THE ART AND SCIENCE OF TEACHING UTILIZING DISCUSSION AND OTHER GROUP PARTICIPATION METHODS IN CLASS ROOM TEACHING

by

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ABSTRACT

The literature concerning teaching is replete with information and research on how to teach and how people learn. There is also a considerable body of knowledge indicating that adult students have learning preferences somewhat different from adolescent and child students. Yet we often find that we are not as well versed in the art and science of teaching as we would like to be, and unless we attend classes in a college of education, little in our formal education teaches us to teach, except our learning from the observational experience of going to class and watching others teach. This lack of emphasis on teaching by college teachers has been exacerbated by structures which reward publication, grantsmanship, and consultation more than effective teaching.

Exposure to the literature on teaching allows one to categorize the many methods and techniques for teaching into five broad sets of methods: telling methods, discussion methods, showing methods, performance methods, and supervised study methods. In this paper the author addresses one of these sets, discussion methods. Discussion methods of teaching are often divided into two sets, closed group methods and open group methods. The distinction in the two being the extent of participation of all members. In closed group methods, all learners are active discussion participants. In open group methods one person or a small group take the most active part and the others are essentially an audience. Nine closed group methods and four open group methods are described and cautions and suggestions concerning their use are given.

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> *....Except for a few institutions, the beginning professor emerges from graduate work deficient in almost all the skills of teaching: the formulation of goals, curriculum and course construction, an understanding of student differences, the development of a good lecture, the conduct of lively discussion, the adequate use of teaching aids, the evaluation of students.*
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> *Report of the Committee on Undergraduate Teaching, The Importance of Teaching: A Memorandum to the New College Teacher. New Haven, CT The Hazen Foundation, undated*

INTRODUCTION

As educators we have often heard that the lecture is dead, that it is an ineffective way to induce learning, that it is boring, and a host of other complaints. WE who principally teach adults are frequently reminded that this method of teaching is particularly unsuited for long, adult classes. Yet our academic class structures often virtually dictate that this method of delivery be employed. With the coming to fruition of electronic delivery of courses, the use of the lecture seems, at least at first glance, to become even more pervasive, whether the "head in the box" comes to us live from a remote source by land line or satellite drop link, or whether presented by various video recording means. Furthermore, the use of the lecture as the primary teaching technique is reinforced by the experiences of the instructor. If we, as instructors, were primarily educated by lecture method, it is quite natural for us to view that as the way to teach - it's just the way it's done. It has been my observation that most instructors, particularly those in technical fields, must rely totally on their experiences as models for teaching since they have little, if any, formal training or education in the art and science of teaching. This view is supported by the lead quote.

A competent mechanic would not consider working on an aircraft with only one type of tool, say a graduated set of hammers, no matter how finely made and balanced those hammers were. WE would certainly expect his tool kit to contain screw drivers, wrenches, and other tools. We, as teachers, should not expect to practice our craft with just one or two tools at our disposal, regardless of how good we could use those tools.

While I view the lecture as an important and useful teaching method, it is but one of many methods of inducing learning and certainly should not be the only, or in many cases, the primary tool in the instructor's teaching methods tool kit. My purpose for this paper is to summarize some of the research and reporting that

has occurred concerning another set of teaching methodologies. Those who have been educated in the art and science of teaching are generally well aware of these techniques, but those whose major efforts are or must be in content may not be quite as aware.

The major thrust of this presentation is to explore several of the many ways by which learning can be elicited or enhanced through active participation by the student in teaching methods employing the use of discussion and other group participation means and to offer some advice and hints concerning specific, situational employment of these methods and techniques. As an introduction to this presentation, I will address some of the so called "laws and truths" concerning learning, learners, and adult learners, specifically.

DEFINITIONS

In addressing anything it is usually wise to establish a common ground for discussion; thus the following definitions will be used. There is no claim on the part of the author that these are universally accepted definitions, only that these are the definitions that will be employed in this paper.

Definitions: Learning - Learning is a change in behavior as a result of experience. The behavior may be physical and overt, or it may be attitudinal or intellectual and thus may not be easily seen or measured, or it may be both in combination.

