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# Opening Up the Black Box: Why We Need a PBL “TalkBank”

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**Editorial/Perspective:**

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**Opening Up the Black Box:  
Why We Need a PBL “TalkBank”**

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## ABSTRACT

**Summary.** A proposal is offered for a new initiative in medical education research, one focused on documenting the range of practices employed in different implementations of problem-based learning (PBL). A vital facet of this initiative would be the development of a shared corpus of video recordings referred to here as the "PBL TalkBank."

**Background.** Interest runs high these days in developing "evidence-based" reviews to provide guidelines for instructional practice. We lack careful documentation of the ways in which the practices of PBL vary across groups and across implementations. A necessary starting point for developing any sweeping conclusions about the efficacy of PBL as an instructional innovation, therefore, is that we begin to become more articulate about what it is that people *do* when they say they are doing PBL.

**Conclusions.** The authors propose that medical educators adopt the tradition employed in linguistics and communication studies of creating shared data corpora. The corpus in this case would consist of recordings, transcripts, and research notes documenting PBL practices in different PBL curricula.

Preliminary work has been undertaken to develop such a TalkBank and we invite the participation of other researchers.

Every educational practice must be evaluated in terms of the degree to which it succeeds in achieving specific educational objectives. The evaluation of PBL or problem-based learning is a particularly challenging task, because of the variation in PBL implementations in widely differing contexts. For all forms of educational practice, interest runs high these days in developing “evidence-based” reviews to provide guidelines for instructional practice.[1, 2] In discussing the requirements for such reviews for PBL at a recent meeting of the BEME Collaborative [3], it was asserted that:

Reviews, for example on the topic of problem-based learning, should not only address the question as to whether PBL is more or less effective than traditional approaches but should also identify those aspects of PBL that contribute to effective teaching and learning, and the contexts in which PBL has been shown to be effective and ineffective.

We think this point is very well taken, but wonder what basis reviewers would have for identifying “aspects of PBL that contribute to effective teaching and learning” and characterizing contexts within which “PBL has been shown to be effective or ineffective.” Because the detailed implementation of PBL varies so widely across contexts, it is difficult to understand how reviewers can evaluate the approach as a whole until the details of these implementations are fully disclosed. As Hak and Maguire [4] observed, the primary research literature in medical education has for the most part “neglected the issue of the *actual* activities and learning processes that mediate and moderate the relationship between [PBL] programs and their cognitive activities” (p. 769). They referred to this as the “Black Box” of PBL research.

To shine some light into this black box, we must initiate a new program of research, one that treats PBL practices as a phenomenon of study rather than as an experimentally imposed intervention. The goal of this essay, then, is to make some suggestions as to how such a program

of study could be undertaken. In particular, we will suggest a way in which recent advances in technology can help us shine light into the black box and learn more about teaching and learning in the process.

**New Tools for Studying PBL**

It is now easier than ever before to construct digital records of what takes place in the classroom. The development of low-cost video recording equipment and software for non-linear editing has made it possible for anyone with a camcorder and a personal computer to do what previously would have required the resources of a well-financed film studio. The ease by which we can now produce high-quality recordings, however, does not in and of itself ensure that we will become more articulate about the practices of learning. Merely collecting unanalyzed and untranscribed collections of mini-DV movies will not, in its self, further educational progress. Instead, we need to find ways of unlocking the information that is stored into these recordings in an effort to foster reflection and open discussion of what is to count as effective learning and teaching practices.

We need to develop a way of transcribing, coding, analyzing, and distributing samples of videotaped instructional interaction, particularly for PBL. The print-based research literature is not structured in such a way that it can readily handle video materials. Fortunately, new high-bandwidth data connections coupled with improved data compression algorithms and data exchange protocols make storing and disseminating of video materials possible through the net and through DVD. However, the institutional and professional arrangements whereby video materials could be shared and studied by a community of researchers have yet to be developed.

