References

Alexander, J. O. (1999). Collaborative design, constructivist learning, information technology immersion, & electronic communities: A case study. *Interpersonal Computing and Technology: An Electronic Journal for the 21st Century, 7*(1&2) Retrieved from http://www.emoderators.com/ipct-j/1999/n1-2/alexander.html

Barnard, A., R. Nash, and M. O'Brien. 2005. Information literacy: Developing lifelong skills through nursing education. *Journal of Nursing Education* 44, (11) (11): 505-10.

Barnard and O'Brien argue for an integrated problem-based nursing education heavily infused with Information Literacy instruction. They claim that as the roles of nursing become more demanding that strong research skills are required to facilitate life-long learning. Throughout the article the author point to other references to substantiate their claims by examining example in which integration was successful and barriers to overcome in order to achieve this success. The article is a summary of current literature.

Blake, Jennifer. 1994. Library resources for problem-based learning: The program perspective. *Computer Methods and Programs in Biomedicine* 44, (3-4): 167.

Blummer, B. (2008). Applying perkins's facets of a learning environment for information literacy instruction. *Community and Junior College Libraries, 14*(3), 179-189.

The intension of this study is to promote Perkin's Five Facets of a Learning Environment. Blummer uses these principles to create a scenario in which Librarians would be partners with faculty in a constructivist learning environment. This is a case study example and does not offer and evidence based research to promote its findings. It relies on the experience of the community college in which the author's employed and relevant literature.

Bruner, J. S. (1961). The act of discovery. *Harvard Educational Review, 31*(1), 21-32.

One of the original and most important works when referring to the concept of discovery learning. In the article Bruner advocates for a different approach to teaching pedagogy. He states that through discovery, rather than traditional instruction, students are able to process and apply knowledge more effectively. He makes his argument in four headings:

- The increase of intellectual potency
- The shift from extrinsic to intrinsic rewards.
- Learning the heuristics of discovering
- The aid to memory processing

Carder, Linda, Patricia Willingham, and David Bibb. 2001. Case-based, problem-based learning: Information literacy for the real world. *Research Strategies* 18, (3): 181-90.

This article outlines the function of the library and the role of the librarian within a case based or problem based learning curriculum. The authors give tips and strategies for designing an effective information literacy assignment to assess the students work. There is little research done in this paper, it is mostly a practical guide for a librarian teaching PBL learners.

Cheney, D. (2004). Problem-based learning: Librarians as collaborators. *Portal: Libraries and the Academy, 4*(4), 495-508.

This article describes a specific scenario in which librarians assimilated to a problem based learning pedagogy that was being used the School of Information and Sciences Technology within their institution. This case study discusses lessons learned and possible suggestion for future success. It does not offer any evidence based research.

Dean Jr., D., & Kuhn, D. (2007). Direct instruction vs. discovery: The long view. *Science Education, 91*(3), 384-397.

Dean and Kuhn start this article by evaluating a prior study conducted by Klahr and Nigham in 2004. That article stated that direct instruction were more effective than discovery teaching strategies for themes essential to the scientific method. Dean and Kuhn recreated the experiment and followed the progress of their fourth grade students for a longer period of time. They concluded that over the extended period of time that discovery teaching methods were more effective when measures over a longer period of time.

Dimitroff, A., A. M. Ancona, S. B. Beman, A. M. Dodge, K. L. Hutchinson, M. J. LaBonte, T. L. Mays, and D. T. Simon. 1998. Problem-based learning in a health sciences librarianship course. *Bulletin of the Medical Library Association* 86, (3): 340.

This journal article outlines the incorporation of problem-based learning techniques from the health sciences field to a health sciences librarianship course at the University of Wisconsin-Milwaukee. This article adequately explains the benefits and the disadvantages to teaching with a PBL pedagogy. Based on their perceptions and student feedback the course instructor abandoned the PBL model in favour of more traditional teaching methods.

Earl, M. F., K. Hensley, J. S. Fisher, M. J. Kelley, and D. Merrick. 1996. Faculty involvement in problem-based library orientation for first-year medical students. *Bulletin of the Medical Library Association* 84, (3): 411.

The authors of this article outlined measures that were taken to improve library instruction at East Tennessee State University. The librarians and facilitators involved discussed incorporating PBL techniques by assigning simple case studies to supplement a library tour. The students were divided into groups and each had their own facilitator to answer questions. Library staff considered the sessions a great success as it was perceived that this group of first-year library students were more frequently using the library in comparison to

their predecessors. One problem with the article is that it often stated its conclusions without offering the evidence to substantiate the claims that it was making.