Teaching method - A type of activity in which instructional personnel attempt to elicit learning in others.

Teaching technique - A specific way of presenting instructional material or conducting instruction activities. (Good, 1973)[1]

Caveats: While it is currently in vogue to use the terms learners and facilitators, throughout this paper the terms student and learner are synonymous, as are the terms teacher, instructor, and learning facilitator.

LAWS AND CHARACTERISTICS OF LEARNING

Early in the twentieth century Edward L. Thorndyke introduced several postulates, usually referred to as "Thorndyke's Laws of Learning." For decades these were accepted as "laws" and instruction was designed to adhere to these laws. While several of these laws have come into question by later learning theorists, falling out of, and into, favor several times, others are still regarded as applicable in most cases, if not "law." Briefly,

these are summarized as follows.

1. Law of readiness. One learns best when ready to learn and not much learning occurs for which no purpose is evident to the learner.
2. Law of exercise. Learning is facilitated by practice. Repetition and use, which may include recall, review, drill, and physical application, enhances learning.
3. Law of primacy. Primacy, that of being learned first, creates strong impressions and engenders learning which is extremely resistant to change.
4. Law of intensity. A vivid, dynamic, or exciting learning experience is more effective in inducing learning than one which is boring or routine.
5. Law of recency. Other aspects being constant, things most recently learned are better remembered.
6. Law of effect. Learning is strengthened when accompanied by a feeling of satisfaction or accomplishment and weakened when accompanied by dissatisfaction or displeasure.

While the above may or may not be universally applicable, it is difficult to envision situations where these are not applicable to teaching methods employed in class room environments.

Synthesis of these ideas or laws and the years of discussion, practice, and research regarding them leads to the postulation of several characteristics of learning which may be useful to the teacher in selecting teaching methods and perfecting teaching techniques. These are summarized in the statement that learning is purposeful, active, and multi-faceted. These are amplified below.

Characteristic of purpose. Students attend instruction with individual goals and purposes. Students learn from activities that tend to further their goals and purposes. Their individual needs and notions of needs may determine what they learn as much as what the teacher desires or expects they learn. The needs of the students may be shallow, such as getting a passing grade in a required course, or deep such as learning information and acquiring skills that may save their lives or alter the future of their lives. Thus, one objective of the teacher is to show purpose for the learning and to seek to align the goals of the student with the goals of the instructor.

Characteristic of active, experiential process. For learning to take place students must have active involvement in the learning process. This involvement may be observable and outwardly directed or it may be an inwardly directed activity such as thinking or eliciting an emotional state. The student must have some experience, that is some activity, for learning to occur. This experience can be rich and varied or it may be very limited and singular. Seeing words on a viewgraph, hearing someone speak, thinking about a posed problem, and writing responses to questions

are all active, experiential processes, as is extricating oneself, while blindfolded, from a submersed helicopter rollover trainer. These vary not in that the participant is active in one and not the other, but in the degree of participation or action.

Multi-faceted characteristic. Psychologists, learning theorists, and practitioners have often categorized people as being visual learners, auditory learners, or reflective learners. Furthermore, learning itself is often classified by types such as verbal, conceptual, perceptual, motor, problem solving, attitudinal , and emotional. What is being described is not an exclusive way a person learns or exclusive types of learning, but forms of learner preference or learner facility in the type of learning experience. Seventeen different styles inventories are listed by Smith (1982) to aid the adult learner in determining their preferred or prevalent learning style. Some learning occurs whenever the learner is active, and some learning will take place from each of the activities in which the student is involved. In committing the multiplication tables to memory by rote recitation, young Johnny may learn that two times six is twelve, but he may also be learning, quite unintentionally on the part of the teacher, that math is boring and laborious. The adult student who is assigned a term paper, of specified length, on the demise of Eastern Airlines may learn more about the art of "filling" than about why the airline failed. Thus, the astute teacher must be aware of incidental, unintentioned learning engendered by the teaching methods and techniques employed and will employ a variety of methods and techniques in order to address the multi-faceted nature of learning and the multiple learning preferences of the students. (Cross, 1981; Gregoric, 1979; Guild and Garger, 1985; Kolb, 1984)

METHODS OF TEACHING

Ausebel (1963), Bruner (1962), and Joyce and Weil (1980) describe in detail numerous models or methods of teaching. Morgan (1981) has synthesized these and numerous others into five broad categories.

