

## **Aspects of Problem-Based Learning: implications for library collaboration in learning & teaching**

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**Keywords:** *problem-based learning, information literacy, collaborative teaching and learning*

### **Introduction**

Problem Based Learning (PBL) is a curriculum development and delivery method encompassing, in addition to disciplinary knowledge, independent learning, and effective information retrieval, evaluation and communication as core values. In PBL active student learning is situated in facilitated, constructivist learning environments using real-world problems as conduits to the construction of new knowledge.

The principles of Information Literacy (IL) recognize the information literate person as possessing the ability to recognise when specific information is needed, the ability to locate & critically evaluate that information and the ability to communicate it effectively and ethically.

Amongst the explicit learning outcomes of both PBL and IL are the acquisition of competencies in the areas of critical reflexivity, information gathering & evaluation, communication, problem-solving and independent learning. Implicit in both is the potential for learners to acquire lifelong learning skills.

PBL & IL appear, in the main, to make easy bedfellows. It is the evidence for this mutually beneficial relationship, from the point of view of the learner, academic staff, and academic/subject librarian in HE that is examined in this paper.

### **PBL: a brief overview**

Problem-Based Learning as a pedagogical method based on active learning, cognitive constructivist theories and social constructivist principles, is a radical shift from traditional teaching methods in that learning is perceived as a cognitive rather than receptive process in which *knowledge is constructed by learners, not transmitted by teachers* (Bruer 1993, p.290).

Constructivism has its roots in the theories of Dewey, Bruner and Piaget and is based on cognitive theories which argue that learners construct their own knowledge based on their existing understanding, that social interaction is central to learning and that meaningful learning is best achieved by the application of real-world tasks.

The basic characteristics of PBL (Boud & Feletti, 1997; Barrows & Tamblyn, 1980) are:

- Student-centred learning process; students collaboratively construct their own learning goals and knowledge base
- Small-group process
- Facilitator rather than lecturer
- Problems are set as a starting-point for learning and used as a tool for learners to build upon shared prior knowledge

PBL learning goals for students are described by Hmelo-Silver (2004) as helping students to:

- Construct an extensive & flexible knowledge base
- Develop effective problem-solving skills
- Develop self-directed lifelong-learning skills
- Become effective collaborators
- Become intrinsically motivated to learn

### **The UK Higher Education Setting**

The shift from the traditional 'transmission' teaching methods to learner-focused programmes such as PBL has, in part, developed as a reaction to calls for the reform of the higher education curriculum in the UK. (Savin-Baden, 2000, p.21). Traditional methods of education were criticized, from within and outside of education, for producing graduates whose education was not equipping them with the competencies necessary for the problem-solving, flexibility, critical thinking, teamwork and lifelong learning skills necessary to their working futures.

Moves from ideologies of academic competence to those of operational competence and the strengthening of links with industry in the UK can be traced from the Robbins Report (1963) which emphasized the importance of links between higher education and the labour market. The Dearing Report (1997) called for the development of the 'key skills' in order to prepare students for lifelong learning and employment. From the student point of view, the Report (Chapter 2) showed that two of the most important reasons for entering higher education were work-related.

Discussion around the primacy of an operational curriculum over a traditional liberal education curriculum, the problems around the notion of education as a market (Gibbs, 2001) and the questions around the area of skills and skill-transferability continue (Hyland & Johnson, 1998) but Savin-Baden (2000, p.5) argues that PBL can offer an amalgam of both operational and liberal education curricula.

Arguably one of the most significant reasons to implement a student-centred approach to learning is the changed nature of the student body. In the wake of widening participation policies, the problem of first year undergraduate student non-completion began to cause concern, in particular at London Metropolitan University. The University was formed in 2002 by a merger of two universities, London Guildhall University & the University of North London. In 2005 Aston & Bekhradnia investigated the differing non-completion rates at the two constituent institutions. The investigation noted the comparatively high non-completion rates of students at UNL and concluded that one of the main differences between that institution and LGU was the intake of a higher proportion of student without formal qualifications.

