Diamond, R.M., Eickmann, P.E., Kelley, E.F., Holloway, R.E., Vickery, T.R., & Pascarella, E.T. (1975). Instructional Development for Individualized Learning in higher education. Englewood Cliffs, NJ: Educational Technology Publications.
Merrill, P.F. (1978). Hierarchical and information processing task analysis: A comparison. Journal of Instructional Development, 1, 35-40.
Reigeluth, C.M. (1979). In search of a better way to organize instruction: The Elaboration Theory Journal of Instructional Development, 2, 8-15.
Reigeluth, C.M. & Rodgers, C. (1980). The elaboration theory of instruction: Prescriptions for task analysis and design. NSPI Journal, 19, 16-26.
Reigeluth, C.M. & Stein, F.S. (1983). The elaboration theory of instruction. In C.M. Reigeluth (Ed.), Instructional design theories and models: An overview of their current status. Hilldale, NJ: Erlbaum Associates.

An Approach to Colleague Evaluation of Classroom Instruction

Mary Deane Sorcinelli
Division of Development and Special Projects
Audio Visual Center
Indiana University

Abstract. Academic institutions across the country are becoming increasingly interested in involving colleagues in the assessment of classroom teaching. This article will assist instructional developers who consult with faculty members and their departments in an effort to improve and evaluate teaching performance. It briefly reviews the literature on colleague evaluation of classroom teaching, discusses the issues developers should consider when assisting in the design of colleague visitation programs, and suggests guidelines for instituting such programs.

Introduction

National studies of how college teaching is evaluated demonstrate a dramatic increase in the use of faculty colleagues as raters of classroom instruction. Academic deans and department chairs who were surveyed report that use of ratings based on classroom visitations by colleagues or trained consultants are gaining popularity as sources of information on teaching effectiveness for teaching improvement and for promotion and tenure decisions (Centra, 1980; Seldin, 1980, 1984).

By comparison, systematic student ratings of instruction have been and still are more readily accepted and endorsed by faculty. In a recent study, 67% of private and 72% of public institutions surveyed always use student evaluations as a source of information for evaluating teaching performance (Seldin, 1984). At the same time, the study found that 17% of private and 34% of public institutions now regularly use classroom visits, and Seldin highlighted their increasing importance as tools in the assessment of classroom teaching performance.

It seems appropriate that faculty members are questioning the past practice of leaving the formal and systematic evaluation of teaching almost exclusively to students. Not only are there real limitations to student ratings but there are also elements of classroom teaching which colleagues are in a better position to assess. A colleague's observation of aspects such as the appropriateness of teaching methods and materials, the amount of material covered, the currency of course material being presented, and the importance of material taught both within the field and for its value to related fields could offer a more adequate appraisal of teaching effectiveness than could students' perceptions. Such observations have the potential to contribute to a more complete assessment of classroom instruction and deserve consideration in teaching improvement and evaluation processes.

Although faculty are interested in considering a greater variety of evidence about the quality of their teaching, they are usually untrained in formal evaluation procedures. The staff of instructional development centers is one source they can draw upon for professional advice. Instructional developers can play a useful role in assisting departments to plan and implement workable systems for assessing their faculty colleagues contributions to instruction. This paper is focused exclusively on the responsibilities colleagues can take in evaluating classroom instruction. The literature on colleague evaluation of teaching is reviewed, the issues developers need to be aware of when consulting with faculty on colleague visitation programs are discussed, and practical guidelines for instituting such programs are suggested.

Literature on Evaluation by Colleagues Through Classroom Visitation

Most of the literature on colleague

evaluation of classroom teaching consists of position papers either supporting or opposing the concept. The few formal studies on visitation by colleagues have yielded mixed results. After reviewing the findings by a number of researchers, Seldin (1980) observed that, "If the information is carefully gathered, promptly reported, and judiciously interpreted, colleague evaluation based in part on classroom observation is capable of solid judgments on merit increases, promotion, and tenure" (p. 75).

At the same time, other reviews of research (Cohen & McKeachie, 1981; Centra, 1980) concluded that the value of observing classroom teaching for promotion and tenure decisions was dubious. The reviewers felt it was not at all clear whether the validity and reliability of such procedures warranted their consideration as a legitimate element in personnel decisions. A study by Centra (1975) in which college instructors' classroom teaching was observed and rated twice by three colleagues demonstrated that colleague ratings based on limited classroom observation were extremely generous and not statistically reliable. He concluded that ratings based primarily on classroom observation "were not sufficiently reliable to use in making tenure, promotion, and salary decision—or would require investing more time in visitations or in training sessions" (p. 336).

