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# THE BEACON

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## Free writing tutoring – Help your students now!

As the pilot program for offering free writing tutoring to HPD graduate students draws to a close, the HPD Librarians ask for your assistance in encouraging your students to take advantage of this terrific service. Since the program's inception in September 2009, the number of students who have utilized the service has fallen below expectations. The program will be discontinued by the end of May if the service continues to go unused. Students can call 954-262-8350 for an appointment (they must identify themselves as an HPD graduate student).

## Save the Date

May 3, 2010
Deadline for grant proposals for HPD Chancellor's Educational Research Grant Competition.
Visit http://www.nova.edu/cwis/hpdtesting/ctl/ for details

May 7, 2010
Full day workshop with Dr. James Zull, author of
*The Art of Changing the Brain.*
RSVP to Kathleen Hagen (x21235 or khagen@nova.edu) for details.

# 25 Learning Principles to Guide Pedagogy and the Design of Learning Environments

**Applying the Science of Learning: What We Know About Learning and How We Can Improve the Teaching-Learning Interaction**

This is a shortened version of a longer article available online. (See the reference at the end of this article.) Reprinted with the gracious permission of Dr. Arthur Graesser.

**1. Contiguity Effects.**
Ideas that need to be associated should be presented contiguously in space and time in the multimedia learning environment. For example, the verbal label for a picture needs to be placed spatially near the picture on the display, not on the other side of the screen. An explanation of an event should be given when the event is depicted rather than many minutes, hours, or days later.

**2. Perceptual-motor Grounding.**
Whenever a concept is first introduced, it is important to ground it in a concrete perceptual-motor experience. The learner will ideally visualize a picture of the concept, will be able to manipulate its parts and aspects, and will observe how it functions over time. The teacher and learner will also gain a common ground (shared knowledge) of the learning material. Perceptual-motor experience is particularly important when there is a need for precision, such as getting directions to find a spatial location. For example, a course in statistics is not grounded in perceptual-motor experience when the teacher presents symbols and formulae that have no meaning to the student and cannot be visualized.

**3. Dual Code and Multi-media Effects.**
Information is encoded and remembered better when it is delivered in multiple modes (verbal and pictorial), sensory modalities (auditory and visual), or media (computers and lectures) than when delivered in only a singe mode, modality, or medium. Dual codes provide richer and more varied representations that allow more memory retrieval routes. However, the amount of information should not overwhelm the learner because attention is split or cognitive capacities are overloaded.

**4. Testing Effect.**
There are direct and indirect effects of taking frequent tests. One indirect benefit is that frequent testing keeps students constantly engaged in the material. Although students will learn from testing without receiving feedback, there is less forgetting if students receive informative feedback about their performance. Multiple tests slow forgetting better than a single test. Formative assessment refers to the use of testing results to guide teachers in making decisions about what to teach. Learners also benefit if they use test results as a guide for their own learning.

**5. Spaced Effects.**
Spaced schedules of testing (like spaced schedules of studying) produce better long-term retention than a single test. When a single test is administered immediately after learning, students obtain high scores, but long-term retention is reduced with a single immediate test relative to spaced testing. When a test is given immediately after learning has occurred, learners still have the newly-learned information in a primary memory system and therefore obtain high test scores. Both teachers and learners often misjudge their high scores on a test given immediately after learning as evidence of good retention, when, in fact, long-term retention suffers with this practice**.**

**6. Exam Expectations.**
Students benefit more from repeated testing when they expect a final exam that

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## *25 Learning Principles*

will include additional information than when they do not expect a final exam. It seems that learners will keep material more accessible in memory when they expect to need it later than when they do not.

**7. Generation Effect.**
Learning is enhanced when learners produce answers compared to having them recognize answers. Free recall or essay tests which require the test taker to generate answers with minimal cues produce better learning than multiple choice tests in which the learner only needs to be able to recognize correct answers. In fact, free recall tests produce as much learning as restudying the material.

**8. Organization Effects.**
Outlining, integrating, and synthesizing information produces better learning than rereading materials or other more passive strategies. Students frequently report that when they study they reread materials they already read once. Strategies that require learners to be actively engaged with the material to-be-learned produce better long-term retention than the passive act of reading. Learners should develop their own mini-testing situations as they review, such as stating the information in their own words (without viewing the text) and synthesizing information from multiple sources, such as from class and textbooks.