Though the study did not consider pedagogic issues, a reasonable implication to be drawn from the findings is that students may not have been offered the right learning support at the right time. Tinto (2002) suggests that a strong institutional commitment to academic and social support helps students to persist and graduate. Student involvement in learning with others is also highlighted by Tinto as a key to retention and he indicates some US initiatives in this area show that collaborative learning methods, such as PBL, are one of the key elements in student retention.

## **Student Learning**

Changes in the world of work, mainly attributed to the rapid evolution of technology, means that today's student needs learn how to learn. The constructivist learning principles underpinning PBL mean that learners construct their own knowledge, building on their existing knowledge, and a cognitive conflict (the problem) is the stimulus for learning. Metacognitive skills developed in this process are important for the acquisition of self-directed, lifelong learning skills (Hmelo-Silver, 2004) as well as key to students' evaluation of their own learning.

Student motivation has a central role in effective learning and successful PBL programmes foster intrinsic motivation when the problem posed is of interest and moderately challenging to the learner. PBL has been defined as *the learning that results from working towards the understanding or resolution of a problem* (Barrows & Tamblyn, 1980). The student is an active participant in the learning process, driving their own learning by enquiry and working collaboratively with their peers towards understanding and solving set real-world problems independent of the context of lectures and seminars. The learner is aided in this process by the contribution of a facilitator, who may or may not be a subject specialist.

The success of PBL as a curriculum development is still debated (Kirschner et al 2006) and even the success of PBL in its European heartland, Maastricht University, has come under scrutiny (Moust, 2005), though problems reported relate to bad practices developed over time rather than to fundamental flaws in the concept of PBL. In the main, however, PBL, properly implemented and supported, is widely considered to be a very successful learning method, particularly for 'non-traditional', undergraduate students.

But how do students feel about student-centred learning and collaborative learning programmes? Some studies suggest that there is some resistance to this approach (Peeke, 1993; Newman, 2004). Students have been shown to feel unenthusiastic about PBL in the early stages, due to fear that they were not achieving an adequate disciplinary knowledge base (Poskiparta et al, 2003). However, in the case of Poskiparta's nursing student group, this problem was mitigated by advance instruction on the methods of PBL and by learners growing familiarity with PBL sessions.

Group processes are also a challenge for many students and not only in PBL environments. Hodgkinson (2003), describing a PBL project initiative in a 2<sup>nd</sup> year Sociology course, identifies group work as the most problematic area during the project. Hodgkinson associates problems with attendance, in part due to the necessity for additional sessions, as one of the main challenges to the success of the group-work process though this is perhaps related to the students outside commitments rather than an aversion to the PBL learning approach.

### **Information Literacy and the Role of the Academic Librarian**

IL has gone beyond the library environment to be taken up by UNESCO (2005), in its Prague Declaration and Alexandria Proclamation, in which information literacy is stated to be a basic human right in a digital world. A Google search shows that Information Literacy now features in the Mission Statements of many Universities around the world.

One of the main challenges for academic librarians, as evinced in the disciplinary literature, has been the difficulty in spreading the IL message to their teaching colleagues. In an exploratory study into the attitudes of faculty to information literacy development McGuinness (2006) reports that IL has not yet become a priority for academic staff. However a more recent report by Streatfield & Markless (2008) shows that this situation is changing, arguably due to librarians re-conceptualizing IL as pedagogic practice.

This shift to re-imagining IL practice within pedagogical frameworks (Jacobs, 2008) is accompanied by a growing call for academic librarians to acquire teaching qualifications and this is reflected in current job specifications for academic librarians

in the UK. Arguably, this move will better position academic librarians to imagine themselves and to be imagined by their academic colleagues and students, as full members of the academic communities of practice within which they operate.

The successful transition of the academic library enterprise from being mainly a resource repository to collaboration in the pedagogical mission is best understood in light of traditional elements of library philosophy; an attitude and culture of collaboration, an interdisciplinary perspective, established institutional partnerships and agendas intended to reach across all disciplines. Learning-centred teaching methods lend themselves well to the strengths of academic librarians, who are well-placed to take a strong role in aiding higher education institutions in the adoption of student-centred curricula.

