Teaching Tip

A Simple and Effective Method for Teaching Information Systems Vocabulary and Concepts in a Large Lecture Setting

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ABSTRACT

A teaching method is described for use in large lecture settings as a way to help alleviate problems in content understanding, problems in concentration and lack of variety, need for multiple explanations, and lack of professorial assistance. The method has the instructor present a concept or problem, followed by students attempting to solve the problem or define the concept themselves, and then seeking agreement with the person to their right and their left. When agreement has been achieved, students each turn a name placard around so that the blank side is facing forward. The instructor can observe the ripple effect of understanding or non-understanding and quickly act appropriately. A survey study comparing the method to lecture only at two universities suggests that using it in combination with a lecture setting is superior to lecture only.

Keywords: Teaching method, Effective instruction, Lecture setting, Large class.

1. INTRODUCTION

It has been said that the game of chess takes "five minutes to learn and a lifetime to master". While five minutes might be a slight understatement, such a concept is nonetheless quite appealing: low initial investment, low overhead, and nearly limitless potential. This paper describes and reports on a teaching method with similar characteristics. The method is quick and easy to learn for both instructors and students, yet yields tremendous benefits. In fact, it might be said that this teaching method "takes five minutes to learn and provides a lifetime of benefits". In an era of incredible and often complex applications of technology to improve the pedagogical process, simple and effective methods are still greatly valued by all members of educational institutions.

This paper reports on such a method which uses mutual student agreement with a ripple effect to help students understand terms and solve problems. Evidence from a medium sized private East Coast university and a large public Midwestern university suggest that the method addresses many contemporary education problems.

2. BACKGROUND

Training and education in the field of information systems is viewed as a current critical issue (Kim & Kim, 1999). A review of the literature is Information Systems education reveals the following four major issues / problems in delivering effective instruction in large lecture settings: Problems in Content Understanding, Problems in Concentration and Lack of Variety, Need for Multiple Explanations, and Lack of Professorial Assistance. These issues are discussed individually below.

2.1 Problems in Content Understanding
Often students have trouble with the rapidly evolving content of an Information Systems course. In particular, given the pace of change in the Information Systems

field in the 1990s up to the present, the volume of material that needs to be covered simply to gain "general IS knowledge" is so formidable as to create problems (Gill & Hu, 1999; Lightfoot, 1999; Maier & Gambill, 1996; Nelson, 1991; Silver et al., 1995). Students find it difficult to grasp even the vocabulary and acronyms of the field, and without such foundation it is a stretch to think these same students would be able to effectively apply their new knowledge to business problems (Haworth & Van Wetering 1994; Lightfoot, 1999; Zawacki et al., 1988)

2.2 Problems in Concentration and Lack of Variety
A second problem is that students often have poor concentration in a large, lecture setting. Frequently students experience and have trouble with the lack of variety *in the presentation* of a large Information Systems course, in particular losing interest in a lecture-only format (Yaverbaum, 1993). In fact, Mckinney & Yoos (1998) note that pure lecture settings tend to reinforce isolated, passive thinking in students, if any information or knowledge is communicated at all. Purao (1998), Spruell & Le Blanc (1992), and Zack (1995) argue that passivity leads to problems in concentration and performance, and that some sort of active-based approach is necessary.

2.3 Need for Multiple Explanations
Students frequently need or desire multiple explanations of difficult topics, and the professor and the textbook are not enough (Mckinney & Yoos, 1998; Thomson, 1994). In particular, in a lecture setting most course information is tied to a single source, the professor, and teaching/learning activity focuses on that source's explanation (including biases) of the content (Thomson, 1994). Thus, teacher-centered courses have severe limitations in promoting learning, and additional sources are important (Mckinney & Yoos, 1998; Thomson, 1994).

2.4 Lack of Professorial Assistance
Despite the fact that multiple sources are necessary, certain students still sometimes desire and need more individual time with the professor of a lecture course. Doing so in a large lecture setting is problematic for the instructor, yet to ensure a quality learning experience some individual attention must be available to students (Gursky, 1998; Thomson, 1994; Wagner & Van Dyne, 1999).