**9. Coherence Effect.**
The learner needs to get a coherent, well connected representation of the main ideas to be learned. It is important to remove distracting, irrelevant material, even when the added information is artistically appealing. Seductive details that do not address the main points to be conveyed run the risk of consuming the learner's attention and effort at the expense of their missing the main points.

**10. Stories and Example Cases.**
Stories and other forms of narrative are easier to read, comprehend, and remember than other types of learning materials. For many millennia, the primary way of passing wisdom down from generation to generation was through stories. Stories have concrete characters, objects, locations, plot, themes, emotions, and actions that bear some similarity to everyday experiences. Many stories also convey a point or moral that can be generalized to many situations. Example cases in a story-like format are persuasive, easy to comprehend, and very memorable.

**11. Multiple Examples.**
An understanding of an abstract concept improves with multiple and varied examples.

**12. Feedback Effects.**
Students benefit from feedback on their performance in a learning task, but the timing of the feedback depends on the task.

**13. Negative Suggestion Effects.**
Just as people learn correct information with frequent testing, they also can learn wrong information this way. For example, when incorrect alternatives on multiple choice tests are presented, the wrong answers can be learned instead of the correct answers. This effect is also found on short answer essay questions when students do not know the answers and use their general knowledge about the field to construct a response that seems reasonable to them. In this situation, learners recall their incorrect, but logically consistent response as being correct. These effects can be reduced when learners receive feedback immediately after taking a test which allows them to revise their memory and understanding without delay.

**14. Desirable Difficulties.**
Learning is enhanced when learners have to organize the information themselves or exert additional effort during acquisition or retrieval than in conditions in which the information to be learned or retrieved does not require effort. One possible explanation for this effect is that learners create multiple retrieval paths which make the information more accessible at retrieval. These practices slow initial learning, but promote long-term recall.

**15. Manageable Cognitive Load.**
Multimedia learning environments should be compatible with what we know about how people learn. A common error in the design of multimedia learning materials is to "clutter" the learning environment with extraneous information that increases the cognitive load for learners who are in the process of discovery what is important and what is decorative and distracting. The demands on working memory can exceed capacity when there is auditory input that does not match written text and there is visual animation and other movement to monitor at the same time, especially early in learning. The *coherence principle* calls for the removal of extraneous materials. The *spatial contiguity* principle refers to the need to keep printed text next to the visual display that it describes.

**16. Segmentation Principle.**
Information presented in text is necessarily linear because of the constraints of language. When multimedia materials are designed, it is possible to present information simultaneously in multiple modes—auditory, motor, visual, being the most common. The general principle of introducing new concepts in manageable segments becomes even more critical when there are multiple sensory systems involved.

**17. Explanation Effects.**
Explanations consist of causal analyses of events, logical justifications of claims, and functional rationales for actions. Explanations provide coherence to the material and justify *why* information is relevant and important. Students may be prompted to give self-explanations of the material through think aloud protocols or questioning tasks that elicit explanations that connect the material to what they already know. Self-explanations and the activity of studying good explanations facilitate deeper comprehension, learning, memory, and transfer.

**18. Deep Questions.**
Deep explanations of material and reasoning are elicited by questions such as *why, how, what-if*-and *what-if not*, as opposed to shallow questions that require the learner to simply fill in missing words, such as *who, what, where,* and *when*. Training students to ask deep questions facilitates comprehension of material from text and classroom lectures. The learner gets into the mindset of having deeper standards of comprehension and the resulting representations are more elaborate.

**19. Cognitive Disequilibrium.**
Cognitive disequilibrium stimulates inquiry, curiosity, thinking, and deep questions, which in turn lead to deeper learning. Cognitive disequilibrium occurs when there are obstacles to goals, contradictions, conflicts, anomalous events, breakdown scenarios, salient gaps in knowledge, uncertainty, equally attractive alternatives, and other types of impasses. When these impasses occur, the learner needs to engage in reasoning, thought,



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# Seven Recommendations to Improve Student Learning

I recently had the good fortune to come across a study done by the Institute of Education Sciences – National Center for Education Research, *Organizing Instruction and Study to Improve Student Learning: A Practice Guide.* It can be downloaded free of charge from http://ies.ed.gov/ncee/wwc/pdf/practiceguides/20072004.pdf . What follows are the main points of the study, although the entire study can be read fairly quickly. *(Kathleen Hagen)*

The practice guide uses the same approach as evidence-based medicine in determining whether support for its recommendations is grounded in well-conducted research. It lists seven recommendations and then rates the supporting evidence for their usefulness as strong, moderate, or low. The standards required for the assignment of each rating are found in the Preamble, page vi.