1. Telling methods. One way processes which include lectures, printed material, electronic audio and video presentations.
2. Discussion methods. Two way or multi-directional processes which encompass interchange of ideas, opinions, and observations.
3. Showing methods. These include demonstrations, field trips, use of mockups, observations of plays and audiovisual presentations or real-life events, and other observations of enactments.
4. Performance methods. These include simulations and role play, return demonstrations, supervised experience, case studies and games.
5. Supervised study methods. These include projects,

experiments, research efforts, and synthesizing previous works and research.

It is number two, discussion methods, that is now addressed.

DISCUSSION METHODS

Discussion Methods - Limitations

Anxiety reduction. The main purpose of discussion methods to be discussed below is to enhance the learning of the student by causing greater student activity in the learning process. There are many supporting outcomes as well. Increased learning in group social skills, increases in communications skills, and learning planning and control usually also result. However, use of these methods may have other effects as well. Since we deal primarily with adult students it is to application in this field that my comments apply. It is well known that adult students come to class with rich and varied experiences (Knox, 1977). It is also widely accepted that adult students desire greater control of their learning experiences, and desire to be perceived as successes (Gould, 1978). Discussion methods of teaching require a gamble on the part of the adult student. When they openly participate in the class, whether it be specific responding or leading a seminar, they offer themselves up to the opportunity for disagreement and even ridicule by their peers. They expose their weaknesses in vocabulary, grammar, argument, and articulation, as well as weakness in subject content, to the entire class. For the outcomes of discussion techniques to be those that the teacher desires, rather than that of the student learning that coming to class is embarrassing and that embarrassment is uncomfortable it is wise to prepare the class very early with anxiety reducing techniques. Only when an atmosphere has been established where the student is comfortable with participation can the instructor concentrate on other outcomes.

So how does one set such an atmosphere. It is easy and correct to say that you do that by assuring the students that their responses are valued, even though you may be in disagreement with the response. Easy to say, not so easy to convey. If the instructor truly does not value the response of each student then one should stay clear of discussion methods. General advice is to start early and start easy. If you plan to use anything but showing and telling methods of teaching, session one is a good place to start. Setting the stage by explaining that participation is an important part of the learning process and of the evaluation (grading) process (if true) is essential.

Self introductions are a familiar method of preparation for discussion and have other benefits. A valuable alternative is the peer interview and introduction technique, in which students are paired and given several minutes to interview each other. Based on

the interviews, the students introduce each other to the class.

It is also wise to plan some very early Socratic questioning or specific responding techniques where the responses are straightforward and not too complex. Posing follow on questions that lead to alternative answers, rather than direct correction or criticism of answers, particularly early in the course also lead to less anxiety and more open discussion. To keep anxiety level low, the instructors must constantly monitor and control their own response, carefully avoiding words or actions that are likely to cause hesitancy in the respondents.

Maintaining control. For the inexperienced user of discussion methods, loss of control of the class is a danger. This may occur in any one or a combination of ways. Allowing debates and arguments between several of the participants, to the exclusion of others in the class participating, is a frequent occurrence. Structuring in such a way that one or more "grade grabbers", whose major concern is the quantity, vice quality of participation, can dominate the activity is a very real threat. Allowing too much time and allowing participation to become frivolous, inane, or too widely ranging for the intended learning outcome can be a troublesome problem in several of the methods to be described below. Not being well prepared, not having carefully thought-out the learning experience, or just throwing together some discussion groups, or tossing out some questions to fill class time will almost inevitably lead to some loss of control. Of course the greatest danger to loss of control of the class is allowing students to respond, question, or guide the flow of discussion when the instructor is not well versed in the content matter of the discipline. A well developed plan, including ideas about time constraints and the allowable scope, helps insure a meaningful learning experience. Needless to say, one should have some objective, other than filling time, in mind whatever method is employed.

