

IT'S ALL IN WHAT YOU ASK: TECHNIQUES FOR ENHANCING REFLECTION AND LEARNING IN AN ONLINE COURSE

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We describe two techniques, prompting and process modeling, that we used in an attempt to improve student understanding of the concept of bias in information sources. We designed an action research study (O'Hanlon and Diaz, 2010) so that we could evaluate the effectiveness of this effort, along with efforts to promote reflection by students in our online course. We will provide examples of reflective questions and discuss how we were able to make this work more efficiently in the online course that we teach.

Why were we concerned with building reflection into our online course? The study *Information Behaviour of the Researcher of the Future, 2008* <http://www.ucl.ac.uk/infostudies/research/ciber/downloads/ggexecutive.pdf>, commissioned by the British Library, looked at transaction logs to determine information behavior of both students and scholars and found similar behavior by both groups – they move quickly and read only superficially when they work online. Around 60 percent of e-journal users viewed no more than three pages and a majority (up to 65 percent) never returned. Users of digital content are not reading online in the traditional sense. Other studies by psychologists have suggested that thinking fast made participants feel more elated, creative, energetic and powerful. This behavior is rewarding, but it tends to create a staccato quality of thought, where readers jump from idea to idea as they jump from site to site. A reader may get a lot of breadth of information, but sacrifice depth (Marshall, 2010).

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Students want to work quickly and we teach and encourage them to make quick judgments about information sources. But some critical intellectual tasks, such as determination of accuracy and bias, really require more time, careful reading, and reflection. Students typically do not engage in these reflective activities unless specifically encouraged to do so.

METACOGNITION AND LEARNING

Reflecting on one's own learning (aka metacognition) is important, especially for less proficient students, and studies have shown that it works. Learning is enhanced when students engage in metacognitive activities such as self-assessment and monitoring (Lin, 2001). Tools or features prompting students to reflect on learning were effective in improving outcomes (Means et al, 2009). Although reflection is important in every kind of instructional setting, in Web-based environments learners are asked to complete complex tasks independently, with little support from others, and self-regulated learning strategies are essential to success.

How do you encourage students to reflect? Ask them. Incorporate this into your in person or online instruction. There are various kinds of prompts. High-level prompts are questions related to how well the student comprehends and can integrate instructional content. Lin (2001) discusses "process prompts," questions asking students to monitor how and why decisions were made and to explain specifically where and what they did not understand, and notes that they are likely to be effective. Solving information problems is a complex cognitive skill. Several experiments related specifically to information problem solving used reflective or self-monitoring prompts successfully to improve student outcomes. Lin (1999, p. 43) notes that "reflective thinking involves actively **monitoring**, evaluating,

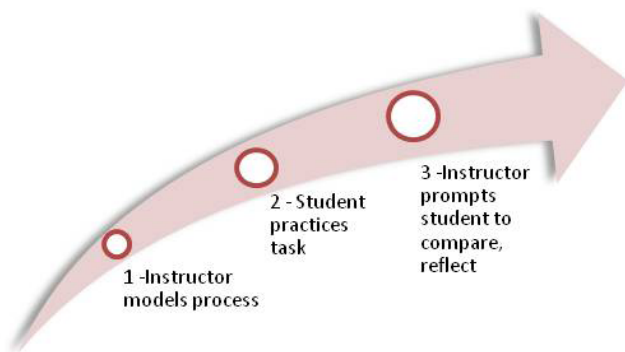
and modifying one's thinking and **comparing** it to both expert models and peers." Pace and Middendorf (2004) suggest that instructors can help students overcome learning obstacles (bottlenecks) by reflecting in depth on the steps an expert would take to accomplish a particular task and then modeling it for students.

MODELING AND REFLECTION

In order to determine how well they are doing, students need a point of comparison. Process modeling focuses on the steps an expert would take when solving a problem and may be demonstrated through a video in an online course. It is also important to incorporate practice and reflection opportunities into the video. Providing a good model of a complex process for students is an important component of any approach to incorporate reflection into the curriculum. It is also important for instructors to reflect on their own process and do their best to consciously model it for students.

Figure 1 shows a model for bringing these two techniques together. We suspect that quite often we instinctively use steps one and two but stop short of the third, critical step, literally asking students to compare their work to the model and identify what they could do better. This method can work equally well in a one shot lecture, an extended workshop, or in online instruction, using learning objects.

Figure 1

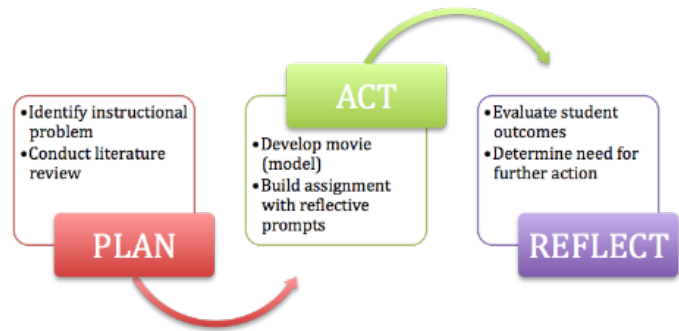


The research we did was for one of the online classes we teach, Internet Tools and Research Techniques. The purpose of this four week course is threefold: To help students learn to use the Web browser, e-mail and online discussion tools effectively for a variety of academic tasks; to develop the skills needed to do online research, using the Internet and library databases; and to teach or reinforce the skills needed to be successful in future online courses.