The seven recommendations are:

1. Space learning over time. *Arrange to review key elements of course content after a delay of several weeks to several months after the initial presentation.*
2. Interleave worked example solutions with problem-solving exercises. *Have students alternate between reading already worked solutions and trying to solve problems on their own.*
3. Combine graphics with verbal descriptions. *Combine graphical presentations (e.g., graphs, figures) that illustrate key processes and procedures with verbal descriptions.*
4. Connect and integrate abstract and concrete representations of concepts. *Connect and integrate abstract representations of a concept with concrete representations of the same concept.*
5. Use quizzing to promote learning. *Use quizzing with active retrieval of information at all phases of the learning process to exploit the ability of retrieval directly to facilitate long-lasting memory traces.*
   a. *Use pre-questions to introduce a new topic.*
   b. *Use quizzes to re-expose students to key content.*
6. Help students allocate study time efficiently. *Assist students in identifying what material they know well, and what needs further study, by teaching children how to judge what they have learned.*
   a. *Teach students how to use delayed judgments of learning to identify content that needs further study.*
   b. *Use tests and quizzes to identify content that needs to be learned.*
7. Ask deep explanatory questions. *Use instructional prompts that encourage students to pose and answer "deep-level" questions on course material. These questions enable students to respond with explanations and supports deep understanding of taught material.*

Each recommendation is supplemented with explanations and practical advice on how to implement the suggestion.

Recommendation 7, given a strong rating for its level of evidence, offers the following advice for carrying out the recommendation:

1. Periodically encourage students to "think aloud" in speaking or writing their explanations as they study the material. After presenting their explanations, it is beneficial for them to get feedback by observing good explanation of peers, tutors, teachers, and computer environments.
2. Ask questions that elicit explanations, such as those with the following stems: why, what caused X, how did X occur, what if, what-if-not, how does X compare to Y, what is the evidence for X, and why is X important?
3. Ask questions that challenge students' prior beliefs and assumptions, thereby promoting more intensive and deeper reasoning.



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## *25 Learning Principles*

problem solving, and planning in route to restoring cognitive equilibrium. There is a higher incidence of deep questions, thought, reasoning, and study efforts when learners undergo cognitive disequilibrium.

**20. Cognitive Flexibility.**
Cognitive flexibility increases when there are multiple viewpoints, perspectives, and points of view about a phenomenon. It also increases when there multiple layers of knowledge that interconnect facts, rules, skills, procedures, plans, and deep conceptual principles. The cognitive complexity and multiple viewpoints are helpful when learners face tasks that have unique complexities that cannot be anticipated proactively. For example, mathematics has the layers of facts (2 + 3 = 5), algebraic procedures, and deep mathematical concepts that need to be linked and coordinated. Cognitive flexibility is achieved by trying to solve a large variety of problems and by training that links these different layers.

**21. Goldilocks Principle.**
Assignments should not be too hard or two easy, but at the right level of difficulty for the student's level of skill or prior knowledge. The definition of the zone of proximal development (ZPD) is a bit more technical: the difference in learning that occurs with versus without a learning scaffold (e.g., tutor, teacher, text, and computer). Researchers have identified a number of zones that reflect how much learning, memory, mastery, or satisfaction occurs along a continuum of task difficulty and that is sensitive to individual differences among learners. When the material is too easy for the learner, the student is not challenged and may get bored. When it is too difficult, the student acquires very little and gets frustrated or tunes out.

**22. Imperfect Metacognition.**
Both adults and children have very limited knowledge of how their mind works and how to learn, so they need explicit training on cognitive processes and optimal learning strategies. Metacognition is a person's knowledge or judgments of memory, learning, planning, problem solving, and decision processes. Students' metacognition can be misled by folk wisdom of a culture about cognition and their making incorrect analyses of their personal mental experiences. The vast majority of adults are not good at planning,

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### *25 Learning Principles*

selecting, monitoring, and evaluating their strategies of self-regulated learning. Most students have trouble discovering important principles on their own, without guidance and scaffolding by teachers. Occasionally the learning materials have precisely the right characteristics and affordances to stimulate discovery by the student, but that is rare and difficult to engineer. As a consequence, there needs to be explicit training and practice before students acquire adequate metacognition, self-regulated learning, and discovery learning.