Size and time limitations. To maximize effectiveness, group sizes should be small. Group sizes larger than 15 will be very unwieldy for several of the group methods discussed. Some of the methods are time consuming, and others have been shown to be more effective when very specific time limits are set. Some guidelines for each method are given in the specific sections below.

Discussion methods described

Discussion methods of teaching are often divided into two sets, closed group methods and open group methods. The distinction in the two being the extent of participation of all members. In closed group methods, all learners are active discussion participants. In open group methods one person or a small group take the most active part and the others are essentially an audience. These are briefly described below and expanded later.

Closed group methods

1. Socratic - A task or problem oriented group in which the instructor serves as an opinion or information seeker and the students provide responses.
2. Seminar - A problem oriented effort in which a group of learners, under guidance of an instructor, in a structured or informal setting, attempt to synthesis known facts or information.
3. Debate - Two groups of students formally argue a question using prescribed rules and time allotments.
4. Task group or committee - In a class setting, the instructor assigns specific, clearly defined tasks to all members, to be accomplished as a team effort.
5. Buzz groups - Small groups formed from a larger group, each group considering limited, specific questions pertaining to a more complex question or problem under consideration by the larger group.
6. Round table - Participants discuss specific questions, with the purpose of learning from each other. The instructor may act as moderator.
7. Tutorial groups - One or several competent students guide the effort of other students in learning material with which some of the group are experiencing difficulties.
8. Creative ideation (Brainstorming) - A discussion format with the purpose of generating many unique or novel ideas in a short time span.
9. Discursive method - Free and uninhibited discussion by students on topics of their choosing.

Open group methods

1. Lecture/forum - An expert makes a presentation, one or several experts respond, and the audience responds with questions or comments.
2. Dialogue - Two well informed persons discuss a topic for the benefit of the audience in a direct conversational exchange.
3. Panel - A small group of experts discuss, in direct conversation, a topic for the benefit of the audience.
4. Symposium - Persons with special competence or knowledge deliver brief, prepared papers on several aspects of a topic before an audience.

Each of the methods is amplified below, along with cautions, suggestions, and examples of how they might be applied in teaching situations at Embry Riddle Aeronautical University.

Socratic method. This method stems from the teaching techniques of Socrates, who would pose a problem or question and then question students until they arrived at an answer. Each response elicited

either a challenge or another question leading to an answer. There is process to the method, but product is the desired outcome. An answer to the question or solution of the problem is that outcome.

Almost any number of students may be accommodated by this method, but as the group exceeds 10, the instructor must be diligent to challenge all to be involved. With over 10 participants, or in situations where there are "mouthy" students who try to dominate the responding, it is often wise to use specific responding techniques rather than waiting for voluntary answering. This involves posing the question or challenge, waiting, in silence, for ideas and responses to be generated, and then calling on a specific student to answer.

Typically one starts this two phase method by posing a question which has some divergence, or which has an evaluative element to it. After each student response the instructor must make a snap decision as to whether to challenge the response, reject the response as going in the wrong direction, accept the response as correct in totality and move to the next logical question, or use some portion of the response to fashion the next question. To use socratic discussion effectively the instructor must be able to think quickly and must be very well versed in the content area. The instructor must have a clear goal of arriving at an answer or solution and be diligent in maintaining focus through the challenges and follow on questions, Careful avoidance of cutting or derogatory remarks and belittling answers is a must.

As a transition to the second phase the instructor calls for self-criticism and self-analysis of the responses that have been made and attempts to summarize the points that have been made and list the errors of fact or logic. In the second phase of the method the instructor challenges the students to evaluate their responses and make them more valid, better operationally defined or more accurate. During this phase the instructor, through the use of questions and challenges, leads the class toward clarification and specificity and away from vagueness.

