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From Sage on the Stage to Guide on the Side

Alison King

In most college classrooms, the professor lectures and the students listen and take notes. The professor is the central figure, the "sage on the stage," the one who *has* the knowledge and transmits that knowledge to the students, who simply memorize the information and later reproduce it on an exam—often without even thinking about it. This model of the teaching-learning process, called the transmittal model, assumes that the student's brain is like an empty container into which the professor pours knowledge. In this view of teaching and learning, students are passive learners rather than active ones. Such a view is outdated and will not be effective for the twenty-first century, when individuals will be expected to think for themselves, pose and solve complex problems, and generally produce knowledge rather than reproduce it.

According to the current constructivist theory of learning, knowledge does not come packaged in books, or journals, or computer disks (or professors' and students' heads) to be transmitted intact from one to another. Those vessels contain information, not knowledge. Rather, knowledge is a state of understanding and can only exist in the mind of the individual knower; as such, knowledge must be constructed—or reconstructed—by each individual knower through the process of trying to make sense of new information in terms of what that individual already knows. In this constructivist view of learning, students use their own existing knowledge and prior experience to help them understand the new material; in particular, they generate relationships between and among the new ideas and between the new material and information already in memory (see also Brown, Bransford, Ferrara, and Campione 1983; Wittrock 1990).

When students are engaged in actively processing information by reconstructing that information in such new and personally meaningful ways, they are far more likely to remember it and apply it in new situations. This approach to learning is consistent with information-processing theories (e.g., Mayer 1984), which argue that reformulating given information or generating new information based on what is provided helps one build extensive cognitive structures that connect the new ideas and link them to what is already known. According to this view, creating such elaborated memory structures aids understanding of the new material and makes it easier to remember.

In contrast to the transmittal model illustrated by the classroom lecture-note-taking scenario, the constructivist model places students at the center of the process—actively participating in thinking and discussing ideas while making meaning for themselves. And the professor, instead of being the "sage on the stage," functions as a "guide on the side," facilitating learning in less directive ways. The professor is still responsible for presenting the course material, but he or she presents that material in ways that make the students do something with the information—interact with it—manipulate the ideas and relate them to what they already know. Essentially, the professor's role is to *facilitate* students' interaction with the material and with each other in their knowledge-producing endeavor. In the constructivist model the student is like a carpenter (or sculptor) who uses new information and prior knowledge and experience, along with previously learned cognitive tools (such as learning strategies, algorithms, and critical thinking skills) to build new knowledge structures and rearrange existing knowledge.

But how do we get from transmission of information to construction of meaning? Such a change can entail a considerable shift in roles for the professor, who must move away from being the one who has all the answers and does most of the talking toward being a facilitator who orchestrates the context, provides resources, and poses questions to stimulate students to think up their own answers.

Change is never easy; usually, however, changes are easier to bring about by modifying existing practices than by starting afresh. So, we will begin by looking at some practical active-learning activities that can be incorporated into a typical lecture; then we will move on to

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the more formal approach of cooperative learning, an alternative to the lecture. This sequence will show how the professor can make a gradual transition from the role of sage to that of guide.

Promoting Active Learning

Active learning simply means getting involved with the information presented —really thinking about it (analyzing, synthesizing, evaluating) rather than just passively receiving it and memorizing it. Active learning usually results in the generation of something new, such as a cause-effect relationship between two ideas, an inference, or an elaboration, and it *always* leads to deeper understanding. However, students do not spontaneously engage in active learning; they must be prompted to do so. Therefore we need to provide opportunities for active learning to take place. A general rule of thumb might be as follows: for each major concept or principle that we present, or that our students read about in their text, we structure some activity that requires students to generate meaning about that concept or principle. For this approach to be effective, students must use their own words and experiences—not regurgitate the text or lecture.

An active-learning activity that can easily be incorporated into a lecture is "think-pair-share." Let's look at an example of how this works. Dr. Jones is lecturing to his Anthropology 101 class on the role of language in culture. After several minutes, he poses the question: "What do you think would happen if we had no spoken language? Think about that for a minute." After a minute he continues, "Now pair up with the person beside you and share your ideas."