**23. Discovery Learning.**
Most students have trouble discovering important principles on their own, without careful guidance, scaffolding, or materials with well-crafted affordances.

**24. Self-regulated Learning.**
Most students need training in how to self -regulate their own learning and other cognitive processes.

**25. Anchored Learning.**
Anchored learning occurs when students work in teams for several hours or days trying to solve a challenging practical problem that matters to the student. The activity is linked to background knowledge of the learner on a topic that is interesting. The problem is challenging, so the learner needs to engage in problem solving and recruit multiple levels of knowledge and skills. These activities are coherently organized around solving the practical problem. Examples of anchored learning are *problem-based curricula* in medical schools where students work on genuine medical cases and *communities of practice* where students try to solve problems of pollution in their city.

Graesser, A. C., Halpern, D. F., & Hakel, M. (2008). *25 principles of learning.* Washington, DC: Task Force on Lifelong Learning at Work and at Homes. Available from http://www.psyc.memphis.edu/learning/whatweknow/index.shtml

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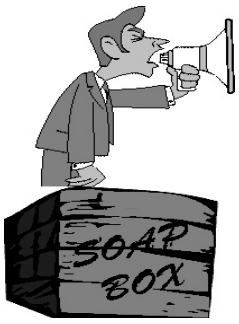


# Stan's Soap Box

## EVERY TEST BECOMES A DIAGNOSTIC TOOL

If professors can assess students' unique mix of correct and incorrect ideas based on test item responses, then what is to be learned next becomes clearer. If you can't get a handle on what students initially understand, then you really have little chance of getting students to do much more than rote learning. Misconceptions that students have will not go away by osmosis.

We must change our view of ourselves. Yes, we are the imparter of information, but we are also diagnosticians of students' understanding. What is required to do this?

1. A thorough knowledge of subject matter.
2. An understanding of how different kinds of learning best occur.
3. A willingness to help students find a way to correct misconceptions before piling on new factual data. The misconception may not always involve the material to be learned. Sometimes the misconception to be corrected is what would be an effective studying technique for particular content. Or it could be a modification in the estimation of one's abilities, either up or down. ("I'm doing pretty good. If I keep working hard, I'll make it!" or "I guess I'm going to have to study harder than I thought.")

There is a framework in the brain which contains previously learned facts and ideas. If the students can attach new information to old ideas already in the brain, then new facts will not be just part of a jumble of isolated bits of information. In 1905 Thorndike said, "We learn from the known to the unknown. Otherwise we lose new factual data quickly." Diagnosing a misconception in our students is not enough, we must also overcome it. One good way to do that is to ask questions that clearly show the misconception, then guide students into resolving the difficulty.

For example, do a classroom demonstration and ask your students to predict what will happen and why. If the results show their predictions are false, there is a good chance that they will modify their ideas.

Asking exam questions that start with *why* and *how* will reveal how much conceptual knowledge students have. Students can learn to perform many intellectual tasks without understanding why they do them, but that knowledge will fade without constant practice. However, if students understand the concepts behind the tasks, they will never forget the principles.

If you want to create technicians, teach formulas. If you want to create health care professionals, teach concepts first – then formulas.

# Mastery and Performance Orientations

This is from *The Teaching Professor* blog, posted by Dr. Maryellen Weimer on October 22, 2009. It is available at http://www.teachingprofessor.com/articles/student-performance/mastery-and-performance-orientations. Reprinted with the kind permission of Dr. Weimer.

"Students with mastery orientation seek to improve their competence. Those with performance orientations seek to prove their competence." (p. 122)

It's a quote that succinctly captures how what students believe about themselves as learners affects how they approach learning. A mastery orientation means that students believe that they have some control over factors related to learning. They believe that they can learn, that hard work and efforts pays off, and that they have or can acquire strategies that will help them learn. They don't give up easily when a learning task

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# RESOURCES TO COURSES

Access to health information is a rapidly changing environment which looks very different from only a few years ago. You may have watched the TV commercials which show traditional higher education classrooms depicted as not meeting student needs, and showing alternatives--school desks on a beach or at a subway station. Many HPD students are either distance students or have a face-to-face classroom with an online WebCT courseware component. This hybrid classroom format is becoming the norm rather than the new trend in higher education. It supports more diverse learning styles and allows students opportunities to catch up if they fall behind during the semester. It also allows students to refer to previous course content as needed and to clarify important concepts.

