Fall 1992

Goodbye to the Lecture: Embracing Interactive Learning Techniques

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GOODBYE TO THE LECTURE:
EMBRACING INTERACTIVE LEARNING TECHNIQUES

by Stephen Newburg

BACKGROUND

This article addresses many factors on the frontier of improved effectiveness in teaching and learning. Although there are no specific references to any aviation-related courses of study, this field could benefit substantially from an interactive approach. Flight training has always been almost entirely pure memorization. Flight students are constantly going over system after system and procedure after procedure. This type of learning has yielded an extremely poor retention rate.

The realm of flight-training is now in an era that stresses subjects like cockpit resource management, pilot adaptability, and teamwork. Therefore, it seems odd that those responsible for flight training have not employed more interaction in their teaching on a consistent and widespread basis. Considering the amount of information that pilots need to manage, not only individually, but collectively with the members of their crews, a different approach should be examined. An approach that emphasizes better interpersonal skills, improved knowledge retention, and more acute conclusion-drawing abilities, should at least be analyzed by flight-training experts.

INTRODUCTION

Throughout history, the teaching profession has garnered many stereotypes. The stereotypical bad teacher is, perhaps, a Latin instructor who spends fifty minutes every class repeating verb tenses. The stereotypical good teacher can be found in any classroom and has vigor and zeal about the subject matter and conveys this easily. The popular film *The Dead Poet's Society* is a useful illustration of boring and ineffectual teaching styles compared to motivational and impactful ones. In this movie, Robin Williams plays a non-traditional instructor at a very traditional boarding school. His charisma, interactive technique, and off-the-wall nature create a feeling within his students of learning as an adventure rather than a task. This is not to say that there exists particularly charismatic and interactive ways to teach Latin, but there might be.

Interactive teaching approaches, according to many modern experts in the education field, may represent the future of successful learning. Therefore the time has come for an investigation and judgment of "traditional" teaching practices. In other words, the lecture method of teaching might consider, for the good of education, laying itself to rest in a grave of banality, allowing innovative and creative teaching methods to rise from its wake.

To meet head-on such an educational staple as the lecture is a difficult endeavor. After all, "the lecture method of instruction is the single most commonly used teaching method in the world and is by far the oldest existing method" (Broadwell, 1980). Therefore, expert theory, opinion, and case studies will be examined. An overview of the lecture itself and a definition of its merits and drawbacks will also be discussed.

LECTURE METHOD

The basic lecture can be summed up by the old adage "tell them what you're going to tell them, then tell them, then tell them what you've told them" (Broadwell, 1980). This is humorous partly because it is funny and partly because it is true.

The key word in defining a lecture is "tell." Lecturers generally rely on an organized soliloquy of their own information as the sole vehicle for

learning. Thus, there is a disproportionate amount of "telling" in this type of class. There is, therefore, a frustratingly small amount of opportunity for comment, interjection, or even questions on the part of the students. "Lecturing is a passive form of information transfer enjoyed by faculty as a demonstration of their academic prowess and tolerated by students as a substitute for their own scholarship" (Eisner and Carter, 1989).

Ideally, "lecture classes are part of the standard approach to high productivity in higher education. In such classes, knowledgeable instructors feed students masses of information in a very efficient manner" (Connolly, 1991). However, this is rarely the case. Lecture classes can be notoriously under-productive and inefficient. Students are often left with unanswered questions and an inability to draw their own conclusions after a lecture. Take, for example, an illustration provided in *Dimensions of Thinking* (Marzano, et al, 1988): a class can understand the individual dynamics of photosynthesis, that is, plants take in carbon dioxide, sunlight, and water and then produce oxygen. However, the class could not conclude that throughout this process plants produce their own food which is the purpose of photosynthesis. When a more interactive approach to this problem was presented, students were able to formulate and prove their own conclusions. This is only one example, but numerous similar scenarios can be found.

> [The teaching] profession doesn't have any collective memory at all. We just keep reinventing the wheel. Students just sit and listen to the conclusions of others. They have no idea what all this stuff is good for, or what effect it will have on their lives. It's a joke! It's a sham! It's a trick! It's teacher manipulation! (Jenkins, 1992).

