning and achievement is for all, rather than the top percentage of an arbitrarily-determined group. The National Qualifications Framework exists. Our job is to make it inclusive, rather than a ladder that becomes progressively more difficult to climb.

Building the Knowledge Society via Thinking Tools

What exactly is the knowledge society? We believe that people need to be adept at creating their own knowledge by making better sense of their learning experiences. This notion leads us to suggest that individual members of society need to be educated with transferable skills mediated by thinking tools. Indeed, Harri-Augstein and Thomas (1985) describe such learning needs in terms of experiential reflection from which knowledge is creatively derived:

Individuals achieve personal learning by reflecting upon their own experience ... (but, for) ... those who do not bring this relatively simple mechanism into operation ... reinforces the barriers within them that interfere with creative understanding (p.14).

The authors of this paper maintain that we need new pedagogical 'thinking tools' to assist in this experientially derived knowledge creation process. Indeed, Jonassen (1996) suggests that we use computers as 'mindtools' to enable critical thinking in the classroom. Jonassen further proposes that any learning system or tool which supports a learner with this kind of higher-order thinking task operates as an Intelligent Tutoring System (ITS) and Coombs and Wong (2000) describe this kind of learning support as a self-coaching thinking scaffold to enable better quality student-centred learning activities. According to Jonassen, an IT-assisted thinking system operates as a "Mindtool" and he maintains that: Mindtools are a reflective use of technology. That is, using Mindtools necessarily engages learners in reflective thinking, which leads to knowledge construction" (p. 13).

Thus, we have an important pedagogical link between reflective thinking and knowledge construction via an educational technology tool operating as a 'critical thinking scaffold' (Coombs, 2000). The deeper philosophical basis and pedagogical rationale of a 'critical thinking scaffold' is linked to the concept of a knowledge

elicitation system (KES) (Coombs 1995, 2000 & 2001). The learning theory of a KES is described by 'conversational constructivism' (Coombs & Smith, 1998), which explains the pedagogy of critical thinking scaffolds (CTS). It is from this CTS pedagogy that a range of systems-thinking design templates and instructional design criteria emerge from which one can develop 'mindtools' that support the qualitative project management tasks of teachers operating as action researchers within their real-life social learning environment.

All the BSUC work-based learning CPD modules make use of CTS technology, which helps teachers to critically reflect upon their school-based project experiences. In particular, we have developed a sophisticated range of CTS tools as Word-based templates to support the work-based action research project management reflection of teachers in schools, summarised in the following table.

Critical Thinking Scaffold	Use of tool and type of support
The Spidergram.	For eliciting focus questions and connecting to associated experiences, events and ideas.
The P-S-O-R systems analysis tool	Used for eliciting project management cycles or analysing any systems thinking process.
The P-L-C or Personal Learning Contract	A project management reflective analysis tool that allows the user to reflectively analyse the three important stages of a project management event: reflective planning (before the action), on-the-job reflection (during the action), and post reflection (after completing the main project activity).
Project Management Scheduler	To identify all the different project management tasks and activities and put them into a relative set of timeline completions.

Project Management Journal	A tool that enables reflection and recording of on-the-job professional learning practice in terms of identifying and completing specific professional learning tasks as key events.
Professional Learning Task Account	To reflect and record tasks completed against an educational rationale and supporting field literature.
Developing a source reference	Allows the user to elicit key research project focus questions against literature sources being evaluated against and author abstracts.

Contd. //

AuthorMap of Project Dissertation/Report	Allows user to identify key writing themes and elaborate these against different sections of a project management report or dissertation.
ReportMap initial planner	This template helps the user to author an initial draft project management report into appropriate sections and elicits short summative abstracts from which to elaborate a final expanded version within this organised format.
Self-assessment Assignment Report of M-Level Evidences	A tabular template that encourages the participant to analyse how the two main M-Level criteria have been met cross-referenced to task evidences supplied. This self-assessment report is to be submitted as a front cover to all the other assignment materials and second page to the PMP assignment mark sheet.

Exhibits of some of these 'scaffolds' were presented at last year's IPDA conference (Coombs, Penny & Richards, 2003) and BERA (Coombs, Penny & Smith, 2003). Since then, however, we have developed numerous other scaffolds to support work-based learning. In particular, the self-assessment M-Level reporting scaffold that helps teachers to identify their M-Level evidences from their action enquiry project work and helps to verify both ownership and authorship to our external examiners.

Conclusion and Future Developments

We conclude that instigating school-based CPD learning networks that also integrate HEI accreditation requires a complete rethink of the pedagogical design framework of the Professional Development Master's degree. There is no doubt that placing the emphasis upon school-based accreditation through a work-based learning delivery mechanism is very beneficial. However, the pedagogical support and Quality Assurance mechanisms required to back this up need to be carefully considered along with new financial models and methods for placing such HE work within the community of schools. Improvements to the development of support resources via the BSUC Website are envisaged. We are, in fact, seeking to make new appointments in this new area of work, so that we have a dedicated CPD 'learning technology support' staff member, qualified as both a teacher and Website designer. This post would be capable of developing unique services such as online CTS assessment tools and other essential network learning resources, so as to improve our outreach CPD academic services and thereby directly support teachers' applied projects from within their schools.

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