Eldredge, Jonathan D., Janis B. Teal, Judith C. Ducharme, Rebecca M. Harris, Lillian Croghan, and James A. Perea. 1998. The roles of library liaisons in a problem-based learning (PBL) medical school curriculum: A case study from university of new mexico. *Health Libraries Review* 15, (3): 145.

The authors of this article examine the role of the liaison librarian and how it changed in a transition of health education to problem-based learning at the University of New Mexico. The need for library services had increased as the need to develop life-long research skills demanded. This article was unique in that it not only discussed how information literacy had changed but also the collection management strategies of the institution were also effected. In addition there is a fairly comprehensive history of PBL outlined in the work.

Fosmire, M., & Macklin, A. Riding the active learning wave: Problem-based learning as a catalyst for creating faculty-librarian instructional partnerships. *Issues in Science and Technology Librarianship.n34 Spr 2002*,

Gehring, K. M., and D. A. Eastman. 2008. Information fluency for undergraduate biology majors: Applications of inquiry-based learning in a developmental biology course. *CBE Life Sciences Education* 7, (1): 54.

This comprehensive study gauged the effectiveness of information literacy sessions within a inquiry-based learning teaching environment. The biology majors in this study were taught the skill necessary to search for, and find, primary literature. The authors of this study used both qualitative and quantitative methods in order to determine the success of IL initiatives in the program. The evidence for these conclusions was acquired through testing of student information fluency both before and after the sessions and a student self assessment. All results were presented in a clear and logical manner.

Halvorson, S. J., & Wescoat, J. L.,Jr. (2002). Problem-based inquiry on world water problems in large undergraduate classes. *Journal of Geography, 101*(3), 91-102.

This is article authored by instructors of Geography and not librarians. It describes the incorporation of a problem based learning pedagogy to a course focusing on world water problems. Although not written by a librarian the course offered information literacy instruction to its students in order to complete its learning objectives. This article offers significant detail of what was taught in the course and examines student feedback.

Hartwich, D. (2008). Helping students to become lifelong learners one teacher's journey to implementing collaborative planning and teaching. *International Association of School Librarianship.Selected Papers from the ...Annual Conference,* , 1.

Hartwich recounts his experience developing a collaborative teaching environment between instructors and librarians in a grade school setting. She delivers quantitative data surveying student perspectives on information literacy. Hartwich also describes changes in these perspectives and the opinion of the teachers who took part in the partnership. The article concludes that the librarian teacher partnership was received well by both students and their instructors.

Horne, Maria, Kath Woodhead, Liz Morgan, Lynda Smithies, Denise Megson, and Geraldine Lyte. 2007. *Using enquiry in learning: From vision to reality in higher education.(author abstract)*. Vol. 27.

The authors of this article examine the success of incorporating a PBL curriculum at the University of Manchester nursing program. Focus groups were used to evaluate the strengths and weaknesses of the pedagogy through the perspectives of both the students and the facilitators. Although a strong study in how it examines opinions of the teaching style from different perspectives, there is no mention of the role of the librarian or information literacy.

Hsieh, C., & Knight, L. (2008). Problem-based learning for engineering students: An evidence-based comparative study. *Journal of Academic Librarianship, 34*(1), 25-30.

This article, authored by a librarian, offers perspective on a problem based learning experiment in a first year engineering class. It compares results of test taken by students after a lecture style session and after a problem based learning session. Through the quantitative data the authors suggest that problem-based learning, performed adequately enhances information literacy.

Ispahany, Nighat, Kathren Torraca, Marina Chilov, Elaine R. Zimbler, Konstantina Matsoukas, and Tracy Y. Allen. 2007. Library support for problem-based learning: An algorithmic approach. *Medical Reference Services Quarterly* 26, (4): 45.

The authors of this article detail the use of what they refer to as an algorithmic toolkit for library instruction to a problem-based learning curriculum. They tested the toolkit on a pathophysiology in the second year of the Dentistry program at their school. A diagram of each page was supplied and explanations' of why each was included was given. The article lacked any method of evaluating the success of the toolkit and its success as a teaching aid.