The HPD Library is committed to supporting the HPD academic curriculum in all its variations. Our recent survey confirms that our users prefer to find research articles displayed in an online format rather than making a trip into the library to find the print version. Although we continue to purchase the print books and resources needed to support the curriculum, our collection budget is largely focused on providing materials 24/7 in a digital format. We are currently compiling an inventory of the slides we own and plan to partner with the HPD faculty later in the term to digitize any of these which could be needed in WebCT/Blackboard as a part of course content in E-reserves. Faculty will receive a list of our slide collection and we will work closely with them to see what could be used to supplement the curriculum.

The HPD Library Liaisons strive to strengthen our partnership with faculty by working as a team to support assignments and courses. It is very important for the faculty to communicate class resource needs at the beginning of the semester. Many of the faculty are now sharing their syllabi and required reading lists with their library liaison, who assists by checking and updating the list of materials. For example, when a new edition of a required textbook is published, HPD Library buys multiple copies for the Library Reserves collection. If the professor communicates which books are required for the course, the liaison librarian is able to make recommendations and keep the professor updated about new editions. Liaison librarians also check the journal articles listed for class assignments for accuracy and location. Databases frequently change which journal subscriptions they carry. An article available online through one database may not be available the following semester through the same database. Your HPD Library liaison can help you identify a persistent link to the article which can be listed within a syllabus or WebCT/Blackboard. We may also be able to recommend articles that are more current on the same topic.

The HPD Library liaisons are also finding that as we offer more E-resources, more complex researching skills are needed by our HPD students. Some of the databases used for research contain only abstracts of articles, and students must use a Web Bridge to locate a different database to find full text. The process can be confusing to both a novice researcher and also to anyone who has not performed research for a few months. Even with the best instruction librarians often get student feedback that it is too much information at one time and they are not able to grasp all the instructions when they begin to research.

Most of the colleges within HPD offer courses require literature reviews, and professors are arranging for library instruction for their classes with the liaison librarians. These instruction sessions are a very important component in learning how to research. If the students have received instruction only in general orientation sessions, students often find they later have difficulty researching as it takes practice to develop effective research skills within the complex health information environment. If the course calendar allows, library instruction may ideally be presented in several shorter sessions throughout the term. Many instruction librarians agree that breaking the information into smaller increments helps students learn the necessary researching skills more effectively. If the professor is unable to allot enough time for instruction, there are other possibilities for instruction, such as small group sessions conducted by the librarian. These strategies can be utilized even in courses that do not have a research component or even in courses with clinical or lab components.

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### *Mastery and Performance Orientations*

challenges them. Those with performance orientations see learning as something beyond their control. Generally they equate it with ability and after several failed attempts to learn something, they decide they can't do it—that no matter what they do, they won't be able to learn math, learn to write, learn to paint, learn to ski, you name the skill. They just don't have what it takes.

In light of Tuesday's post about the error of finding convenient groupings and then putting all students in them, most students are exclusively mastery or performance oriented. They fall somewhere on the continuum between the two extremes, although most researchers would say that few fall precisely in the middle.

I think a lot of beginning students who aren't among the top cohort of college students put more stock in ability than effort. How they talk about their performance is revealing. Those who do well are not likely to tell a group of peers, "I studied my tail off for this test." Some research found that when students fail an exam, a lot are not motivated to study harder for the next exam. No, they see their unsatisfactory performance as proof of their incompetence. Do our universities reinforce that conclusion by graciously giving them opportunities to drop the course? If they decide to stay, they do so with fingers crossed that they'll get lucky on the next exam.

As teachers we want to think about how well we balance mastery and performance goals. Students must perform in our classes, but we can emphasize how the activities and assignments we evaluate offer students an opportunity to master the material. Equally important is how we demonstrate that effort does make a difference. We can tell students that, but it is much more effective to design activities through which they discover what they can do once their put their minds to it.

Here's the reference for the opening quote: Schraw, G. (1998). Promoting general metacognitive awareness. *Instructional Science, 26*, 113-125.

# Reasons To Read Deeply

This is from *The Teaching Professor* blog, posted by Dr. Maryellen Weimer on August 13, 2009. It is available at http://www.teachingprofessor.com/articles/deep-learning/reasons-to-read-deeply#comments. Reprinted with the kind permission of Dr. Weimer.