It should be noted that this method can be damaging to students with low self-esteem or low self-confidence. It is not recommended as a first discussion method with a class. It is not appropriate for cases where the students do not have the foundation knowledge to pursue the problem to solution. As an example, it would be inappropriate to use this method to elicit an answer as to what a possible solution to the problems of the Federal airways systems with a group of students who did not have a knowledge of the current system and its operation, its reasons for existence, and it evolution. It would be entirely appropriate to use the same solution from students with that foundation knowledge.

<u>Example</u>: This method could be used in a regulation class

to explore whether a specific regulation was necessary or advisable.

Seminar. A seminar is a problem or topic oriented assembly wherein a group of supervised students, after having performed individual study or research, meet to present their findings, conclusions and opinions and receive benefit from constructive advice and criticism of the group. The major thrust is clarification of the concepts, facts, and opinions surrounding the topic and profit from mutual exchange of these. Successful seminars require that all students be well prepared for the session by having conducted the necessary research or literature survey and be prepared to present those results in an organized, coherent manner. Seminar participation requires that the students have speech delivery and systematic problem solving skills in place.

For instructors, it is necessary that they advise the students well in advance of the seminar, its format, and the preparation required. It is necessary to have selected a focus topic, for which adequate resources are available for student preparation. It is also necessary, in order to direct the seminar, that the instructor be well versed in the topic at hand.

The procedures for a seminar my vary somewhat depending on the size of the group. Seminars size greater than 15 usually lose effectiveness and permit too many students to "slide" without conducting adequate preparation or actively participating. In most cases the instructor acts as seminar leader. It is also helpful to have a seminar recorder who keeps track of the information presented and provides summation at crucial points in the process. If knowledge concerning group processes is also a desired learning outcome it is also possible to assign an observer, who doesn't participate in the seminar discussion, but rather, keeps track of the various interactions, usually by constructing some sort of frequency sociogram. Learning outcomes of all well conducted seminars include increased communications skills and information synthesis skills. In more formal settings, usually with larger groups, the leader has each participant make opening remarks about their findings and then directs discussion on the various aspects presented. In less formal seminars one participant presents their findings, and the leader directs development of the topic by having other participants build on the lead speakers presentation.

Seminars are not appropriate for novice students. They are not appropriate when adequate time or resources do not exist for student preparation, nor are they appropriate when the instructor lacks the initiative to prepare in advance or to demand student participation. If the text is the only resource to be had, a seminar method is not recommended. The seminar method takes time. It is not conducive to continued active participation by the student to require preparation for participation and then not afford the student opportunity to fully participate.

Seminar is not a synonym for general B.S. session.

Example: A seminar method may be used in a Current Issues and Problems course with good effect. Selection of a specific problem for the seminar discussion is made (perhaps one topic for each two hour segment) and students are instructed to come to each session having consulted and summarized several current sources on the issue. The seminar is then commenced by having each student summarize their findings for the class.

Debate method. The debate method of participation finds its primary use in issues' exploration and attitude formation, but is also useful in expanding the students knowledge base. Like other discussion methods, when well done it will enhance the students' communication and organizational skills. As with the seminar, use of debate methods requires advance planning and preparation on the part of both the instructor and the student. Debates may, for large classes, better fit into the open methods category.

In its usual form a debate is a highly structured affair. Students are divided into two teams and each assigned one side of an issue, and given ample time and resources to prepare for the debate. In general, each side is given a specific time to make an opening argument, then each side is given opportunity for a rebuttal of the opposing side's points. Each side may then have opportunity for a closing summary and argument. Breaks are provided between each segment to afford the teams opportunity to make adjustments and seek additional information.

Team sizes greater than five each become awkward. If class size is greater than ten but less than twenty, the remaining students may be encouraged to be active in the debate by acting as judges, with specific, instructor supplied, criteria for judging.

There are several variations of the method which may be useful for this audience. One is to conduct the argument or debate using court room procedures and rules, vice debate procedures and rules. Another is to conduct the debate as a regulatory board or legislative hearing meeting. In the latter, each side presents a prepared statement before the board made up of students, then the board members question the "witnesses" in order to clarify points or expand response.

