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Learning how to Learn: Using the Dublin Core Metadata Element Set to Support Teachers as Researchers

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The Teaching and Learning Research Programme

Teachers need to know what they can do in their classroom practice to help pupils acquire the knowledge and skills of learning how to learn. At the same time, the transfer of knowledge among teachers and between networked schools needs to be investigated and an evidence-based model of knowledge creation and transfer in school settings needs to be developed.

The Teaching and Learning Research Project (TLRP) is a £ 23 million programme of research into teaching and learning in the United Kingdom commissioned and managed by the Economic and Social Research Council. The programme aims to "enhance the achievement of learners at all ages and stages in education, training and life-long learning; develop the capability for transforming the knowledge base relevant to learning into effective and efficient teaching and training practices; enhance the system-wide capacity for research based practice in teaching and learning [and] promote and extend multi-disciplinary and multi-sector research in teaching and learning". (Teaching and Learning Research Programme n.d.). Central to the programme's approach is a commitment to use research in support of "evidence-based teaching and learning", characterised by Macintyre and Macintyre (1999, p15) as being "concerned with the effectiveness of patterns of teaching and learning, or with 'what works'". The programme's approach is premised on a view that the improved understanding of educational practices offered by educational research leads to more informed and effective policies and practice through teacher education, the development of curriculum materials and exemplification of 'best practices'. At the same time, educational research is advanced and sustained by the presence of 'teachers as researchers' engaged in action research on their own practice (Stenhouse 1975), and many of the projects which make up the Teaching and Learning Research Programme have a commitment to involving and supporting teachers in research activity.

Learning how to Learn

'Learning how to Learn' is a project in the second phase of the Teaching and Learning Research Programme and has been running since January 2001. It involves over 40 schools, spread across 6 Local Education Authorities in the UK, in a programme of training and development as part of which they identify areas of potential development of their assessment practice. They are supported in this by an assigned 'critical friend' – a member of the project team who facilitates training and needs analysis, advises on the application of new strategies, and supports teachers who wish to undertake research in their own classrooms.

The project itself builds on previous work: in particular, the work of the Assessment Reform Group (Assessment Reform Group, 1999) and of KMOFAP (Kings-Medway-Oxfordshire Formative Assessment Project) (Black and Wiliam, 2000). These in turn draw on the work of Black and Wiliam (1998a, 1998b) whose review of research into classroom assessment informs both the 'research-based principles to guide classroom practice' of the Assessment Research Group (Assessment Reform Group, 2001) and the approach to the development of classroom practice which underlies the current project. Black and Wiliam (1998b, p. 13) argue that:

"teachers will not take up attractive-sounding ideas, albeit based on extensive research, if these are presented as general principles which leave entirely to them the task of translating them into everyday practice … what they need is a variety of living examples of implementation, by teachers with whom they can identify and from whom they can derive conviction and confidence that they can do better and see concrete examples of what doing better means in practice".

At the same time, the intention is not simply to present teachers with 'recipes' for successful practice, but rather to support them in undertaking research and development in their own classrooms and to explore theoretical insights and research evidence

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underpinning the classroom practice, extending and elaborating what Elliot (1991, p. 54) describes as 'a theory of education and teaching which is accessible to other teachers'. This is to be achieved, in part, through access to a developing online 'Knowledge Base'.

The Knowledge Base comprises a collection of resources including text (including accounts of classroom practice, transcripts and children's writing), images, audio and video content. These illustrate practice in a number of areas: 'Questioning' (concerned with effective teacher questions); 'Quality' (concerned with teachers making explicit to learners what measures of achievement they use); 'Feedback' (the nature of teacher response to learner's work); and 'Self-Assessment and Peer Assessment'. They illustrate teaching and learning in different curriculum areas with learners of different ages in a variety of classroom settings. In addition, there is a series of general pedagogical principles derived from the work of KMOFAP and Assessment Reform Group, each of which is supported by research evidence. Metadata records of relevant published and unpublished research reports are also incorporated into the Knowledge Base.