Each of the examples of active learning listed in Table 1 can be similarly incorporated into a lecture and can be accomplished during a one- to four-minute pause in the presentation. When I use these tactics during a lecture, I simply stop talking for a few minutes and have students engage in one of the activities. Then I have selected students share the product of their activity before continuing with my presentation. Students either work alone or collaborate in pairs.

Table 1.—Learning Activities to Incorporate into a Lecture

Student activity	Explanation or example
Think-pair-share	Students individually think for a moment about a question posed on the lecture, then pair up with a classmate beside them to share/discuss their thoughts
Generating examples	Students individually (or in pairs) think up a new example of a concept presented
Developing scenarios	Students work in pairs to develop a specific scenario of how and where a particular concept or principle could be applied
Concept mapping	Students draw a concept map (a graphic representation such as a web) depicting the relationshps among aspects of a concept or principle
Flowcharting	Students sketch a flowchart showing how a procedure or process works
Predicting	Given certain principles or concepts, students write down their own predictions about what might happen in a specific situation
Developing rebuttals	Students individually develop rebuttals for arguments presented in the lecture and then pair up with another student to argue for and against
Constructing tables/graphs	Students develop a table or draw a graph representing information presented
Analogical thinking	Students propose a metaphor or analogy for a principle or procedure
Problem posing	Individual students make up a real-world problem regarding a particular concept or principle, then exchange problems with a classmate for solving
Developing critiques	Students develop a critique of a common practice
Pair summarizing/checking	Students work in pairs—one summarizes what's been presented and the other listens and checks for errors, correcting errors when noted

Guided Reciprocal Peer Questioning

Now let's look at small group learning processes. These are methods that promote problem exploration and task completion by students working in small groups while also having individual students engage in interactive learning with their peers. In these small groups the student is simultaneously an active constructor of knowledge and a collaborator with peers in a shared construction of meaning; the role of the professor is to guide and facilitate this process.

Again, let's begin with an instructional approach that is interactive, can be used in conjunction with the familiar lecture presentation format, and that gets students actively involved in constructing meaning. This is an approach that I have developed and that I call "Guided Reciprocal Peer Questioning" (King 1989, 1990, 1992).

Guided Reciprocal Peer Questioning is an interactive learning procedure that can be used by students in any area of the curriculum to help them actively process material presented in lectures or other classroom presentations. Students work in groups of three or four. They are provided with a set of *generic* questions to use as a guide for generating their own *specific* questions on the lecture content (see Figure 1). With the help of the question stems, each student individually writes two or three thought-provoking questions based on the lecture. Following this self-questioning step of the procedure, students engage in peer-questioning. They pose their questions to their group and then take turns answering each other's questions in a group discussion format.

These generic questions are designed to induce higher-order thinking on the part of students. For example, simply formulating specific questions (based on the generic questions) forces students to identify the relevant ideas from the lecture, elaborate on them, and think about how those ideas relate to each other and to their own prior knowledge. Responding to others' questions further extends such active learning.

A Classroom Example

Professor Tax-Fax lectures to his introductory principles of accounting class for twenty minutes on the topic of intangible assets. Then he pauses, signals to the class, and the students turn to their neighbors and form groups of three. Dr. Tax-Fax turns on the overhead projector to display a list of questions. All of the questions are content-free, such as, "What does . . . mean?" and "What conclusions can you draw about . . . ?" (see Figure 1). Dr. Tax-Fax expects his students to use these generic questions to guide them in formulating specific questions on the topic of intangible assets. Within a few minutes, each student in the class (working individually) has selected appropriate generic questions and has written down one or two specific questions. At another signal from Dr. Tax-Fax, the small groups begin their questioning and responding (see dialogue in Figure 2).

