Helping Teachers implement Experience Based Learning

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Abstract
Experience Based Learning (EBL) is a process in which real world problems are used to help and motivate students to identify, apply, collaborate and communicate their knowledge effectively. However, implementation of EBL requires substantial effort on the part of the teacher involving new teaching strategies and significant course restructuring. Also, coming up with suitable problems and solutions in sufficient detail that still allow for creativity and individuality is time consuming and difficult. This project focuses on facilitating the development of a problem-based repository of teaching resources. We are developing a web-based system to capture valuable teaching resources that may otherwise be lost and provide a searchable repository of problems and solutions that can be reused in a number of different units, possibly being expanded on each reuse, to implement EBL.

Keywords
Experience Based Learning, Problem Based Learning, Intra-net use in conventional universities

1. Introduction to Experience Based Learning
Experience Based Learning (EBL), also known as problem-based learning (PBL), is a process in which real world problems are used to help and motivate students to identify, apply, collaborate and communicate their knowledge effectively [2]. This strategy helps promote life-long habits of learning. The modern history of problem-based learning began in the early 1970s at the medical school at McMaster University in Canada. Though its intellectual history can be traced earlier than this. Thomas Corts, president of Samford University, sees PBL as "a newly recovered style of learning" [1]. In his view, it embraces the question-and-answer dialectical approach associated with Socrates as well as the Hegelian thesis-antithesis-synthesis dialectic. As John Cavanaugh puts it: 'It's like discovery-based learning in the 1960s. We knew about it; we didn't do it. Dewey talked about it when he talked about 'engagement.' Dewey had it right on the abstract level. We do the details better now, that's all, and that's because of advances in cognitive science and in technology." [1] EBL has found 80% acceptance in medical schools where it is used to teach students about clinical cases, either real or hypothetical [5]. However successes are reported in the in other fields such as the Humanities and Physics. Universities like University of Delaware [3] and Samford University in Alabama [4] have received grants for restructuring their teaching methods.

The interest in PBL is growing because research shows a higher quality of learning and it also feels right intuitively. PBL appears to reflect the way the mind actually works, not a set of procedures for manipulating students into learning. Hence in a problem-based approach to teaching and learning, both teachers and student interact where the intellectual commonalities between research and teaching can be noted. Apart from equipping students with a more lateral approach to problem solving so that they are able to handle the unstructured and unexpected problems of normal life, PBL fosters group work, social skills, independent investigation, high level of comprehension and mobilises prior knowledge more readily.

2. Issues in Implementing Experience Based Learning
The implementation of EBL requires substantial effort on the part of teacher. Coming up with suitable problems and solutions that allow for creativity and individuality is time consuming and difficult. EBL typically involves groupwork which requires managing the teams and training the tutors. Just providing a problem and a solution does not encourage the tutor or the student to engage with the problem and to guide without seeming to be hiding the answer. It also a difficult task to pose authentic problems with certain open-endedness about them. This approach helps to keep a constant interaction between teacher and student. [1]. When it comes to creating problems, John Cavanaugh says: "One place to start is to take your exams and work backwards. Take those word problems and essay questions and make cases out of them." [1] Loreta Ulmer, who teaches psychology at Delaware Technical and Community College, says it's hard work revamping a course into problems, "but after you've done it, the whole course becomes so exciting, you'd never go back." [3]
3. Facilitating the Development of Problem Based Resources

This project does not solve all of the problems identified above. This project is a first step to assist and encourage teachers in managing and accessing various teaching resources within the Computing Department that can be used in problem based teaching. The project will develop a web-based system to archive and retrieve teaching resources. As part of the project we have interviewed each teacher to discover what teaching resources they have and to raise awareness of the benefits of EBL. The goals of the project are:

1. Capture valuable teaching resources that may otherwise be lost.
2. Facilitate cohesion within a unit from one semester to the next.
3. Provide a searchable repository of problems and solutions that can be reused in a number of different units, possibly being expanded on each reuse.
4. Encourage a forum for discussion between teachers to implement EBL across a number of units.

The third and fourth goals are focused on providing a complete and integrated program of study for students that encourages them to develop complete and workable to real problems as opposed to toy or oversimplified problems often used in lectures. For example, a problem could be introduced in an Introductory Programming unit and code developed to solve part of it. In a Database unit a database can be built to support and improve the original solution. In another unit more efficient data structures and alternative algorithms could be explored. In a Communications unit students could look at network issues for this problem. A Web Design unit could build a web-based solution. A Human Computer Interaction unit could develop an interface to be used by the other units. Currently this scenario is not possible because these problems and solutions are not known or available across units in the department. We do not want students to rote learn solutions but to learn concepts. Expanding on and exploring alternatives to problems/solutions already seen should complement the concept building process. As each resource is archived it will be indexed according to the type of resource and keywords entered by the depositor. Problem statements, assignments, teacher worked solutions, selected assignment submissions, implemented systems, executables, case studies, reports, analysis and design models, lecture notes, code, databases, etc are all candidates for the repository.

For the project to achieve its goals teachers will need to occasionally add to the repository and be encouraged to use the resources. Currently we have a Master’s student building the system. Further development will require a programmer, allocation of equipment, disk space, technical support and possibly purchase of software. Maintenance and appropriate procedures to handle access, version control, etc will need to be put in place. This involves an ongoing commitment at the department level as any major shift in teaching practice requires. These are the costs.

In summary we believe the benefits will outweigh the costs. These benefits are difficult to measure but can be broken into three main categories.

1. The benefit to lecturers are:
   a. A systematic way of storing a resource that a lecturer would like to keep track of and maybe make available to others.
   b. Problems can be explored in greater depth and more interesting issues considered since students are familiar with aspects of the problem already.
   c. A potential source of ideas, code, etc that can be used in implementing EBL.

2. The benefit to students are:
   a. They will be encouraged to solve problems for themselves.
   b. Selective material from prerequisite units can be made available to students who have transferred from other institutions or who have done the units many years prior.
   c. They gain a more comprehensive and deeper understanding of real problems and their solutions.

3. The benefits to the department:
   a. Resources may be reused requiring less duplication of effort.
   b. Greater cohesion of a program of study
   c. Greater consistency in unit content across semesters.

REFERENCES
[4] University of Alabama http://www.ua.edu