Academic staff involved in PBL and other active-learning programmes are best placed to understand the role of IL competencies in fostering students' metacognitive skills. The formation of effective partnerships between faculty and academic librarians has been identified as essential to the successful teaching of IL (Bruce, 2001; Bundy, 2003).

#### *Embedding Information Literacy Teaching*

Studies show that IL competency is best developed when embedded within a discipline-specific learning environment though not all models of embedment are successful:

*“...the abstract nature of information literacy means that, although it can be taught in isolation, it is only really successful when it is integrated into a realistic inquiry / problem / project based task...”* (Bowler & Street, 2008)

Successful embedding of IL teaching is dependent on institutional commitment at policy level as well as at the learning and teaching coalface. Students become information literate by being exposed to

*“...repeated opportunities for seeking, evaluating, managing and applying information gathered from multiple sources and obtained from discipline specific research methods...”* (Bundy, 2004).

These opportunities are not to be found in *ad hoc*, stand-alone IL sessions but are best offered in embedded learning environments.

### **Academic Librarian Collaboration in PBL**

In many PBL programmes group facilitators are not required to be subject experts. In this context the subject librarian has many of the qualities and skills required of a facilitator: they have an in-depth knowledge of the resources available learners, they have experience of group-work, and their professional education and daily practice with learners contain a strong element of problem elicitation and problem-solving.

Academic Librarians have been involved in PBL since the outset, in various capacities. Subject Librarians at University College Dublin have been involved in facilitating PBL sessions in various disciplinary areas for several years. The benefits and challenges to the learners, faculty and the library are described by Dodd (2007) whose involvement included the process of setting problems as well as that of group facilitator. The role of facilitator proved beneficial in that it served to integrate the librarian's role into the academic community and highlighted the services the library has to offer. The benefit to the students is that involvement enables the librarian to better understand their needs and adjust IL instruction to suit these. Amongst the benefits to faculty are that often scarce human resources are augmented by professional library staff as well as the opportunity to become more familiar with library learning resources. This reciprocity balances and aids the library requests for IL teaching time in already crowded curricula.

The generic facilitator role in PBL is to guide the students through the enquiry and decision-making process, facilitate a climate of open learning, question learners assumptions in order to generate new learning and, often, to assess learning. The subject librarian on a PBL programme is well fitted to aid in the assessment of the skills elements of the programme as many are already assessing the same skills in IL programmes (Brown & Krumholz, 2002; Breivik & McDermand, 2004) and a number are already collaborating in the assessment design for PBL programmes (Dodd, 2007; Miller, 2001).

### *Communities of Practice / Learning Communities*

*“Communities of practice are formed by people who engage in a process of collective learning in a shared domain of human endeavour” (Wenger, 2007)*

Weber (2000) and Krete & Towns (1997) report that membership of collaborative learning communities produces higher-achieving learners, with a more positive attitude to their subject and improves their interpersonal skills and supportiveness towards their peers. Additionally, collaboration improves retention, develops deeper understanding of concepts and connections, and creates a supportive learning environment.

In higher education the library and its staff are a central component of the wider institutional learning community. Consequently the academic librarian should be a significant element of the disciplinary community within which they operate. This is best achieved when the academic librarian takes an active part in the learning and teaching enterprise of that community and is in the best interests of all stakeholders in the community. Transfer of the librarian's specific knowledge can occur more easily when positioned within the collaborative learning community as a constructivist collective practice (Lloyd, 2005)

A critical area for further investigation identified during the course of this investigation, which space constraints prevent reporting on in this paper, is the rapidly developing area of blended/online learning.

## Conclusion

Collaborative, active learning programmes, such as problem-based learning, have been shown to benefit learners, teachers and, in consequence, the wider society. The need for information literate graduates equipped to take a constructive role in society and the labour market has been promoted worldwide by leaders in all areas of society. PBL and IL have been shown to have complementary characteristics which benefit all stakeholders.