Figure 1. Generic Questions

What is the main idea of . . . ?
What if . . . ?
How does . . . affect . . . ?
What is the meaning of . . . ?
Why is . . . important?
What is a new example of . . . ?
Explain why . . . .
Explain how . . . .
How does this relate to what I've learned before?
What conclusions can I draw about . . . ?
What is the difference between . . . and . . . ?
How are . . . and . . . similar?
How would I use . . . to . . . ?
What are the strengths and weaknesses of . . . ?
What is the best . . . and why?

The students continue asking and answering each other's questions for several more minutes until Dr. Tax-Fax indicates that their discussion time is over. He then brings the class together to share and discuss inferences, examples, and explanations generated by the different small groups and to clarify any misunderstandings that the students might have had regarding the topic of intangible assets.

An Analysis of the Example

Dr. Tax-Fax's students were engaged in several forms of active learning during their guided peer-questioning and responding activity. First of all, they had to think critically about the lecture content just to be able to formulate their specific thought-provoking questions. To generate those questions, not only did the students have to identify the main ideas of the lecture, they also had to consider how those ideas relate to one another and to the students' own existing knowledge. Second, in order to answer those questions, the students had to be able to analyze and evaluate ideas presented, apply the information in new situations, generate inferences from the lecture material, and identify relationships among the concepts covered.

More specifically, in order to respond to a student's question, the other students in a group had to construct explanations and communicate them. Explaining something to someone else often requires the explainer to think about and present the material in new ways, such as relating it to the questioner's prior knowledge or experience, translating it into familiar terms, or generating new examples. Such cognitive activities force the explainer to clarify concepts, elaborate on them, reorganize thinking, or in some manner reconceptualize the material.

Webb's (1989) extensive research on interaction and learning in peer groups indicates that giving such explanations improves understanding for the individual doing the explaining. For example, in the sequence of dialogue shown in Figure 2, Maggie asked her group for the definition of the term *intangible assets*, and Fred, in the first part of his response, simply parroted Dr. Tax-Fax's definition. However, Fred showed that he actually had made some meaning for the term when he later explained why the cookie recipe would be considered an intangible asset, thus suggesting that he had reorganized his thinking by incorporating that concept into his existing knowledge. Similarly, Sam's inclusion of Mrs. Field's cookie recipes as a new example of intangible assets was an indication of reconceptualization on *his* part. Furthermore, Sam's explanation of how Mrs. Field's recipe (an intangible asset) could lose value showed concept clarification—he really understood some of the nuances of the concept. Essentially, Sam was using his prior knowledge to make sense of the newly presented concept of intangible assets.

When students think about class material in these ways, they actively process the ideas and construct for themselves extensive cognitive networks that connect the new ideas and link them to what they already know (e.g., Mayer 1984). Developing such cognitive networks facilitates understanding and makes it easier to remember the new material. In the discussion precipitated by Sam's "What if . . . ?" question, the three students together explored the relationship between maintaining the value of unique intangible assets and dissemination of the information that makes those assets unique. In speculating on the effects that the newspaper advertisement might have for Mrs. Field's business, they undoubtedly forged new links among the ideas presented in the lecture and between those ideas and their own prior knowledge. For example, Fred integrated the new information about intangible assets with marketing/advertis-

Figure 2. Sample Guided Reciprocal Peer-Questioning Dialogue

Maggie starts her group off by reading her first question, "What does 'intangible assets' mean?"

FRED: Well, Dr. Tax-Fax said in the lecture that intangible assets are things that a company has that have value but aren't concrete—you can't actually see them like you can machinery or buildings or merchandise. Things like goodwill—and patents and trademarks—stuff like that. But you have to count them on the books somehow. You have to come up with a dollar value for them. And when you sell a company, the intangible assets are sold too.

SAM: I suppose things like Mrs. Field's cookie recipes would be considered an intangible asset too.

FRED: Yeah, I guess so. It fits the definition. They're not concrete, but they're valuable. People love her cookies! Her cookies wouldn't be unique if every cookie shop and bakery had the recipe.