In contrast to the controversy over the value of colleague evaluations of classroom teaching for personnel decisions, the literature provides strong support for classroom visitation when the purpose is to improve teaching performance. A number of model programs and their successes have been described (Berquist & Phillips, 1977; Diamond, Sharp, & Ory, 1978; Sweeny & Grasa, 1978). There is a consensus of opinion among writers that classroom observation by colleagues can be a means for improving teaching. They urge that experimentation and development continue in order to explore the full potential of programs which feature visits by faculty observers to classrooms of instructors who are interested in improving their teaching.

Although the literature on colleague assessment of classroom instruction offers abundant opinions and some research, there is a need for further development of visitation programs that can help both colleagues and their departments to capitalize upon the unique insights and contributions which the peer observer can offer to the evaluation process. Seldin (1984) suggests that peers are best able to judge their colleagues' classroom teaching in the following areas: subject matter knowledge, course structure and goals, instructor-student rapport, and instructor teaching behaviors. Already, both students and instructional development consultants can and do make useful evaluative comments in various of these domains. When students rate teaching skills they are capable of judging, such as instructor rapport and ability to stimulate interest in the course, they can provide useful appraisals of the course and instructor. Instructional developers offer yet another viewpoint on instruction since they are trained to observe a broad range of teacher and student skills and behaviors as well as overall classroom environment.

However, it is decidedly more difficult for students and outside observers to examine the domain of subject matter knowledge with the confidence and credibility of the peer observer. Put simply, a colleague from one's own or a related department is in the most advantageous position to observe and evaluate aspects of the instructor's mastery and selection of course content as well as the currency or importance of that content within the discipline. Judgments about issues such as exhibited knowledge of the content, and presentation of the origin of ideas and concepts, current developments in the field, and the appropriate depth and breadth of material cannot be judged adequately by observers with limited or no content expertise. It is these tough but important criteria that classroom visitation programs need to address.

The literature on colleague evaluation of classroom teaching already recognizes content knowledge as a critical aspect of classroom teaching effectiveness, and one that can be best critiqued by colleagues (Centra, 1980; Seldin, 1980, 1984). Colleague visitation programs now need to identify and detail the range of skills and behaviors related to this domain and to encourage their careful assessment by the colleague observer. The evaluation system described in this paper takes into account the special vantage point of the peer observer and highlights the areas colleagues are in an especially favorable position to assess, including the domain of content knowledge. It offers a classroom visitation procedure which successfully combines a rating form and a guide for taking detailed classroom observation notes. The rating form provides items directly related to subject matter knowledge as well as other important teaching skills and behaviors. The classroom observation notes allow the colleague observer to elucidate his or her ratings in critical teaching domains. The combination of ratings and notes offers a more comprehensive structure for use by faculty and departments which plan to institute or improve colleague visitation programs.

A review of the literature on evaluation of classroom teaching by colleagues makes it clear that the role of faculty colleagues as evaluators of classroom instruction, although gaining in popularity, has not been adequately defined or systematically studied. It is also evident that the policies and practices colleagues use to evaluate teaching for either improvement of instruction or personnel decisions need to be more explicit and systematic. Visitation programs which provide practical advice on the areas of classroom teaching that colleagues are particularly well suited to assess can assist faculty and their departments to maximize not only the fairness but also

Ratings based on classroom visitations by colleagues play an increasing role in promotion and tenure decisions.

the usefulness of classroom observations by colleagues.

Considerations When Developing Colleague Visitation Programs

The instructional developer should consider several issues when advising departments interested in developing a system of evaluation by colleagues. First, the department needs to define the purpose of the colleague visitation program. It will have to decide whether information from classroom observations should be used for teaching development, for promotion, tenure, and salary decisions, or both. Each department needs to work out its own specific goals, standards, and procedures for such a program if it is to be generally acceptable to the faculty and provide reliable results.

Second, a department should recognize that using evaluations by colleagues in tenure and promotion decisions could affect the collegiality which is essential within a department. A mandatory or formal system, no matter how fair, may undermine relationships among faculty. Institutions report greater faculty support for evaluation by colleagues when it is voluntary, used primarily to improve teaching, and the individual faculty member has the option to include data in a promotion and tenure file.