A critical obstacle to learning in this course involves student understanding of the process of identifying bias in information sources. Most students are upperclassmen, with a variety of majors. Although we teach steps in evaluating sources and provide some practice with feedback in course assignments, it became apparent that a number of students were still unable to perform this task adequately after instruction, as evidenced by their final capstone assignments. We adopted an

action research model to guide our efforts to find a remedy for this problem. The model, shown in Figure 2, is iterative, so that results from one cycle, when complete, can feed into another cycle. In our case, we conducted research over two academic quarters and based on our assessment of progress in cycle one (autumn 2008) we made changes in the curriculum for cycle two (winter 2009).

Figure 2



NEW INSTRUCTIONAL CONTENT

In our planning phase we determined that we needed additional and more in-depth course content focused on this topic. We learned from our research that movies can be an effective tool for modeling in online courses, where students don't have direct contact with the instructor. Mnemonics also help students to remember new strategies. We used Adobe Captivate to produce the movie. One feature of this software is the ability to insert various types of practice activities into the content and provide feedback to the student on their answers.

We developed a movie to teach a strategy for identifying bias. The MAPit strategy focuses on critically examining Message, Author, and Purpose of the information source. Message analysis is the most difficult part of the process for many students. For each of these message attributes, examples and some practice opportunities are provided. The movie also offers instruction on specific methods for determining author credibility and the primary purpose of an information source or site. The entire movie can be viewed online at <http://liblearn.osu.edu/movies/bias.htm>.

NEW QUIZ

Along with introducing the movie as instructional content, we also developed a new quiz for the content. The quiz includes four multiple choice questions that assess recall of content from the movie, two multiple choice questions with links to websites that assess students' ability to apply the MAPit strategy and finally two open ended questions (metacognitive prompts) intended to encourage reflection by students.

Reflective questions were intended to encourage students to think about their level of understanding and ability to apply the strategy as well as any actions needed to improve their ability to recognize bias. In our second research cycle, we decided to try a slightly different method of encouraging

reflection, given the large enrollments in this course and the additional grading required by including open-ended questions. Before offering the course again, we reviewed and categorized student responses to the open-ended quiz questions, and used this data to construct multiple-choice responses to the questions containing metacognitive prompts. This facilitated comparison of student responses between the two course offerings (autumn 2008 and winter 2009), described later in this paper. Also, by making the quiz entirely multiple-choice and thus available for automatic grading by the course management system, immediate feedback is available to the student.

Here is how the first reflection question changed from the first analysis to the second:

<i>Autumn 2008</i>	<i>Winter 2009</i>
<p>How well do you understand what is needed and how prepared do you feel to recognize bias in other information you encounter?</p> <p>(To receive credit, your answer must include at least one complete and clear sentence.)</p>	<p>How well do you understand what is needed and how prepared do you feel to recognize bias in other information you encounter? (Select one.)</p> <ul style="list-style-type: none"> • I understand the concepts related to, and feel confident that I will be able to recognize bias in all other information sources. • I understand the concepts needed to recognize bias, but think it may still be difficult to recognize bias in some information sources. • Not all the concepts related to recognizing bias are easy for me, and am not confident in my ability to recognize bias in all information sources. • I do not feel prepared at all to recognize bias in information sources.

Similarly we were able to categorize responses to the second reflection question, which was open-ended the first time around, to offer it as a multiple-choice question the second time.

<i>Autumn 2008</i>	<i>Winter 2009</i>
<p>What do you think you should do to improve your own abilities for recognizing bias?</p> <p>(To receive credit, your answer must include at least one complete and clear sentence.)</p>	<p>What do you think you should do to improve your own abilities for recognizing bias?</p> <ul style="list-style-type: none"> • I need to remember to apply the MAPit strategy in the future. • There are one or two elements in the MAPit strategy that I know are challenging for me, and need to pay attention to those when I try to detect bias. • I need to pay more attention to elements from information sources (such as author credentials, or "about us" links). • I should spend time practicing going to web sites and applying the MAPit strategy to get good at it.

CONFIDENCE

By changing the way we asked these questions, something very interesting happened, as shown in Table 1.

Table 1

Q.7 Confidence in detecting bias	Autumn 2008	Winter 2009
Very confident	83.33%	26.53%
Somewhat confident	14.58%	61.22%
Not very confident	2.08%	10.20%
Not at all confident	0.00%	2.04%
Q.8 How to improve ability to detect bias	Autumn 2008	Winter 2009
Remember to apply MAPit strategy	15.00%	30.61%
Improve understanding of elements of MAPit strategy	45.00%	12.24%
Pay more attention to elements of websites	17.50%	40.82%
Practice applying MAPit strategy to websites	22.50%	16.33%

For autumn 2008, we questioned 50 students; in winter 2009 we questioned 49 students. In question 7, we saw student responses about their confidence level become much more tempered from autumn to winter. Many studies have shown that students tend to be over confident in their skills. It is interesting to note that by suggesting terminology, student confidence dropped from "very confident" (83%) to "somewhat confident" (61%). The change in q. 8 was also notable. In this case, when terminology was suggested, fewer students selected the somewhat "general" concept of "improving understanding" to more specific strategies of "applying" and "paying attention to elements."