OTHER STYLES - ENTHUSIASM

Until this point, there has been a presupposition that a lecture is not beneficial to learning. Unfortunately, lectures and lecturers exist in almost every learning environment. Thankfully, better approaches and more interesting people also inhabit these environments. This should not be taken to mean that plain classes and teachers are wholly unproductive while interesting classes and teachers are totally efficient. Clearly, plain is lower than interesting on a learning hierarchy, but this is merely one criteria that should be considered in understanding a worthwhile educational event. For example, the teacher of the Latin class mentioned in the first paragraph asks the students to conjugate verb tenses aloud for the entire period. This is known as the rote method and is a common way to teach classes in which much memorization is involved. The rote method of instruction is synonymous with the straight lecture method in terms objectives, designs, and outcomes. It is not very exciting. The teacher could, instead, come to class dressed as Julius Caesar and speak in an old-world tone and ask the class to also repeat verb tenses. This style would certainly hold more attention and the teacher would have a bit more panache in this case. Although it is unlikely that this alone will enhance the learning process, a more enthusiastic atmosphere is a major step in stimulating learning and knowledge retention.

The first item in the list of good teacher characteristics in *The Lecture Method of Instruction* (Broadwell, 1980) is enthusiasm. "The best enthusiasm occurs when the teacher gets excited about teaching students to do some things they couldn't do before they came to the teaching-learning exercise." As mentioned previously, rote teaching involves no enthusiasm, excitement, or appeal, so it lies on very tenuous grounds in terms of effective learning.

At this point, it might seem appropriate for a proponent of the straight lecture method of teaching to exclaim that there is no better way to teach languages, math, science, etc. This common refrain in support of the lecture will be addressed shortly.

FOXFIRE

Feedback and individual involvement in each class session are necessary to intensify learning. "Feedback is a critical component to students gaining mastery" and "leads to a longer retention period than the traditional lecture" (Connolly, 1991). There is an innovative and increasingly popular method of instruction which relies heavily on these important attributes. It is known as *Foxfire*, and was con-ceived by an Education profes-sor at the University of Georgia named Eliot Wigginton. "The *Foxfire* method is based on the notion that classrooms should revolve around the interests of students, rather than the direction of teachers or bureaucrats" (Jenkins, 1992).

The principles of *Foxfire* stress the following:

(1) Within the limits of the class objectives, all classroom activities must stem from the desires and interests of the students themselves.

(2) The teacher is not a boss or [an authority] but a guide.

(3) All work involves activity rather than passivity.

(4) The entire class, and not just the teacher, benefits from the work of the students.

(5) The class must be receptive to change when it deems the change useful.

This list is not comprehen-sive, but does represent the crux of the feedback/inter-action notion of *Foxfire*.

In practice, *Foxfire* methods replace traditional reading assignments and tests with open writing assignments, group discussions, role-playing, and peer reviews. This has shown to have a positive effect on students by giving them greater opportunities to explore subjects that interest them, by providing immediate and constructive input on their work, by allowing for questions and concerns to be addressed more comfortably and more quickly, and by giving students a "vested interest" (Jenkins, 1992) in their assignments.

Foxfire is an especially noteworthy teaching philosophy which has a *Foxfire*-trained following of 1500 and has received over 3 million dollars in donations in six years. This method has also gained critical acclaim from educators across the country. "When compared to conven-tional schooling practice, *Fox-fire* fares remarkably well and merits a great deal of praise" (Jenkins, 1992).

Referring to the aforemen-tioned supporters of the lecture, *Foxfire* has been used in classes that are customarily rote-oriented. For instance, interactive *Foxfire* methods have been used effectively in English classes which typically involved pure memorization of sentence structure and the like. "Such exercises are far more productive than having [learners] memorize rules about sentence structure in a text-book" (Jenkins, 1992).