Third, developing the materials and implementing the policies necessary to any departmental program which evaluates teaching by drawing on the observations of colleagues in the classroom places a further demand on the service time of faculty members. The assistance of a developer could help to minimize the investment of faculty time. Program designs which assess colleagues every three years, only evaluate colleagues preparing for tenure or promotion review, limit observations to only one course per year, or call on the developer to serve as a trained observer could help to alleviate demands on faculty schedules. In any event, the time and amount of effort invested by faculty members to develop and implement a system would have to be recognized by the department and the institution as a worthwhile investment.

Fourth, a program seeking to evaluate the teaching of faculty members requires materials which will yield systematic and comparable data about the performance of the instructor in the classroom. It is important to have a set of explicit criteria by which colleagues make their evaluations. The criteria help to guide the classroom observation and to summarize impressions developed over numerous observations. A set of standard criteria should yield data which is sufficiently similar in form to allow departments or the instructor himself to find a pattern in the observations that identifies a faculty member's particular strengths and weaknesses in the classroom. Also, if a number of items are common to evaluations completed by students and those used by faculty observers, then some useful comparisons can be drawn between the ratings by students and colleagues.

Unfortunately, in contrast to the vast number of student forms for evaluating teaching, there are few forms for use by colleagues in observing classroom teaching. The literature suggests that institutions can begin to develop instruments which colleagues can use to evaluate teaching by modifying their student evaluation form, which in most universities is standardized and research-based. For example, Figure 1 is a modified version of the Multi-Option System of Course and Instructor Evaluation (MULTI-OP) developed at Indiana University. Items were selected which reflect dimensions of effective teaching on which colleagues are best able to provide information, and can observe in a

Page 1 of the Classroom Visititation Form contained 17 items to be rated on a 5-point scale from Strongly Agree to Strongly Disagree.

1 The instructor is very knowledgeable about the subject matter

2 The amount of material covered in the class is reasonable

3 The instructor is well prepared for the class meeting

4 The objectives of the class session are clearly stated

5 The instructor is able to explain the subject clearly

6 The instructor makes the subject matter more meaningful through the use of examples and illustrations

7 The instructor summarizes or emphasizes major points in the lecture or discussion

8 The instructor deals with topics in sufficient depth and breadth

9 The instructor uses class time well

10 The instructor uses teaching methods well suited to the objectives of the class

11 The instructor makes students feel free to ask questions or express their opinions in class

12 The instructor answers questions carefully and precisely

13 The instructor seems to recognize when students fail to comprehend the material

14 The instructor emphasizes a conceptual grasp of the material

15 The instructor makes the subject interesting

16 The instructor discusses current developments in the field

17 The instructor demonstrates enthusiasm for the subject matter

Page 2 of the Classroom Visitation Form contained three questions that required written answers.

18 What did you like most about this particular class and/or the instructor's teaching effectiveness?

19 What specific suggestions could you make to improve this particular class and/or the instructor's teaching effectiveness?

20 Did you learn anything in the pre- or post-observation sessions that influenced or modified your responses?

Figure 1. Colleague Classroom Visitation Form

classroom setting. (Content knowledge, on which the colleague observer can offer particularly useful assessments, is represented by items 1, 2, 8, 14, and 16.) In addition, there are three open-ended questions and space for extensive comments. Use of this standardized form in conjunction with detailed classroom notes allows faculty to make useful comparisons among the information they collect on their teaching effectiveness.

Fifth, a department must determine which faculty members will participate as observers in the program. The means by which colleagues are selected as observers may vary, depending on the purpose of the classroom visitation. If the evaluations are used for personnel decisions, several approaches are possible. Senior colleagues within the department who are regarded as effective teachers could be selected to observe the teaching of all junior faculty under consideration for promotion and tenure. Another approach would be to ask nontenured faculty to submit names of five or six colleagues willing to assess their classroom teaching. The department chair would select at least three of the names. In either case, colleagues should observe at least two classes, use a standard rating form, and make independent evaluation of the instruction.