3. THE TEACHING METHOD

This paper reports on a teaching method designed to alleviate all four of these issues / problems. The method is very simple: At the beginning of the semester, the instructor has every student make a large name placard. During class, the instructor develops a technique or concept on the computer screen, blackboard or overhead, just like a normal lecture (only the students know what is coming, and should have added incentive to attempt to

follow). Then, the instructor gives a similar exercise and tells the students to solve it using the rules previously described to them. These rules are:

1. Every name placard starts out facing the instructor.
2. Individual students attempt to solve the problem.
3. Students must check for, and seek, solution agreement with the person on their left and their right.
4. Once agreement is reached, the students should turn their placards around so that the white side is facing the instructor.
5. When all the instructor sees is white, he/she randomly calls on a student to give the answer.
6. If the answer is correct, the instructor moves on to a new concept.

Talking is of course encouraged during this process. Students have heard the instructor attempt to explain something, and if they are still having trouble, they now get a chance to hear a peer explanation. Simultaneously, the instructor is playing "Free Safety" in the process, going to areas of the room which are the most "dark" (least amount of placards turned around), giving personal attention where it is needed the most. "Smart" students and "less smart" students are equally likely to stay busy, as "smart" students are not allowed to turn their placards around until they have achieved agreement with their neighbors. The final result is a ripple effect, where if one student in a row understands the problem, all the students in the row should benefit. Finally, when a student is randomly called upon, there should be no risk of public embarrassment (a forbidden circumstance in many undergraduate cultures), as long as the process was followed. If in fact a student does give the wrong answer, the instructor can immediately call on other students in the same row to explain the reasoning behind the wrong answer, an answer they should share (by definition) as they are sitting in the same row. In three seconds the instructor can obtain an approximate status regarding the concept being taught and the problem assigned, simply by glancing at the placards. As consensus is needed among every member of the classroom to continue, this method will be referred to as the "Consensus Method".

4. THE STUDY

Hopefully it is clear from the previous section that the method is in fact easy to learn for both the instructor and the students. Of greater importance is that the method is beneficial. While nine years of anecdotal evidence certainly suggests that this is the case, more formal validation of the benefits of the method was desired and pursued using a survey in two separate courses in two separate universities. The hypothesis of the study was simply that the Consensus Method used in a lecture setting was superior to lecture only.

4.1 Study Settings

The first course studied was MC 340, "Management Information Systems" ("MIS"), during the Fall semester of 1996. MIS is a course in the Operations and Strategic Management Department at the business school of a medium sized private Eastern university (undergraduate enrollment approximately 7,000) offered to upper-level undergraduate students. This course is an elective MIS course for the business school, designed to go one step beyond the core course which requires only basic office automation skills. The Consensus Method was used primarily for information systems vocabulary (e.g., "What is a firewall?") and concepts in this course. Two sections of MC 340 with 60 students each (120 total) were studied for this research.

The second course studied was OMIS 462, "Business Systems Project Management", during the Spring semester of 2001. OMIS 462 is a Systems Analysis and Design course taught to upper-level undergraduate Information Systems majors in the business school of a large public Midwestern university (undergraduate enrollment approximately 17,000). The Consensus Method was used primarily for information systems vocabulary (e.g., "What is ATM?") and concepts in this course. One section of OMIS 462 with 42 students was studied for this research.

4.2 Study Design

Students were asked to complete an anonymous survey and compare their experiences with lecture only classrooms with that of the combination of the Consensus Method in a lecture setting. Each of the four problem areas discussed previously was represented as a separate question. A pilot survey concerning the Consensus Method had uncovered an unforeseen advantage, "Social Benefits" (e.g., "It was fun to be able to talk to and get to know my classmates", "A great way to meet chicks", etc.), and as such this was added as an additional question on the survey. A copy of the survey instrument appears in the Appendix. The design was not to compare the courses to one another, but rather to have the students compare their prior experience with lecture only classes with that of their current experience of lecture combined with the Consensus Method.