ACTIVE LEARNING

A more interactive ap-proach has also been used in science related applications with similar results. A case study in "active learning" con-ducted in a group of college biology courses presents an important illustration. The thesis of this study is that "students entering science careers in the next century are likely to rely little on factual information conveyed by their teachers. They will rely heavily on problem-solving skills, and enthusiasm for the rapidly changing challenges in their fields" (Goodwin, et al, 1991).

Basically, the curriculum of a freshman biology course offered at Worcester Polytechnical Institute (WPI) in Massachu-setts in January of 1989 was drastically changed. The orig-inal course was conducted in the traditional lecture fashion. The new course was a semester long group project that encom-passed all the topics that were normally covered during the course of the term. There were class meetings, large group meetings, and small group meetings each week to discuss the progress of the project.

At the end of the semester, the students of this experimen-tal biology class were not tremendously satisfied with the format because they felt that they may not have learned as much as they may have in a traditional lecture. However, most students viewed the change of teaching style as a worthwhile method because it

broadened their perspective on biology. "These students expressed positive feelings about working in project groups and about the instructors. In addition, they said that the new approach had made them interested in learning more biology" (Goodwin, et al, 1991).

The same approach was then used in the next level of biology class offered at WPI. During the semester, students began to embrace this technique as one that enhances learning. Ultimately, the attitudes of these students about the original biology course changed. The preference for an "active" classroom dramatically increased and many students believed that the style used in Biology 1 was part of the impetus in their desire to continue in biology.

The grades of students who participated in these innovative classes were virtually identical to the grades of those who studied under the traditional methods. However, the non-traditional students clearly showed more motivation and desire for individual learning because they "were involved in a process of exploration, learning how to go about gathering information rather than being fed information and asked to memorize it" (Goodwin, et al, 1991). Additionally, one instructor referred to the students of the new format as "less likely than previous year's groups to expect the TAs or myself to tell them exactly what to do. There seemed to be some sort of

group esprit going" (Goodwin, et al, 1991). The other instructor commented that:

this year's sophomore class is less afraid to ask questions. They seem more aggressive, and less likely to remain silent if dissatisfied. They also seemed to have provided more highly creative answers on their essay exams (and) more alternative explanation than any preceding class I have taught (Goodwin, et al, 1991).

THE TEACHING MACHINE

Another case study dealing with group interaction and feedback methods was conducted at The American University in Washington, D.C. This study involves the use of an electronic device called a "Consensor" which enables and encourages mass participation in a lecture-style class. This study is useful on many counts, but is interesting in that it provides a quantitative measure of the success of feedback in learning and retention. The Consensor is a refinement of a teaching machine first conceived by B.F. Skinner and, in Skinner's own words, "emphasize the importance of immediate feedback in education and propose a system in which each student could move at his own pace" (Skinner, 1968).

In the class in which the Consensor is used, the teacher is able to present questions to the class to which everyone can

respond with privacy. This fact ensures that everyone will participate. The Consensor then tabulates the responses and displays them to the class. At this point, a student can ascertain his or her individual progress, and the teacher can evaluate his or her own success in delivering a clear course of study. Thus, classroom discussion can proceed in the most effective direction.

Using the Consensor did not take long to prove successful. "Research has indicated that the use of the interactive teaching technology increased discussion and group interaction" (Connolly, 1991). Also, it was determined "that students had an increased level of attentiveness and their test scores increased with the use of the Consensor" (Connolly, 1991).

However, the evidence illustrates conclusively that, when compared to traditional lecture techniques, a feedback/interaction oriented class "results in the retention of knowledge over a longer period of time" (Connolly, 1991).

In the experiment, the retention level of those in the traditional classroom declined by 13.5 percent in seven days. The retention level of those in the Consensor classroom declined less than 0.1 percent over the same period. Thus, the Consensor, or a derivative thereof, is a possible medium for working towards increasing learning and retention.

The other group included in

this study is known as the "hand-raisers." Hand-raisers experienced similar results to the Consensor class. Hand-raisers are those who would have voluntarily participated even without the Consensor. A possible solution to more effective learning, according to this study, is to create an entire classes of hand-raisers, but this is too idealistic an approach.