Many of our students don't read well. They read slowly, struggle with the vocabulary and retain little. They need stronger reading skills—to succeed in college and in life. We need to encourage them to read deeply, to read for understanding and retention, but how do we do that? Roberts and Roberts suggest six ways to entice students to read at deeper levels.

1. Intrinsic interest—Students (like the rest of us) read deeply what they find of interest. The challenge for us is to find course-related material of interest to students. Once interest in something is piqued, motivating more reading on the topic is not as difficult.
2. Curiosity—Can we make students curious about what's in their assigned readings? We can try. For example, we could pose an interesting question, taking a few minutes to play with the question before telling students that they'll find the answer in the reading assigned this week. Or, we say that there's something in the text that really explains how/why a particular theory works. "If you don't really understand this, and of course success in this course depends on you understanding this, you'll want to spend some time with the reading assignment."
3. Connections—When an assigned reading relates to students' lives, to their beliefs or to their future ambitions, there a reason to read. Teachers do sometimes forget that connections between content and life issues that are perfectly clear may not be as obvious to students. We shouldn't be reluctant about pointing out those connections. "If you're planning on staying married for life, you'll want to thoroughly understand the chapter on conflict resolution."
4. Deep reading makes material easier to remember—You have to get students doing some deep reading in order for this to work, but most students do know that what they memorize the night before is gone the moment they finish the exam. If they experience how really understanding something in a course makes it so much easier to remember and how that makes learning tasks more enjoyable and rewarding, deep reading might be something they end up doing for themselves.
5. Perspective taking—If the readings themselves pull students in, engage them by challenging beliefs, proposing alternatives and different views, and offering interesting anecdotes, that engages readers and keep them in the text for longer.
6. Requiring higher-order thinking—"If texts and papers allow the students to be successful with only rote memorization … there is little enticement to read deeply." (p. 130) The same is true of tests. Questions must make students do more than regurgitate.

Reference: Roberts. J. C. and Roberts, K. A. (2008). Deep reading, cost/benefit, and the construction of meaning: Enhancing reading comprehension and deep learning in sociology courses. *Teaching Sociology, 36* (April), 125-140.

## Quotes to Tickle Your Brain

"There are two ways to live your life. One is as though nothing is a miracle. The other is as though everything is a miracle." -- *Albert Einstein*

"Courage is not simply one of the virtues, but the form of every virtue at the testing point." -- *C.S. Lewis*

"The only ones among you who will be really happy are those who will have sought and found how to serve." -- *Albert Schweitzer*

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### *Resources to Courses*

Many professors use WebCT/Blackboard to post their syllabus, course calendar and list of required readings, even if the class format is face-to-face. Courseware usually also has a link to library resources. Your HPD Library liaison can help create customizable resources to supplement library instruction. For example the course may have a link to medical reference sources with a description such as "use instead of Wikipedia". Courses within the College of Pharmacy have added an embedded librarian presence, "Courtney's Corner", in WebCT/Blackboard with instructional material—such as determining the impact factor or a journal or identifying peer-reviewed articles—in addition to library instruction tutorials. An embedded librarian presence within a course serves as your teaching assistant.

As the liaison librarian works with you to develop course content, many benefits are derived. The liaison is more attuned to your instruction needs as well as learning outcomes and can recommend using new resources that may enhance courses. Students are able to access tutorial content and are guided to using authoritative health information sources instead of floundering in Google. More supplemental and detailed instruction may be provided using bibliographic manager software such as EndNote or Zotero. Library instruction may be broken into smaller chunks of information that are more easily assimilated. Both the student and professor save time, and more important resources can be pushed at the point of need. If the college has turnover in the department, the HPD Library liaison may also be able to assist the new professor more closely with what materials and resources were used in the past. Distance students can feel less isolated from the library by the librarian's presence in the courseware and be more inclined to contact the librarian for assistance.

The HPD Library liaisons are also creating subject guides which may be embedded within WebCT/Blackboard. General subject guides will correspond to the colleges of HPD, and at the request of an instructor, special course guides may be created to help create quality librarian instruction components within your courses.

Need more information? Contact your HPD Liaison Librarian:

Courtney Mlinar: Colleges of Pharmacy, Optometry, Dental Medicine

Lynne Joshi: Colleges of Osteopathic Medicine, Medical Sciences

Bonnie DiGiallonardo: Colleges of Allied Health and Nursing