SAM: Well, that's what I'm wondering about. I read in the paper a few months ago that someone called up to the headquarters of Mrs. Field's Cookies and asked if they could get the recipe for Mrs. Field's chocolate chip cookies. The receptionist who answered the phone said that the recipe could be bought and that the caller could even put the charge on his credit card. Which he did. Somehow there was a miscommunication because the caller thought he was being charged two dollars for the recipe but when the credit card statement arrived it was for two *thousand* dollars. The caller was so angry that he put an ad in the paper offering Mrs. Field's chocolate chip cookie recipe free to anyone who called his number. And he put the recipe on his answering machine. He got so many calls that he printed the recipe in the newspaper along with an explanation of what had happened to him. The point of telling this story is that I wonder: Did Mrs. Gield's intangible asset drop in value because of that incident? What if everyone in the United States read that paper?

MAGGIE: Then anyone could make those cookies! There wouldn't be anything special about Mrs. Field's cookies any longer.

FRED: Of course the recipe would be less valuable!

MAGGIE: And then Mrs. Field's assets would be smaller and the value of her business would be less.

SAM: Also the *volume* of her business would probably decline because people would make their own "Mrs. Field's cookies" instead of buying them.

FRED: But would they? In our marketing class we learned that consumers in today's society are pretty lazy—or at least they prefer the leisure time to doing the work. And they'd rather spend the money to buy things than spend the time to make them.

SAM: So maybe only people who enjoy cooking would actually use the recipe, and all the others would continue to buy cookies from Mrs. Field.

MAGGIE: In that case Mrs. Field wouldn't lose much in terms of her business.

SAM: But I don't think the real threat to Mrs. Field's intangible asset would be the general public. I think other cookie shops would start using her recipe to make cookies and then there would be more competition for Mrs. Field and that would hurt her business. They could even advertise that they used her recipe.

FRED: Yeah, we learned in Marketing 101 that it's legal to say things like that in advertising and even actually mention your competitor's name.

MAGGIE: But why do you think Mrs. Field would offer such a valuable intangible asset for sale at all? Especially at such a low price? And does that mean that the actual value of that intangible asset is only $2,000?

ing concepts (such as consumer characteristics and the deliberate comparison with specific competitors) that he had learned about in a different course.

Dr. Tax-Fax's role in this activity was purely facilitative. As a guide on the side, he promoted knowledge building in unobtrusive but powerful ways. To begin with, he provided the students with question starters written at the higher levels of Bloom's (1956) taxonomy of thinking. He was well aware of the importance of carefully selecting the generic question starters to be used.

He knew that the generic questions would control the quality of the specific questions students asked and that those questions in turn would influence the quality of student thinking and knowledge building during discussion. All he had to do was structure the situation to allow that to happen. Therefore, after providing the guiding questions, he arranged the class in groups of three with the requirement that they discuss the topic of intangible assets by taking turns asking and answering each others' specific questions on the topic. Because this reciprocal questioning-answering procedure requires each individual to contribute questions and answers, all members of each group were obligated to particapate, but no one individual dominated the discussion.

Professor Tax-Fax had his students work in small groups because he knew that learning through peer-group interaction results in cognitive benefits for each student far beyond those that an individual would experience working alone. He was aware that in small group learning contexts such as Guided Reciprocal Peer Questioning students are confronted with each others' conflicting viewpoints on issues as well as differences in each other's prior knowledge and current understanding of the topic, and, in attempting to understand each other's views and come to agreement, individual students have to modify their own thinking. Each member of such a group makes important and necessary contributions to the construction of a shared understanding of the topic; however, each individual's understanding and expression of it are idiosyncratic. Such learning exemplifies the social construction of knowledge—a model of the learning process that is constructivist in nature but that also emphasizes collaboration.

When Professor Tax-Fax ended the activity by calling on each group to share its ideas, he was extending the social construction of knowledge to a whole-class context. In doing so, he made sure that new inferences and understandings were disseminated across groups and that if groups arrived at conflicting meanings, those differing perspectives would be revealed and could be reconciled through further whole-class discussion.