Kaplan, R. B., & Whelan, J. S. Buoyed by a rising tide: Information literacy sails into the curriculum on the currents of evidence-based medicine and professional competency objectives. *Journal of Library Administration.v36 n1-2 p219-35 2002,*

Kirschner, P. A., Sweller, J., & Clark, R. E. (2006). Why minimal guidance during instruction does not work: An analysis of the failure of constructivist, discovery, problem-based, experiential, and inquiry-based teaching. *Educational Psychologist, 41*(2), 75-86. doi:10.1207/s15326985ep4102_1

Kirshner, Sweller, and Clark's article offers an extensive literature review for prior studies which advocate for the use of instruction with minimal guidance, and those who argue against. It explores the many different terms used to identify theories of teaching that fall under this category. The main argument that the author's of the piece attempt to make is that the concept of discovery learning is not compatible with the human cognitive architecture. Kirchner, Sweller, and Clark build their psychology based argument by providing different studies conducted in the classroom, research centre, and workplace. This article is a review and perception of the existing literature and does not submit original research.

Kuhlthau, C. (2006). Information literacy through guided inquiry: Preparing students for the 21st century. *International Association of School Librarianship. Selected Papers from the ...Annual Conference,* , 1.

In this article Dr. Kuhlthau advocates for a more involved and direct approach to information literacy. Guided inquiry offers concentrated instruction in information literacy walking the student through the process step-by-step with the assistance of the information professional always available while the pupil searches for information. There is language and techniques in the article that can be viewed as an argument a combination of discovery and direct learning.

Julien, Hedi. 2005. A longitudinal analysis of information literacy instruction in Canadian academic libraries. *Canadian Journal of Information & Library Sciences* 29, (3) (09): 289-313.

This study is based on the survey responses to 450 questionnaires sent to Canadian university and college libraries. Questions focused on information literacy sessions within each individual institution. This article would be useful as supporting documentation for an assessment made on the demographics of classes thought, subject area focused on, and perceived barriers to providing IL instruction within the context of the institution.

Julien, Heidi, and Lisa M. Given. 2002. Faculty-librarian relationships in the information literacy context: A content analysis of librarians' expressed attitudes and experiences. *Canadian Journal of Information & Library Sciences* 27, (3) (Sep2002): 65-87.

This article focuses on faculty-librarian relationships. This includes any perceptions that one group has for the other. Julien and Given monitor a specific listserv to document any mention of a librarian faculty relationship. They also supply a lengthy and thorough bibliography on the topic.

Kanter, S. L. 1998. Fundamental concepts of problem-based learning for the new facilitator. *Bulletin of the Medical Library Association* 86, (3): 391.

This short article outlines the characteristics of problem-based learning and the role of the teacher or facilitator in the process. Kanter discusses ideal group size, learning objectives, self-directed learning time, and discussion meetings. Each has their role within the pedagogy and their importance is outlined by the author. In addition Kanter explains the different between a facilitator in a PBL environment and a traditional instructor.

Koufogiannakis, Denise, Jeanette Buckingham, Arif Alibhai, and David Rayner. 2005. Impact of librarians in first-year medical and dental student problem-based learning (PBL) groups: A controlled study. *Health Information & Libraries Journal* 22, (3) (09): 189-95.

This study was conducted at the John W. Scott Heath Sciences Library at the University of Alberta. It examined the effectiveness of having multiple librarians dedicated to small groups in the problem-based learning environment. The study had found that it had a minor effect on the perception of librarians to the students and no effect at all on their exam scores. Based on this recommendation it was suggested that librarian would continue to work with the PBL classes but addressing them as a larger group to make more efficient use of the librarian's time and effort.

Lennon, A. M., P. F. Anderson, J. L. McDonald, and G. K. Stookey. 2001. Problem-based learning and the dental school library. *Journal of Dental Education* 65, (11): 1219.

This study examined the relationship between a change in teaching method in a specific department and circulation statistics following the change at the Indiana State University School of Dentistry. The librarians examined circulation statistics for the tree years prior to the change and the three years following the change. Taking enrolment numbers into account they had found that the new teaching method, and its focus on library literacy, had increased the circulation numbers of the library.

Lewis, Marilyn. 2000. Library requirements and problem-based learning: The medical sciences library, the university of the west indies. *Bulletin of the Medical Library Association* 88, (3): 255.

Marilyn Lewis has authored a very brie article on her methods of evaluating library services in order to facilitate a problem-based learning curriculum. She describes a questionnaire that she had circulated to her patrons and the results of the questionnaire. She concluded that PBL learning were satisfied with the general collection of items but would prefer more copies of reserve materials and extended library hours.