The second author is the Principal Investigator for a large NSF-funded project to produce what he has termed a "TalkBank." The TalkBank Project is currently working toward providing a large, public corpus of digitized video data combined with a suite of tools for transcription, annotation, and analysis. One of the crucial features of the TalkBank approach is the direct linkage of transcripts and other annotations to the original digitized audio and video record.

Using TalkBank software it is possible to double-click on a particular utterance in a transcript and directly replay the audio or video associated with that utterance.<sup>2</sup>

The basic idea of creating shared repositories of recorded material is not new. There is a long-standing tradition in linguistics and communication studies of employing shared data corpora consisting of recordings, transcripts, and research notes. Well-known examples would be the London-Lund corpus widely used in studies of language pragmatics and the Child Language Data Exchange System (CHILDES) used by developmental linguists. The availability of such shared materials has served to advance work within these fields in important ways. Unfortunately, such forms of sharing have been rare in educational research.<sup>3</sup> In order to become more articulate about how PBL is and ought to be practiced, however, it will be necessary for educational researchers to develop the kinds of data sharing frameworks that have so successfully been employed in other fields.

### **What Could We Do with a TalkBank PBL Database?**

What we currently lack in the PBL literature is a body of carefully constructed and critically evaluated descriptions of the practices employed by teachers and students in *doing* PBL. It is difficult to build a science upon a collection of gathered descriptions; however, if we have no access to the observational material upon which the descriptions were based. McDermott, Gospodinoff, and Aron [5], in describing the criterion for what they considered to be an “adequate description of concerted activities,” wrote:

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<sup>2</sup> A copy of the TalkBank proposal and a description of the software can be found at this URL:

<http://talkbank.org>.

There is a requirement, often neglected, that such a description of behavior and its contexts be presented in a way that readers can decide for themselves whether or not to believe the ethnographer's account of what it is that a particular group of people is doing at any given time. (p. 245).

Providing readers with opportunities to view the video recordings upon which a description is based is one way to satisfy this criterion.

To date, there have only been a small number of published descriptive studies of PBL [cf., 6, 7, 8]. The video segments upon which these analyses were based have been made available in a variety of ways (e.g., posting them on websites, publishing CD-ROMs). These *ad hoc* methods of publishing video material have certain attendant problems, however. Websites can be moved or shut down with no warning; CD-ROMs are produced in fixed runs and, with time, can be difficult or impossible to find. Second, there is no mechanism comparable to that found in research journals for indexing and citing parts of audio and video records. Finally, unlike print resources, digitized audio and video depend upon special technology for viewing and hearing and the protocols for encoding and decoding digital materials are in a state of constant flux.

Preserved video and audio recordings, even though recorded on "permanent media," may eventually become unreadable when the tools for decoding them become obsolete. A TalkBank PBL Database, however, could serve as an archival repository for these materials, providing a valuable service to educational researchers both today and in the future.

In addition to serving as a repository of video and audio recordings from published analyses, the TalkBank PBL Database could provide the basis for some new forms of research. For example, it would enable researchers to conduct contrastive studies of various aspects of

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<sup>3</sup> One possible exception to this observation would be the TIMSS Classroom Videotape Study and the associated database maintained by the National Center for Education Statistics.



PBL practice (e.g. How is a learning issue produced? How are hypotheses accomplished interactively?). More ambitiously, a TalkBank PBL Database could be used as the basis for a public discussion pertaining to the essential set of features that define an instructional activity as problem-based (i.e., a "standard of PBL" [8]). Finally, by making it possible for multiple researchers to analyze a common set of data, differences in methods and conceptual approaches can be brought into relief and made the object of reflection. All such forms of inquiry would contribute to the development of a sound foundation for a more 'evidence-based' approach to educational practice. It is for these reasons that we advocate the establishment of a TalkBank PBL database and solicit the support and participation of the medical education research community.

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