Effective teaching & learning policies and practices, including information literacy policy and practice, require commitment on an institutional and departmental level and the current situation in the UK, where much support for these is mere rhetoric, is selling students short. Widening participation requires widening pedagogical values and initiating effective learning and teaching strategies, though not a cheap option in human and capital investment in the short term, has been shown to pay for itself in student retention and success in the longer term. PBL offers challenges and opportunities for all stakeholders in HE and, on the evidence of the library and information science literature, the library is ready and eager to play its part.

## References

- Aston, L. & Bekhradnia, B. (2005) Non-Completion at the University of North London and London Guildhall University: a case study [Online]  
<http://www.hepi.ac.uk/files/15RetentionatLondonMetropolitanUniversity-V2.pdf> (Accessed 23/03/10)
- Barrows, H. S., Tamblyn, R. H. (1980). *PBL: An approach to medical education*. New York: Springer
- Boud, D, & Feletti, G. (1997) *The Challenge of Problem-Based Learning*, London. Kogan Page
- Breivik, P. S. McDermid, R. (2004). Campus partnerships building on success. *College and Research Libraries News*, 64(4), pp. 210-215.
- Brown, C. Krumholz, L. R. (2002). Integrating information literacy into the science curriculum, *College and Research Libraries*, 63(2), pp. 111-123.
- Bruce, C. (2001) Faculty-librarian partnerships in Australian higher education: critical dimensions, *Reference Services Review*, 29(2), pp. 106-115.

Bruer, J. T. (1993) *Schools for Thought: a science for learning in the classroom*. Cambridge, Mass: MIT Press.

Bundy, A. (2003) A window of opportunity: libraries in higher education, *Library Management*, 24(8/9), pp. 393-400.

Bundy, A. (ed.) (2004) "Australian and New Zealand Information Literacy Framework: Principles, Standards and Practice," 2nd edition. Adelaide: Australian and New Zealand Institute for Information Literacy.

Bowler, M. Street, K. (2008) Investigating the efficacy of embedment: experiments in information literacy integration, *Reference Services Review*, 36(4), pp. 438-449.

Committee on Higher Education. 1963. *Robbins Report*. London: HMSO.

Dearing, R., (1996) Report of the National Committee of Inquiry into Higher Education. London: DfEE Publications Centre.

[Online] <http://www.leeds.ac.uk/educol/ncihe/> (Accessed 21/02/10)

Gibbs, P (2001) Higher Education as a Market: a problem or solution?, *Studies in Higher Education*, 26(1), pp. 85-94.

Dodd, I. (2007) The future of librarianship: moving out of the library and into the faculty, *SCONUL Focus*, 41 Summer/Autumn, pp. 4-8.

Hmelo-Silver (2004) Problem-based learning: what and how do students learn? *Education Psychology Review*, 16(3), pp. 235-266.

Hodgkinson, P (2003) Problem-Based Learning in the Sociology Curriculum. C-SAP.

[Online] [http://www.c-sap.bham.ac.uk/resources/project\\_reports/findings/ShowFinding.asp?id=62](http://www.c-sap.bham.ac.uk/resources/project_reports/findings/ShowFinding.asp?id=62) (Accessed 15/01/2010)

Hyland, T. Johnson, S. (1998) Of cabbages & key skills: exploding the mythology of core transferable skills in post-school education, *Journal of Further & Higher Education*, 22(2) pp. 163-172.

Jacobs, H. (2008) Perspectives on Information Literacy & pedagogic practice, *The Journal of Academic Librarianship*, 34(3), pp. 256-262.