Macklin, A. S. (2008). A PBL approach for teaching complex information and communication technology (ICT) skills in higher education. *Community and Junior College Libraries, 14*(4), 233-249.

This study examined the incorporation of a problem based learning approach in the instruction of information and communication technology skills to first year students in a community college environment. Qualitative and Quantitative data was taken from a small group of 20 students in order to facilitate the study. As in many other studies, the

author concludes that problem-based learning approaches reinforce learning objectives more than traditional methods.

Macklin, A. S., & Fosmire, M. A blueprint for progress: Collaborating with faculty to integrate information literacy into the curriculum at Purdue University. *Resource Sharing and Information Networks.v17 n1-2 p43-56 Apr 2005,*

Mayer, R. E. (2004). Should there be a three-strikes rule against pure discovery learning? The case for guided methods of instruction. *American Psychologist, 59*(1), 14-19. doi:10.1037/0003-066X.59.1.14

Mayer's article is very similar to the Kirchner et al article. It includes an extensive literature review on the concepts of discovery learning. The article also uses literature based on cognition and psychology to argue that pure discovery learning is not compatible to the human learning process. Throughout the piece Mayer argues for a blend of traditional teaching and discovery learning techniques which he refers to as Guided Discovery.

Nail-Chiwetalu, B. J., and N. B. Ratner. 2006. Information literacy for speech-language pathologists: A key to evidence-based practice. *Language, Speech, & Hearing Services in Schools* 37, (3) (07): 157-67.

This article states that instructional librarians would have to adapt to new standards set out by the American Speech-Language-Hearing Association. These new standards stress the importance of students learning research skills and an understanding of evidence based practice. The only mention of PBL in the article is that of an example given for a search strategy.

Nilson, Linda Burzotta. 2003. *Teaching at its best : A research-based resource for college instructors*. 2nd ed. Bolton, MA: Anker Pub. Co.

This chapter of a book focuses on the discovery method of learning. It offers a more modern basic overview than the Bruner article. It also gives an example dialogue for the Socratic Method and demonstrates how the two concepts complement each other. It also references to older, paper-based journal articles that may have some value to the study.

Pelikan, M. (2004). Problem-based learning in the library: Evolving a realistic approach. *Portal: Libraries and the Academy, 4*(4), 509-520.

This article describes a case study in which a problem based learning approach to information literacy was developed at Penn State University. The author admits that he

does not have any evidence-based data to support his conclusion, but maintains that problem based learning is an worth pursuing.

Reid, D. J., Zhang, J., & Chen, Q. (2003). Supporting scientific discovery learning in a simulation environment. *Journal of Computer Assisted Learning, 19*(1), 9-20. doi:10.1046/j.0266-4909.2003.00002.x

Reid, Zhang, and Chen describe their research within a discovery learning science classroom. They used technology to support the student's learning experiments. One such experiment was documented in which three different approaches to discovery instruction was given. These were interpretive support, experimental support, and reflective support. Through surveying the class before and after the experiment they concluded that all three functions were desirable either through the technology supplied or through in class teaching assistance.

Satterthwaite, R. K., M. E. Helms, R. Nouravarsani, M. Van Antwerp, and N. Woefl. 1995. Library faculty role in problem-based learning: Facilitating small groups. *Bulletin of the Medical Library Association* 83, (4): 465.

This is another article which discusses facilitating both small and traditional groups in a PBL learning environment. This article addresses and acknowledges the burden on librarian's time and schedule but advocates for the small group method in the end. The authors make the argument that facilitating small groups was "rewarding in terms of personal growth". Unlike the Koufogiannakis article the four pages of text includes very little evidence but it does offer detailed explanation on the role of the facilitator in a PBL group.

Saab, N., van Joolingen, W. R., & van Hout-Wolters, Bernadette H. A. M. (2005). Communication in collaborative discovery learning. *British Journal of Educational Psychology, 75*(4), 603-621. doi:10.1348/000709905X4290

Saab et al. examine the communication process in a discovery learning environment. Students were instructed by computer with discovery learning based software. They were also given the opportunity to electronically chat with other students learning the same material. The authors found that student would effectively use electronic collaboration methods when learning in this method as they would in a discovery learning classroom.