All of these methods require preparation before the event and usually require resources beyond the text book. These may sometimes be used in the classroom without specific preparation before class time, but only if adequate time and resources are available at the time and place of the class and only if all class members are assigned active roles in the preparation and proceedings. In situations where it is difficult for students to jointly prepare prior to the class session, for this method to be

effective, it will be necessary to allot class time for preparation.

A major caution in using this method is to be conscious of the opportunity for power struggles, rancor, and malice to creep into the proceedings, or for the students, and perhaps the instructor, to lose sight of the learning objectives planned.

> *Example: After studying airline deregulation, the instructor divides the class into thirds. One team is to prepare a 10 minute presentation before the U.S. House subcommittee on Transportation, as to why airline regulation should be reinstituted. A second group is to prepare a statement of the counter argument. The other third are instructed to prepare questions for both groups in order to assist them in making a determination on the issue for the good of the country. The instructor's role is to keep both groups honest.*

Task group, task committee method. Among the various discussion designs, this is one of the least complex. In its simplest form, for a small class of up to six or seven, the class becomes a task group and each member is assigned a specific task to accomplish in order to contribute to the larger task of the overall group. In this situation, the instructor defines the overall problem or task to be addressed and assigns specific accomplishments for each member, and directs the compilation of the efforts into the final report. To add the practice of more skills, the instructor may only define the overall task, and require the members to develop their own plan of attack and assignments, and prepare their final report without undue "stick and rudder" from the instructor. The latter takes more time and require risk on the part of the instructor that the students will undertake all the required activities without benefit of instructor guidance. In the former, the method can be applied to almost any class, in the latter, the method should be used when the instructor has good expectation that the class has the maturity as a group to accomplish the task. Variations include forming several task groups within the class, each with the same instructions and each to make individual final report - useful for class sizes from eight to 20, and dividing the class into subgroups or subcommittees, often referred to as Buzz groups, each addressing various aspects of a larger issue.

To insure adequate opportunity for participation group sizes, whether they be of the task group, sub group or buzz group, should usually be limited to no more than seven members.
Depending on the complexity of the issue, group preparation outside of class may be necessary.

> *Example: In a large class in Aircraft and Spacecraft development concerned with exploring the decision to continue with federal funding of the "Orient Express"*

hypersonic transport concept, the class may be divided into seven task groups, each tasked to study one of the seven determinants of national interest and make a report on how and why continued development does or does not support the national interest. Thirty minutes is allotted for each task group to discuss their position and ten minutes is allotted for each group to report results.

Round table. Round table discussions have many uses outside the classroom, such as in professional organizations and citizen interest groups. In these settings there are several interesting approaches, such as organizing several tables with different topics for each, staffed with discussion leaders and allowing participants to "float" among the several round tables. Here the emphasis is confined to the use of the method as a class room exercise.

The round table is relatively unstructured in order to allow free exchange of knowledge and ideas. Structure is maintained only to the extent that common courtesy is maintained - only one person talking at a time, each having adequate opportunity for discussion, and no exclusionary conversations, no yelling, screaming or cursing. If physically possible, participants should be arranged in a circle or semi-circle so that each participant has a face view of every other participant. The instructor's role in the class room round table is to maintain focus and insure courtesy. Round tables are relatively easy to conduct and generally pose low threat to the students. The size limits are a function of physical space, acoustics, and time. They do not appear to be appropriate for less than five participants and become unwieldy for more than 20. A caution for the instructor is to not let the discussion ramble or get stuck on a limited point, nor go on too long to be effective.

Example: A round table could be used in a meteorology class to explore issues of size, scope, and intensity of mid-latitude cyclones as compared to hurricanes. The effects of the spring, 1993 mid-latitude cyclone could be used as the primary vehicle.