Kirschner, P. A. et al (2006) Why minimal guidance during instruction does not work: an analysis of constructivist, discovery, problem-based, experiential and inquiry-based teaching, *Educational Psychologist*, 41(2), pp. 75-86

- Krete, K., and Towns, M. H. 1997. Student Perspectives of Cooperative Learning Activities. Paper presented at the annual meeting of the National Association for Research in Science Teaching, Oak Brook, ILinois, March 1997. ERIC, ED406241. [Online]  
[http://www.eric.ed.gov/ERICWebPortal/custom/portlets/recordDetails/detailmini.jsp?\\_nfpb=true&\\_ERICExtSearch\\_SearchValue\\_0=ED406241&ERICExtSearch\\_SearchType\\_0=no&accno=ED406241](http://www.eric.ed.gov/ERICWebPortal/custom/portlets/recordDetails/detailmini.jsp?_nfpb=true&_ERICExtSearch_SearchValue_0=ED406241&ERICExtSearch_SearchType_0=no&accno=ED406241) (Accessed 02/04/10)
- Lloyd, A. (2005) No man (or woman) is an island: information literacy, affordances and communities of practice, *The Australian Library Journal*, August, pp. 230-237.
- McGuninness, C. (2006) What faculty think – exploring the Barriers to Information Literacy development in undergraduate education, *Journal of Academic Librarianship*, 32(6), pp. 573-582.
- Miller, J. M. (2001) A framework for multiple roles of librarians in Problem-Based learning, *Medical Reference Services Quarterly*, (20) 3, pp. 23-30
- Moust, J.H.C. et al (2005) Signs of erosion: reflections on three decades of problem-based learning at Maastricht University, *Higher Education*, 50 (4), pp. 665-683.
- Newman, M. (2004) The effectiveness of problem-based learning 2; a randomised experiment in continuing nurse education, Research Briefing, TLRP. [Online]  
[http://www.tlrp.org/pub/documents/no9\\_newman.pdf](http://www.tlrp.org/pub/documents/no9_newman.pdf) (Accessed 20/03/10)
- Peeke, (1993) Issues and problems in implementing student centred learning with adults, *Journal of Teaching Development*, 2, pp. 46-52
- Poskiparta, M. et al (2003) Students' and teachers' experiences of a problem-based learning method in health promotion in a Finnish polytechnic, *Health Education Journal*, 62(1), pp. 73-88.
- Savin-Baden, M. (2000) *Problem-based Learning in Higher Education: Untold Stories*. Buckingham: OUP
- Streatfield, D. Markless, S. (2008) Evaluating the impact of information literacy in higher education: progress and prospects, *Libri*, 58, pp. 102-109
- Tinto, V. (2002) Promoting student retention: lessons learned from the United States, 11th Annual Conference of the European Access Network, Prato, Italy. June 19, 2002. Groundshift.
- UNESCO and National Forum on Information Literacy (2005). *The Alexandria Proclamation on Information Literacy and Lifelong Learning* [Online]:  
<http://www.ifla.org/III/wsis/BeaconInfSoc.html>  
[http://portal.unesco.org/ci/en/ev.php-URL\\_ID=19636&URL\\_DO=DO\\_TOPIC&URL\\_SECTION=201.html](http://portal.unesco.org/ci/en/ev.php-URL_ID=19636&URL_DO=DO_TOPIC&URL_SECTION=201.html)  
 (Accessed 03/02/10)

Weber, J. 2000. Learning communities in higher education: A field observation case study. Doctoral Dissertation. Widener University. ERIC, ED459882 [Online] [http://www.eric.ed.gov/ERICWebPortal/custom/portlets/recordDetails/detailmini.jsp?\\_nfpb=true&\\_ERICExtSearch\\_SearchValue\\_0=ED459882&ERICExtSearch\\_SearchType\\_0=no&accno=ED459882](http://www.eric.ed.gov/ERICWebPortal/custom/portlets/recordDetails/detailmini.jsp?_nfpb=true&_ERICExtSearch_SearchValue_0=ED459882&ERICExtSearch_SearchType_0=no&accno=ED459882) (Accessed 02/04/10)

Wenger, Etienne (c 2007) 'Communities of practice. A brief introduction'. *Communities of practice*. [Online] [<http://www.ewenger.com/theory/>] (Accessed 21/01/10).

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