If the purpose of classroom visitation is for the improvement of teaching, greater flexibility of methods is possible. The simplest procedure is to observe and review their classroom teaching. In one Danforth program, voluntary arrangements for visiting a colleague's classroom proved to be an efficacious way for faculty members to help each other teach better (Elbow, 1980). The literature suggests, however, that observations by skilled, experienced colleagues or teaching improvement consultants may be more effective (Cohen & McKeachie, 1981). The University of Michigan, for example, has a Faculty Associates Program where faculty who are recognized as effective teachers serve as teaching consultants throughout the university. On the Indiana University campus, the Division of Development and Special Projects/Audio Visual Center offers an individualized, confidential, and systematic teaching consultation process which can include classroom observations and video-tapes, questionnaires for both student and instructor self-assessment of teaching, and a review of instructional materials.

Another successful program model (Sweeny & Grasa, 1978) which use observations by faculty members to improve each other's teaching, involves organizing teams of three faculty members. Team members work together for one or more semesters to help each other assess and improve instruction. The key to the credibility and success of this model, and most of the other programs, is the training of participating faculty in what and who to observe. Institutions with such programs found that individual faculty members needed at least three hours of training by a teaching consultant because they were not sure how to conduct classroom observations, or because they used improper consulting methods with colleagues, such as telling them the best way to teach.

Sixth, a department will have to decide on the number of faculty observers and the number of observed sessions which a fair and accurate appraisal of teaching requires. The number of colleagues selected to make independent observations needs to be sufficient to ensure an unbiased and balanced assessment, particularly if the evaluations are used for personnel decisions. The problem with the informal and unsystematic way in which colleagues and administrators often evaluate classroom teaching is that the number of raters is usually small and the amount of instruction given to raters to assure that they are evaluating the same things is usually minimal. Reliability can be increased by asking several colleagues to independently visit a classroom several times. The success of programs at some institutions suggests that two or more separate visits by at least three colleagues would provide representative information on teaching performance for promotion and tenure decisions. An alternative method would be to have one or more colleagues observe an entire course, or one complete segment of it.

Seventh, evaluation by colleagues must be considered as only one component in a system designed for the improvement and evaluation of teaching. A comprehensive assessment of a faculty member's teaching contribution would include observation of students, faculty peers or a teaching consultant, department chairman, and the instructor's self-assessment.

Guidelines for Developing a Colleague Visitation Program

The following procedures for developing a colleague visitation program are drawn from successful programs at Indiana and other colleges and universities. Classroom observation models (University of Massachusetts, 1977; Flanigan, 1978) emphasize a three-step consultation process which includes a pre-observation conference, classroom observation, and a post-observation conference. These guidelines are useful not only to the developer who is assisting departments in designing such programs, but also for the developer who may serve as a trained observer of faculty members' teaching effectiveness.

Pre-Observation Conference

In the pre-observation session, the colleague observer obtains information from the teacher concerning his or her class goals, students, and particular teaching style. An interview schedule provides a brief, structured way of obtaining such information and includes the following questions:

1. Briefly, what will be happening in the class I will observe?
2. What is your goal for the class? What do you hope students will gain from this session?
3. What do you expect students to be doing in class to reach stated goals?
4. What can I expect you to be doing in class? What role will you take? What teaching methods will you use?
5. What have students been asked to do to prepare for this class?
6. What was done in earlier classes to lead up to this one?
7. Will this class be generally typical of your teaching? If not, what will be different?
8. Is there anything in particular that you would like me to focus on during the class?

Details such as the date for the classroom observation, use of particular observation form or method, and seating arrangements for the colleague observer should also be decided by mutual agreement at this session.

Classroom Observation

During a classroom observation, the colleague observer is in the position to collect information on the instructor's knowledge and organization of the content, use of teaching skills, methods and materials, and interaction with students. Some guidelines for classroom observations are presented in Figure 2.

Faculty and students have identified

Figure 1. Some guidelines for classroom observation.

1. Arrive at class ahead of time. Note the physical arrangement of the room, student-to-student interactions, what happens when the instructor arrives, and interactions before class between instructor and students. Listening to students before class often gives clues to their expectations and attitudes concerning the class and instruction.
2. Record as much of what is said and done as possible, creating a "log" of the class session. Record comments verbatim.
3. Write impressions or questions about the teaching in the margins or in parentheses. Separate them from observations.
4. Describe verbal and non-verbal behavior, emphasizing what happened rather than interpretations of events. "Student looking at clock 9:30, 9:34, 9:38" is preferable to "student appears anxious for class to end," or "Instructor talking to board 9-9:15" rather than "instructor mannerism is distracting."
5. Inform the instructor that times will be recorded and notes will be written during the observation.
6. Wear a watch when observing a class. Every few minutes note the time in the margin so that the class structure can be put in context.
7. Diagrams of instructor and student positions and interactions are helpful for illustrating the degree of student participation, who participates in class and how often.
8. Stay through an entire class session. If you must leave, make sure the instructor knows beforehand.
9. Observe from a position that is minimally distracting to students and the instructor and to have another vantage point of students from that of the instructor—unless he or she requests otherwise.
10. Don't intervene in the teaching during the observation. As exception, only intervene by explicit prior agreement with the instructor.