Effects of Guided Reciprocal Peer Questioning

In using Guided Reciprocal Peer Questioning with a number of college classes, I have found that teaching students to ask their own thought-provoking questions stimulates their critical thinking and promotes high-level discussion. Because of the reciprocal nature of this procedure, all students actively participate in the discussions. Even those students who are reluctant to participate in class for fear of asking the teacher "stupid" questions are less hesitant about posing such questions to their peers in a small group.

I have also found that students who are taught to ask and answer thoughtful questions perform better on subsequent tests of lecture comprehension than do students who use other comprehension strategies such as unguided group discussion or independent review (King 1989, 1990). Such an improvement in learning suggests that the students who engage in this questoning-answering process actually reconceptualize the material. In fact, tape recordings of the students' discussions have shown that students using Guided Reciprocal Peer Questioning give more explanations and highly elaborated responses to each other than do students who use either discussion or unguided reciprocal peer questioning straegies, thus indicating some degree of conceptual restructuring on the part of those particular students.

Cooperative Learning

The same sociocognitive benefits that derive from Guided Reciprocal Peer Questioning can be obtained from other instructional approaches that call for cooperative learning, such as Jigsaw, Constructive Controversy, and Co-op Co-op.

Jigsaw

Jigsaw is a cooperative learning procedure commonly used in classroom settings (Aronson et al. 1978). In jigsaw, as with all cooperative learning approaches, the professor says very little but unobtrusively arranges the context and facilitates the process. Jigsaw activities are designed so that each student in a group receives only part of the learning materials and must learn that part and then teach it to the others in the group. Thus, each student's part is like one piece of a jigsaw puzzle; to understand the whole picture, students must have access to all parts of the learning materials. Because students must combine their pieces to complete the puzzle, each team member's contribution is highly valued.

In implementing a jigsaw activity, the professor divides the material to be learned into several parts—usually no more than five or six. Each part must be a unique source of information that is comprehensible on its own without reference to any of the other parts. Students are assigned to "home teams" with as many members as there are parts to the learning materials, and each team member receives one part of the material. Students reassemble into "expert groups" by joining all of the other students who received that particular part. In their expert groups, students read and discuss their part of the material together to learn it thoroughly. Then they return to their home groups and teach the part they learned to the other members of their team.

In this way, each team member is an expert in one part of the material to be learned, and each team member learns material from the other experts on the team; thus, jigsaw emphasizes interdependence. Finally, each student is tested independently to assess individual understanding of the complete set of material. In this way, jigsaw emphasizes individual accountability.

In a psychology course on theories of personality, for example, jigsaw might be used to present material such as differing theories of personality, alternative approaches to assessing personality, or specific examples of personality disorders. In some cases, a jigsaw teaching-learning approach might be used to provide an overview of a particular topic; in other cases, this approach might be used following the introduction of an area of study. (For developing specific uses for the jigsaw in various disciplines, consult Aronson et al. 1978).

Constructive Controversy

Another cooperative learning strategy for use with large classes is constructive controversy. In this procedure, students work in teams of four; pairs of students within teams are assigned to opposing sides of a controversial issue. Each pair researches its side of the issue and then the pairs discuss the issue as a team. The purpose of this discussion is to become more informed about the issue and to engage in collaborative construction of meaning—*not* to win a debate about the issue. After some discussion, pairs switch sides and argue for the opposite side of the issue. Finally, each student takes a test on the material individually to determine that student's understanding of the issue. Constructive controversy might be used in computer courses, for example, to encourage students to explore the ethical issues inherent in the use of computers, software, and telecommunications.

Co-op Co-op

Co-op co-op[1] is a student-centered cooperative approach to learning and can be used for the study of any unit of course material or for any number of research or problem-solving projects. Students work together in small teams to investigate a topic and produce a group product that they then share with the whole class. Thus the name "co-op co-op": students cooperate within their teams to produce something of benefit to the class; they are cooperating in order to cooperate. There are nine steps in implementing co-op co-op. Again, at each step the professor guides the process from the side, facilitating students' interaction with learning materials and with each other.