Schilling, K., D. S. Ginn, P. Mickelson, and L. H. Roth. 1995. Integration of information-seeking skills and activities into a problem-based curriculum. *Bulletin of the Medical Library Association* 83, (5): 176.

Schilling, Ginn, Mickelson, and Roth describe how they were able to develop an effective information literacy session for a patient-doctor relationship PBL course. One major strength of the article was the way it documented the study's method of evaluating success through a carefully designed survey. Another strength is a section detailing the evolution of problem-based learning.

Silen, C., & Uhlin, L. (2008). Self-directed learning--A learning issue for students and faculty! *Teaching in Higher Education, 13*(4), 461-475.

This article by Silen and Uhlin, from Sweden, focuses on the incorporation of self-directed learning to a problem based learning curriculum. Mostly a case study, the authors use learning objectives and personal experience to conclude that information literacy is essential in developing self-directed learning skills.

Snavely, L. Making problem-based learning work: Institutional changes. *Portal: Libraries and the Academy, 4*(4), 521.

Presenting a personal experience incorporating problem based learning into library instruction; Snavely concludes that PBL is worth pursuing as a pedagogical approach in the field. One fault of this particular article is that the author does not provide qualitative or quantitative date to support these claims. The major strength of the scholarly contribution is that it attempts to explain why capturing evidence based data to evaluate the teaching method is problematic. It states that the pedagogy is dependent on "aha" moments which are difficult to quantify.

Spence, L. (2004). The usual doesn't work: Why we need problem-based learning. *Portal: Libraries and the Academy, 4*(4), 485-493.

Spence argues that traditional methods of library instruction are ineffective and a problem based approach may be a more productive approach for librarians. This publication is another in a series that examines the introduction of PBL to library instruction at Penn State University. Like the other articles, this study offers little evidence to substantiate its claims other than personal experience. Spence offers a fairly comprehensive explanation that the internet has diluted the quality of information available to students. According to his estimation, it makes the instruction of information literacy more challenging and important.

Tancheva, K., Andrews, C., & Steinhart, G. (2007). Library instruction assessment in academic libraries. *Public Services Quarterly, 3*(1), 29-56. doi:10.1300/J295v03n01-03

Tancheva, Andrews, and Steinhart describe the process of evaluating three different styles of teaching information literacy at Albert R. Mann Library at Cornell University Library. These methods were attitudinal, outcomes-based, and gap-measure. The detailed research on the topic included surveys and well crafted charts to present their

data. The conclusion of the piece stated that the authors found that a teaching method which combined all three styles was preferable to address the shortcomings of any one.

Wilke, R. R., & Straits, W. J. (2001). The effects of discovery learning in a lower-division biology course. *Advances in Physiology Education, 25*(2), 134-141.

Wilke and Straits evaluate the effectiveness of combining discovery learning activities with instruction based learning. A comprehensive final exam was given to the class that incorporated some discovery learning and compared to a purely instructional class. All tests were performed at the University of Texas at Austin with a introductory level biology course. Wilke and Straits concluded that the class with discovery learning activities achieved a higher level of success on the final exam.

Williams, P. D. (1980). Discovery learning: The differential effects of small-group work and individual work on mathematics achievement and attitudes of college students in remedial mathematics. (Educat.D., University of Pittsburgh). , 185. . (8018332)

Woodard, B. S. (2003). Technology and the constructivist learning environment: Implications for teaching information literacy skills. *Research Strategies, 19*(3-4), 181-192. doi:DOI: 10.1016/j.resstr.2005.01.001

Woodward argues that the relationship between information literacy, discovery learning, and constructivist teaching requires that librarians use technology as a cognitive tool. He makes the distinction between learning "from" technology and learning "with" technology. Online tutorials and course specific websites fall into the former category. According to the author interactive media that allows the user to manipulate information falls under the learning "with" classification. She states that the constructivist approach is essential to provide a basic understanding of the tools. Discovery learning can be adopted by allowing the student to explore what is taught through the technology at their finger tips. Technology is the essential element in ensuring compatibility between discovery learning and information literacy.

Yuan, Haobin, Beverly A. Williams, and Lin Fan. 2008. *A systematic review of selected evidence on developing nursing students' critical thinking through problem-based learning.(report)*. Vol. 28.

This study was published in order to determine if a problem-based learning style of teaching developed nursing student's critical thinking skills more than traditional teaching models. The study found that it did not make any measurable different in the sample studied. It also suggested that a larger sample would be desirable to study further. There is little mention of information literacy in this study.