It should be noted that in a feedback style class, less information is covered because the increased levels of discussion and participation reduce the amount of time spent covering material. This seems like a relatively fair tradeoff, though, when the conclusions of this study are reviewed. They are as follows:

(1) It [the Consensor] contributed to increased class discussion by eliciting opinions that would otherwise not be voiced.

(2) It gave class members the ability to understand the attitudes and positions of the class as a whole.

(3) It helped test the students' level of knowledge.

(4) The Consensor facilitated arriving at closure on compelling arguments in controversial areas" (Connolly, 1991).

WHY LECTURE?

Presented thus far have been many negative feelings, studies, opinions, and testimony as they relate to the lecture. "Why does the lecture persist?" one must ask. The lecture is cost-effective and allows the greatest amount of material to be covered.

These are the only legitimate praises the lecture can receive when compared with the other teaching techniques already described. The actuality that a lecture is cost-effective could be the only fact keeping it in existence. The notion that the lecture is useful because it covers the most material is applicable only if success in learning and teaching is measured in quantity instead of quality.

Without the use of any outside sources, it is reasonable to conclude that a teaching style that incorporates group discussion, immediate feedback, recognition of individual likes and dislikes, encouragement of creativity, and individual exploration is, at the least, fun. Not only is it fun, but it is more constructive to all purposes in the instructional chain.

A class that revolves around the knowledge of one individual and memorization is not fun. It is an acceptable truth that learning should be fun. The classroom must be an enthusiastic and exciting environment for learning to flourish.

HOW TO IMPLEMENT INTERACTIVE TECHNIQUES

There are hundreds of liberal-arts-like classes that come to mind in which an interactive, feedback-oriented, fun approach can be easily implemented. However, it is slightly more difficult to conceive of such an approach to math and language courses. As seen with the biology class at WPI, a comprehensive bio-

logical project can take the place of the lecture. In a calculus class, students could devise their own word problems involving situations from their own lives that require a mathematical solution. Language students could benefit by acting out scenes from foreign films, plays, television shows etc. in the language they are studying. The possibilities seem endless.

Lecturers of today should be forced to modify their approach or potentially be at risk of losing their jobs. The lecture is being questioned in the gamut of teaching circles. A key recommendation made by the National Institute of Education in 1984 indicated that "faculty should design courses that enable students to be actively involved in the learning process" (Goodwin, et al, 1991). This could be seen as too big a task, or, perhaps, too useless a task by many a traditional teacher. In light of the information presented here and in the plethora of similar studies available, the more wide-spread use of interactive teaching methods should probably be a principal demand in future teaching. The lecture itself will remain, albeit in a highly modified form. Not all classes can be exclusively a group event, but it should be remembered that the teacher's role should be "that of guide, not authority" (Jenkins, 1992). Those in the teaching profession who are unwilling or unresponsive to such change should consider the *Guaranteed Failure System for Lecturing* and

Characteristics of a Good Teacher/Lecturer designed by Martin Broadwell in 1980. In brief, these descriptions follow:

* A teacher should not over-prepare or the students will not have enough time to actively participate in class.

* Command of the subject does not guarantee teaching success.

* Visual aids and outside sources make class more interesting and captivating.

* Calling on students who do not volunteer their participation is counter-productive.

* A student is not in class simply to be fed information.

* Classes should be designed around the students not around the material.

* Students should become involved in every class session.

* Teaching can be fun; therefore it is all right for the teacher to have a good time while in class even if that involves acting or "putting on a show."

* Disruptive students may be acting as such because they require additional attention in order to learn, not simply for the sake of being disruptive.

* The teacher is not the most important person in the classroom.

* Experience does not ensure an effective teaching style.

* It is imperative to give and receive feedback.

* The teacher is not the leader and the classroom should not be set up or conceived in this way.

This is just a paraphrasing of Broadwell's concepts. He believes in the lecture, but also understands that teaching is a very responsible pursuit and should have strict guidelines. Even though Broadwell defends the lecture, he does so in a way that might lead one to conclude that his definition of a lecture is strikingly similar to others' definitions of interactive learning environments.

The lecture may live on in the minds of some scholarly supporters, but mostly, in name only.□

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