While careful preparation was taken with both the pilot survey and the full survey, a formal process of establishing the reliability and validity of the instrument was not followed. Hence the results which follow should be read as only slightly better than anecdotal.

5. RESULTS

The survey was anonymous and class time was given for its completion. MIS received 113 completed surveys for a 94% response rate, and OMIS 462 received 38 completed surveys for a 90.5% response rate. As shown in Table 1, the survey results overwhelmingly support the Consensus Method as a useful tool in a lecture

setting. The means for all of the responses concerning the Consensus Method were superior to the means for all the responses concerning Lecture Only. For example, when responding to the statement "Content Understanding: The class allows me to understand the topics we are covering" (see Appendix for survey instrument), the average student responses in MIS and OMIS 462, respectively, for lecture only were 5.00 and 4.79, on a seven point scale. Thus, the average response was that the students "somewhat disagreed" with this statement. However, when responding to the same statement for lecture with consensus technique the average student responses in MIS and OMIS 462, respectively, were 1.49 and 1.26. Thus, the average response was that the students "strongly agreed" with this statement for lecture with the consensus method.

6. DISCUSSION AND CONCLUSIONS

The results indicate that the Consensus Method used in a lecture setting is preferred by students to lecture only in the four areas studied for this research (and also a fifth, "Social Benefits", suggested by the students). Qualitative comments from the students revealed the following observations concerning the five major areas that the method was designed to help with:

- Problems in Content Understanding: Students believed that being "forced" to define important concepts for themselves was important to helping them with content understanding. Additionally, the friendly but real pressure of possibly being called on randomly made them take their task seriously. Also, students commented that they found it beneficial to hear peers explain concepts. While professors often attempt to explain everything clearly, often a second and third explanation from someone at a peer level is extremely useful.
- Problems in Concentration and Lack of Variety: Students commented that the consensus technique did not allow them to "nod off"… it simply wasn't possible if they were engaged in seeking agreement with their neighbors to their right and left. Further, "smart" and "less smart" students stay equally occupied with the technique, because the "smart" students cannot turn their name placards around until they get agreement with their neighbors. Thus, these students are engaged in attempting to explain the concept to their peers, and everyone benefits.
- Need for Multiple Explanations: Again here, students get to hear peers explain concepts, which was found to be quite helpful.
- Lack of Professorial Assistance: Students commented how helpful it was to be able to get quick consultation with the professor in a semi-anonymous way (loud room). The fact that the professor can go to "dark" areas (name placards not yet turned around) as needed and give attention where it is most needed was also noted as being beneficial.

Table 1. Survey Results.

	Lecture Only – Average Response (1 is "Strongly Agree", 7 is "Strongly Disagree")	Lecture with Consensus Technique – Average Response (1 is "Strongly Agree", 7 is "Strongly Disagree")
Course: MIS (113 responses)		
Content	5.00	1.49
Concentration	5.21	1.46
Multiple Explanations	4.98	1.44
Professorial Assistance	5.04	1.65
Social Benefits	5.17	2.12
Course: OMIS 462 (38 responses)		
Content	4.79	1.26
Concentration	4.63	1.39
Multiple Explanations	4.13	1.29
Professorial Assistance	4.45	1.47
Social Benefits	4.92	1.79
Overall		
Content	4.95	1.43
Concentration	5.07	1.44
Multiple Explanations	4.77	1.40
Professorial Assistance	4.89	1.61
Social Benefits	5.11	2.04

It is important to note that the possibility for bias always exists when students are asked (even anonymously) in a classroom setting about something that is happening in that classroom setting. But the results are so positive that even if bias is present they should be considered useful. These students indicated that to help with Content Understanding, Concentration and Variety, Multiple Explanations, Professorial Assistance and even Social Benefits, the Consensus Method was more helpful than lecture alone.