The Learning how to Learn Metadata Set

While some of the entities within the Knowledge Base are relatively easy to describe as 'learning objects' using Dublin Core (the Qualified Dublin Core Metadata set is used throughout, principally to allow the expression of the frequently rather complex patterns of authorship, editorship and other 'contributor' roles), it has proved necessary to combine it with other metadata sets and to design our own set of elements and qualifiers in order to describe fully all project resources – particularly those which describe in 'fine-grained' detail the classroom strategies and activities which we were presenting to teachers as representing exemplary practice. While substantial numbers of sites across the World Wide Web provide teachers and trainee teachers with ready-made 'lesson plans' and other classroom resources (which can, of course, be described quite adequately using Dublin Core), use of these does not in itself promote good practice in the areas with which the project was concerned.

Resources in the Knowledge Base are, therefore, described using an XML-RDF framework using a combination of elements drawn from the Qualified Dublin Core Metadata Set, the IMC's VCalendar and VCard schemes and our own 'Learning how to Learn' namespace. The decision to implement the Knowledge Base in RDF was informed by a need to express complex relationships between components and draws extensively on Kokkelinck and Schwanzl's (2001) discussion of the implementation of Qualified Dublin Core in RDF.

Where possible, we have used Dublin Core elements so that, in the event of the Knowledge Base subsequently being indexed by a Dublin Core-compliant application, basic information about the resource will be retrieved in accordance with the 'Dumb-down' principle. At the same time, the concern of the project to provide teacher-researchers with suggested classroom strategies and associated exemplars along with pointers to the 'evidence-base' informing their use made it necessary to extend the metadata set used to describe resources. After consideration of existing schemes that extend the Dublin Core such as the GEM (Gateway to Education Materials) metadata set (GEM, 2002), and IEEE Learning Object Metadata element set (IEEE, 2001), a project-specific namespace capable of describing classroom teaching strategies in 'fine grained' detail was developed. This was justified on three grounds:

Firstly, many of the strategies identified by the Assessment Reform Group and by KMOFAP and advanced by the project are designed to be integrated into teachers' existing classroom practice; some involve regular interventions each of only a few minutes' duration and others involve teachers' interactions with individual learners or small groups within the scope of normal classroom activities. We address this need by using a 'description' tag and also use the VCalendar recurrence rule grammar to describe repeated learning activities.

Secondly, we wish to present teachers with clear rationales for the implementation of new practices in assessment, wherever possible related to research evidence, and this requires greater detail than currently offered by the IEEE LOM 'Educational' or the GEM 'Pedagogy' metadata elements. A 'rationale' element is included within the namespace and is used to link exemplars to underpinning project principles.

Thirdly, the 'living examples of implementation' we present to teachers are drawn from a range of classroom contexts, and in many cases are offered as suggestions and stimuli for evaluation and possible action; the notion of 'audience' (as used by many of the educational metadata schemes including Dublin Core; Dublin Core Education Working Group, 2002) is inadequate to describe this purpose. Instead, the project namespace includes a qualified 'context' element which allows the 'origin' of the strategy to be distinguished from its 'application' – other classroom contexts, audiences or curriculum areas in which it has been, or might be, applied.

Implications and Prospects

The existence of an extended metadata vocabulary capable of describing not only learning resources but also the classroom contexts in which they may be used, the strategies underpinning them and associated research and other publications has allowed us to begin building a sophisticated Knowledge Base not

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only capable of addressing Black and Wiliam's (1998, p. 13) call for "living examples of implementation", but also of stimulating teachers to extend the scope of the resources on the basis of their own developing classroom practice. The Knowledge Base architecture will allow web pages to be constructed which offer teachers structured information about classroom activities appropriate to their particular circumstances, together with illustrations (on demand) of their practical implementation. They will be able to comment on the activities and on their experiences of their implementation and offer further illustrative material for integration into the Knowledge Base in order to extend its scope. In addition, they will be able to relate their use of classroom strategies to the broader aims of the project and to school and Local Education Authority priorities, and will be able to locate their practice in a broader theoretical context.

The 'Learning how to Learn' website, which contains further information about the development of the project namespace and its application in the Knowledge Base is located at http://www.learntolearn.ac.uk.

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