Tutorial group methods. Tutorial groups usually find their usefulness in helping students who have difficulty in learning some aspect of course material or who are not progressing at a satisfactory rate. Each group should have a leader whose role is threefold: (1) by questioning the student, seek to discover the problem blocking the learning, (2) providing information and assistance by the rest of the group for those having difficulty, and (3) encouraging self-help. In a well functioning tutorial group all benefit, each from being exposed to the way the others approach and solve the problems, and from having to clarify their individual thinking and actions in order to articulate them to the others. For tutorial groups to function well it is necessary that

at least one member of the group have mastered the content and the skills of analyzing work tasks and giving encouragement.

If care is not given to the formation of the groups, it may result in "the blind leading the blind", much time being wasted, and perhaps incorrect methods being reinforced by continued use. Self-selecting into tutorial groups outside the class room is a fact of life, however, self-selecting in the class room can lead to all the weak students grouping together and all the strong students grouping together. While there are some benefits to this sort of arrangement, particularly for the strong students, there are also several significant difficulties. When employing this method as a class room technique it is absolutely necessary that the instructor be aware of what they intend to be accomplished and select groups accordingly. When several tutorial groups are employed in the class, it is necessary for the instructor to monitor the activities of each and to restructure groups when necessary. Another danger in the use of this technique occurs when there are students present who view everything as competition and have a bias against helping others or when there are one or two outsiders in an otherwise heterogeneous group. In these cases the unfavorable outcomes of the unintentional learning in the social realm may out weigh the results in the content realm.

> *Example: Tutorial groups may be formed in an operations research or quantitative methods class, to work on specific problem sets. The instructor assigns people to groups such that each group contains one or more strong students and one or more students needing help. Each session the instructor varies the composition of the groups while maintaining the balance.*

Creative ideation (brainstorming). This method is useful when there exists a desire for a high level of creative ideas to be generated. It should be understood that brainstorming is an initiation process, one for generating ideas, not one for reaching solutions or solving problems. To take the ideas generated to fruition requires other processes. The ideas must be evaluated, selected and implementation plan initiated. This is part of the follow-on processes, not part of the brainstorming.

For the ideas to be retained there should be some efficient method for recording. A person taking notes, unless using stenographic methods, usually holds back the proceedings enough to curtail some ideas. A tape recorder is the recommended means.

The discussion is started by the leader who initiates the session by stating the rules and the problem under discussion. Usual rules for this method are:

1. All ideas except jokes should be acknowledged.
2. Criticism of ideas is unacceptable.
3. Ideas are non-attributable, building on others ideas is strongly encouraged.
4. Silence isn't permitted.

5. Quantity of answers is important, though intelligence and creativity is desired. Evaluation comes later.

Very specific time limits may be used with this method and any number of participants may be involved, time being the only constraint on size. Unless using this method only as a demonstration of the method, follow on processes should be planned to evaluate and utilize the ideas generated.

> *Example: A marketing class may use this method to generate ideas for increasing market share. A safety class may use this to generate ideas for initiating a safety awareness campaign.*

Discursive method. The use of a discursive discussion group permits free, uninhibited discussion of a topic, selected by students led by students. Constraints of time and space determine the permissible size of such groups. While it may initially seem that this is nothing but a gab fest, such is not intended. It is not a time filler, to be used when the under prepared instructor runs out of other ideas. Students should come to the session prepared for meaningful participation. Thus there should some intention on the part of the instructor concerning learning to be accomplished. It is important to evaluate the process of the discursive group, for it may be that more is learned in this case by process than content. Videotaping the discussion for later playback and evaluation can be rewarding.

A perceived danger of this method is that it is non-productive and may go nowhere. By recording and evaluating the session, showing that the group lacked direction and/or attention and ventured into other subjects is highly instructive in and of itself. This method is more difficult to use constructively to the instructor's purposes than it appears. If the instructor has not created a motivating atmosphere for the subject at hand and created an alignment of the instructor's and students' goals and purposes, this is not a method to use.