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BIOGRAPHY

Charles E. Downing is an Associate Professor in the Operations Management and Information Systems Department of the College of Business at Northern Illinois University. Professor Downing researches and consults in topics such as measuring the effectiveness of management information systems, the implementation and management of Decision Support Systems, and telecommunications and electronic commerce. His articles have appeared in major journals such as *Decision Support Systems*, *Information & Management*, *Journal of Global Information Management, The Journal of Information Technology Management, Information Systems Management, Journal of End User Computing*, *Journal of Educational Technology Systems*, *European Journal of Operational Research*, and *Journal of the Operational Research Society*. He has been quoted in *The Boston Herald* and other popular press venues, and he was a contributing author of the book "Groupware: Collaborative Strategies for Corporate LANs and Intranets". Professor Downing has significant experience as an Information Technology consultant in the financial services industry. He was national director of Ernst & Young's microcomputer and telecommunication systems for the Defined Contribution Services group, and as an independent consultant designed, programmed, and implemented telephone interactive voice response systems for Chicago Title and Trust and numerous other companies. Professor Downing received his Ph.D. from Northwestern University in Systems Analysis and Design.

APPENDIX – SURVEY INSTRUMENT

<Course Name and #>. Name Card Problem Technique Survey (Anonymous)

Please rate the problem solving "technique" (turn your name cards around when you agree with the person to your right and your left) as an in-class learning tool (check one box):

1 - Excellent	2 - Very Good	3 - Just O.K.	4 - Not Good	5 - Poor

Please rank and assess the following benefits in a "lecture only" class and then compare to a "lecture and technique combination" class. For ranking, a rank can only be assigned to ONE benefit, and rankings go from 1 to 7 where 1 is the best, or most useful benefit:

ANSWER THIS SECTION FOR LECTURE ONLY

Benefit	*Ranking*	Assessment – "A lecture only class created this benefit for me".						
		Strongly Agree			**Neutral**		**Strongly Disagree**	
Content Understanding: The class allows me to understand the topics we are covering.		☐	☐	☐	☐	☐	☐	☐
Concentration and Variety: The class forces me to "wake up" and talk to my classmates, and helps me to stay focused. The class provides a nice break from a "normal" class structure.		☐	☐	☐	☐	☐	☐	☐
Multiple Explanations: The class lets me integrate my classmates' understandings and explanations with my own understanding.		☐	☐	☐	☐	☐	☐	☐
Professorial Assistance: The class provides an opportunity for me to get brief but personal help from the professor.		☐	☐	☐	☐	☐	☐	☐
Social Benefits: The class allows me to get to know and to talk to my classmates.		☐	☐	☐	☐	☐	☐	☐
Other (please list):		☐	☐	☐	☐	☐	☐	☐

OVER

ANSWER THIS NEXT SECTION FOR LECTURE *COMBINED* WITH CONSENSUS TECHNIQUE

Benefit	*Ranking*	Assessment – "The technique used in a lecture class created this benefit for me".						
		Strongly Agree			**Neutral**	**Strongly Disagree**		
Content Understanding: The class allows me to understand the topics we are covering.		❑	❑	❑	❑	❑	❑	❑
Concentration and Variety: The class forces me to "wake up" and talk to my classmates, and helps me to stay focused. The class provides a nice break from a "normal" class structure.		❑	❑	❑	❑	❑	❑	❑
Multiple Explanations: The class lets me integrate my classmates' understandings and explanations with my own understanding.		❑	❑	❑	❑	❑	❑	❑
Professorial Assistance: The class provides an opportunity for me to get brief but personal help from the professor.		❑	❑	❑	❑	❑	❑	❑
Social Benefits: The class allows me to get to know and to talk to my classmates.		❑	❑	❑	❑	❑	❑	❑
Other (please list):		❑	❑	❑	❑	❑	❑	❑

Comments:

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