Step 1. Student-centered class discussion. At the beginning of an instructional unit, the professor encourages the students to discuss their interests in the subject to be covered. This discussion should lead to an understanding among the professor and all the students about what the students want to learn and experience during the unit. The importance of this initial discussion cannot be underestimated because co-op co-op will not be successful for any students who are not actively interested in a topic related to the unit.

Step 2. Selection of student learning teams. Students self-select into four- to five-member teams.

Step 3. Team topic selection. In their teams, students discuss their interests in the topics and then select a topic for their team. Each team should select a topic with which its members identify.

Step 4. Minitopic selection. Just as the class as a whole divides the unit into sections to create a division of labor among the teams in the class, each team divides its topic into minitopics to create a division of labor within the team. Each team member selects a minitopic.

Step 5. Minitopic preparation. After selecting their minitopics, students work independently to prepare their minitopics. Depending on the nature of the main topic being covered, the preparation of minitopics may involve library research, data gathering through surveys or experimentation, creation of an individual project, or some expressive activity such as writing a script or creating a video.

Step 6. Minitopic presentations. When students complete their minitopics, they present them to their teammates. These presentations should be formal. Presentations and follow-up discussion should allow all team members to gain the knowledge and experience acquired by each. Following the presentations, team members discuss the team topic like a panel of experts, critiquing the presentations and noting points of convergence and divergence. The professor should provide time for feedback and additional time for teams or team members to rework aspects of their reports in light of that feedback.

Step 7. Preparation of team presentations. Students integrate the minitopics for the team presentation. (Panel presentations in which each member reports on his or her minotopic are discouraged as they may represent a failure to reach high-level cooperative synthesis of the material.) The form of the presentation should be dictated by the content of the material. Non-lecture formats such as debates, displays, team-led class discussions, videotapes, simulations, role-playing episodes, or demonstrations are encouraged (as are the use of overheads and audiovisual materials).

Step 8. Team presentations. During its presentation, a team takes over the classroom and is responsible for how the class time, space, and resources are used.

Step 9. Evaluation. Being student-centered, co-op co-op calls for the class to have considerable say in how learning is evaluated as well as the criteria to be used in that evaluation. Therefore most evaluation will be self-evaluation or peer evaluation; however, the class may decide to include instructor evaluation also. Evaluation can take place on three levels: (1) team presentations (generally evaluated by the class or by the team itself), (2) individual contributions to the team effort (often evaluated by the team or the individual student), or (3) a write-up of the minitopic (often evaluated by the team).

Findings

Studies of group-based learning, conducted over the past twenty years, have shown that such approaches to learning can be effective in increasing student achievement (Slavin 1990). However, improved achievement seems to result primarily when the cooperative approach uses some sort of group goal and stresses individual accountability. Apparently, when students are individually accountable for their learning (e.g., when each member of the group must take a test) and a group goal is established (e.g., when every individual in the group must understand the material to pass the test), group members have incentive to help each other learn the material.

This sets up a condition of interdependence. Under these circumstances, group members tend to provide each other with elaborated explanations of concepts and processes so that everyone will understand the material and will excel on the test. As discussed earlier, explaining something to others improves one's own understanding (see Webb 1989). Cooperative and collaborative learning also have positive effects on self-concept, race relations, acceptance of handicapped students, and enjoyment of school (Slavin 1990).

Engaging our students in such active learning experiences helps them to think for themselves—to move away from the reproduction of knowledge toward the production of knowledge—and helps them become critical thinkers and creative problem solvers so that they can deal effectively with the challenges of the twenty-first century.

NOTE

1. The description of co-op co-op is adapted from S. Kagan, 1989, *Cooperative Learning Resources for Teachers*, San Juan Capistrano, Calif.: Resources for Teachers.

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