PERFORMANCE

We saw a change in confidence level of students in one version of the bias quiz to the other, but what about their performance level? Table 2 shows that even though confidence subsided, performance actually rose for all but one question.

Table 2

Question Focus	Percent of Correct Answers	
	<i>Autumn 2008</i>	<i>Winter 2009</i>
1. What letters in MAPit represent	98.04	100.00
2. Factors in analyzing message	84.31	87.76
3. Relevance of author credibility	96.08	100.00
4. Factors in determining purpose	62.75	67.35
5. Simple application to website	74.51	79.59
6. More complex application to site	58.82	53.06

The other assignment that we looked at in this study was our capstone assignment. We wanted to see if what students had learned previously in the course carried through to the last assignment of the course where they needed to put their knowledge to work in an applied setting. When analyzing results for this assignment we also looked back at data before the new instruction was offered to get a picture of the effectiveness of the instruction.

Table 3

Question Focus	Autumn 2007 n= 144 ⁴	Winter 2008 n=144	Autumn 2008 n=50	Winter 2009 n=49
	BEFORE instruction		AFTER instruction	
	Average overall success rates ¹	83.14%	85.08%	84.75%
Q8 Site is reference, commercial, advocacy ²	81.94%	85.42%	80.39%	83.67%
Q11 Site is biased or balanced ²	81.94%	84.03%	82.35%	79.59%
Q24 Evaluation of a site, including issues of bias ³	76.85%	83.1%	86.49%	90.57%
Q25 Comparison of two sites, which may or may not address issues of bias	74.48%	77.43%	79.9%	90.31%
Notes:				
1. All sections were evaluated by the same grader.				
2. Sites evaluated vary within sections and between quarters, making comparisons difficult.				
3. User selects new site to evaluate, based on search results.				
4. Enrollment numbers (n) were different from 2007/08 to 2008/09.				

We looked at the questions in the Capstone assignment that related to the instruction in the MAPit movie. You can see that from autumn to autumn there was improvement, especially for the more difficult questions (Q24 and Q25). And again, in winter to winter there was improvement in these two application questions. (We do not have any quantifiable explanations to explain why students seemed to do better in winter than in autumn, but there did seem to be a trend towards that.)

Besides looking at confidence and performance numbers, we also did some qualitative analysis of student work in autumn 2008 to see what effect the metacognitive prompts may have had. We looked at the work of students receiving the 3 highest and the 3 lowest scores on the Capstone assignment as the culminating experience of the course. One pattern that seemed most to separate the highest scores from the lowest on the Capstone assignment is the overall performance. Those who did best on the Capstone also did best over the entire course; those who did worst performed worse overall. Another somewhat related pattern is that students who performed better tended to work over a more extended period of time, where the low scorers “crammed” their work into a smaller time frame. A benefit of working evenly over time is the ability to do some self-regulation. Another is the ability to allow oneself time to interact with the instructional components of an online course. Both patterns support the contention reported in Dunning (2003) that better students have better metacognitive and self-regulatory skills.

The other qualitative study we did was to compare the language used in the Capstone question 25, which is open ended, requiring students to answer in their own words. We looked at word counts of terms related to reflection and bias to gain a different perspective on their performance. Some of terms we examined were: think, seem/seems, believe, and appear, as reflective terminology. Words like bias, balance, data, facts, neutral, slanted, author, authority, purpose and mission were all terms related to bias that were introduced in the instructional material which are considered to be MAPit terminology. There was little difference from one quarter to the next in terms of language used.

Our action research findings have prompted us to not

only make improvements in what we do in the course that was studied, but we have also begun to think about how to improve reflection in another course, Advanced Online Research. This additional course does more to introduce students to library databases and subject specific tools. Course readings introduce students to what professionals are saying about the state of research. We do suspect, however, that students do a lot of cherry picking for answers in the quizzes covering the readings and not much reflection, as is the actual intent.

Again, we ask several cognitive questions which draw both on students’ ability to recall what is in the article, and also one to see if they comprehend the article. Finally, we ask a reflection question that summarizes the points made by the article and asks students to identify that with which they MOST agree. This allows them the opportunity to have a second attempt to reflect on the article in a more personal way. We made this a multiple choice question which, when auto scored, will give credit for any answer the student selects, just like our previous multiple choice reflection questions. It was possible to create this list of options simply by listing each point the author made.

We have learned that prompting for reflection does not have to be grand or time consuming for the instructor. Small prompts intentionally placed throughout the course can be effective for causing students to reflect in a way that helps them perform better. We expect to continue to introduce this technique through all our classes as we revise them.

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