> *Example: A class studying current issues in America might choose to use this method to consider the under-representation of females in the aviation field. The learning actually taking place may not be why or if such is the case but what the attitudes about the issue are.*

Open group discussion methods

The methods described below are more often used in public and professional meetings, on radio and television talk shows, and other large group settings. They also have usefulness as class room methods, especially when class size is very large, when it is dispersed to remote sites or when the presentation is subject to delayed presentation. As such, the participation of much of the

class will be limited to vicarious action only. These methods also lend themselves to use when visiting experts are available or when selected groups of potential discussants are assembled infrequently.

Lecture/forum. The lecture/forum is a variant of the lecture that provides some relief to several of the handicaps of the lecture. Using this method the expert delivers a planned presentation. Upon completion of the lecture a panel of discussants review and amplify the material and, when the situation warrants, may take questions from the audience. This method is useful as a class room method when the class is very large and size and time limitations do not permit an extensive question and answer period, but the teacher desires to expose the students to other interpretations or clarification.

This method is often preferable to the lecture only method when the presentation is being recorded for later presentation or when it is necessary to adhere to very restrictive time requirements, such as broadcast schedules. Time can be precisely controlled, metering both the lecturer and the amplifications and clarifications of the discussants. For class room use the discussants may be well prepared students or other experts in the field.

Some of the cautions applicable to class room use mentioned here apply to the other open group methods. When you select groups of subject mater experts as discussants or panel members, there appears to sometimes be a tendency for them to try to impress each other with their facility with the topic and very soon exceed the ability of the student to follow their discussion. This often takes the form of name dropping and insider information such as - "...as we are all familiar with what Jones said on the matter, which stands as the definitive treatment of the subject.... "- but the students may not have a clue what Jones said, or may be aware of the ideas of Jones but not connect them with the name. In using these methods as class room applications, it is wise to prepare the discussants or panel by providing clear information concerning the experience and education of the audience as it pertains to the topic.

Additionally, good acoustical quality of the class room or a sound amplification is essential if the audience is to derive maximum benefit. The appropriate allocation of time is essential. Unless the discussants are skilled in presentation, two or three well informed but dry experts droning on can be every bit as unexciting as one doing so.

This method is particularly useful when you have access to a renowned scholar or expert for a very limited period of time and you are able to elicit the help of fellow faculty as discussants. In one variation, wherein the primary lecturer is available for

only long enough to provide the lecture, the forum takes place after departure of the lecturer.

> *Example: An executive of CSX is speaking to the local Chamber of Commerce on the future of inter-modal freight and its impact on the local economy. As a field trip you take your undergraduate transportation principles class to hear the 30 minute talk. You enlist four graduate students who did well in MAS 602 to attend the talk and act as discussants afterward upon return to the classroom.*

Dialogue. In the dialogue method, two experts or knowledgeable people discuss an issue or problem in a direct conversational exchange. The discussants may be of the same mind about the issue or may take divergent views. Audience questioning may be used when time and facilities permit. Several television opinion shows, such as Firing Line provide models of this method.

> *Example: A vocal member of the AOPA (Airplane Owners and Pilots Association) and the chief of staff of your local democratic Congressman agree to attend your economics or current issues in aviation class to discuss the impact of the proposed gasoline tax hikes on aviation. They each can devote only one hour to the class. Setting up a dialogue type exchange would serve as an excellent vehicle to expose the class to their views and to create reflective thought and questioning on the part of the students.*

Panel discussion. Use of a panel to discuss a topic permits an orderly, logical presentation of material from several participants with special knowledge or expertise. The primary use of the panel is to utilize some of the advantages of discussion when the audience, the class, is too large for open discussion to be feasible. It is also useful in bringing some of the advantages of discussion into play when a class is presented as a recording or when there is a large audience at remote sites, especially when there is only one way communication with the remote sites. This format then provides the audience with vicarious participation in the discussion.
As with the dialogue method, panelists may have similar or divergent views, or may be selected for their specialized knowledge of one or more aspects of the topic.

It is important that the panelists be well prepared for their role by having sufficient knowledge of the topic to permit informed participation. If this method is used in a recorded or remotely transmitted situation, and students at the transmission site are to be the panelist, students with good facility with the language and subject matter should be selected.

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