the following as characteristics of effective teaching: organization and clarity, command and communication of subject matter, instructor-student interaction or rapport, and enthusiasm and intellectual stimulation. The questions listed below will help the observer identify particular skills or techniques in the classroom which illustrate these central characteristics of good teaching.

Before Class Begins:

Do students arrive noticeably early or late? How are chairs arranged? Do students talk to each other, prepare for class? Do they take out books, notebooks? When does instructor arrive? What does the instructor do before class (write on board, encourage informal discussion with students, sit behind desk, etc.)?

Knowledge of Subject Matter:

Does the instructor exhibit knowledge and mastery of the content? Is the depth and breadth of material covered appropriate to the level of the course and this group of students? Does the material covered in this class relate to the syllabus and overall goals of the course? Does the instructor present the origin of ideas and concepts? Does he contrast the implications of various theories? Does he emphasize a conceptual grasp of the material? Does the instructor incorporate recent developments in the discipline? Does the instructor present divergent points of view? Is there too much or not enough material included in the class session? Is the content presented considered important within the discipline and within related disciplines?

Organization and Presentation Skills:

Engaging Student Interest - Does the instructor prepare students for what learning is to follow by assessing what they know about the topic through use of analogy, a thought-provoking question, or reference to a common experience, etc.?

Introduction - Does the instructor provide an overview of the class objectives? Does the instructor relate today's lecture to previous lectures? Does he or she use an outline on the board or overhead transparency? Are the class objectives consistent with course objectives?

Organization and Clarity - Is the sequence of content covered logical? Is the instructor able to present content in a clear and logical manner that is made explicit to students? Does the instructor provide transitions from topic to topic, make distinctions between major and minor points, periodically summarize the most important ideas in the lecture? Does the instructor define new concepts and terms? Does he or she use examples and illustrations to clarify difficult ideas? Does the instructor use relevant, clear examples to explain major points? Does the instructor provide handouts when appropriate?

Teaching Strategies - Are the instructor's teaching methods appropriate to the goals of the class? Is the instructor able to vary the pattern of instruction through movement around the class, gestures, voice level, tone and pace? Does or could the instructor use alternative methods such as media, discussion, lecturing, questioning, or case study? Is the use of chalkboard effective? Is the boardwork legible and organized? If appropriate, does the instructor use students' own work (writing assignments, homework problems, etc.)? Are the use of various teaching strategies effectively integrated?

Closure - Does the instructor summarize and integrate major points of the lecture or discussion at the end of class? Does he relate the lecture to upcoming classes or topics? Do students start talking or close notebooks before class ends? Is the homework assignment appropriate to the stated class goals and the course level? What happens after class? Are homework or reading assignments announced hurriedly? Are there informal discussions among students or between the instructor and students after class?

Discussion and Questioning Skills:

Introduction - How is discussion initiated? Are the purpose and guidelines clear to students? Does the instructor encourage student involvement?

Kinds of Questions - Are questions rhetorical or real? One at a time or multiple? Does the instructor use centering questions (to re-focus students' attention on a particular topic), probing questions (to require students to go beyond a superficial or incomplete answer), or redirecting questions (to ask for clarification or agreement from others in the class)?

Level of Questions - What level of questions does the instructor ask? Lower level questions generally have a fixed or "right" answer and require students to recall, list or define principles or facts. Higher level questions ask students to generalize, compare, contrast, analyze, or synthesize information in meaningful patterns.

What is done with student questions -Are questions answered in a direct and understandable manner? Are questions received politely or enthusiastically?

What is done with student responses -How long does the instructor pause for student responses (formulating answers to difficult questions takes a few minutes)? Does the instructor use verbal reinforcement? Is there a non-verbal response (e.g., smile, nod, puzzled look)? Does the instructor repeat answers when necessary so the entire class can hear? Is the instructor receptive to student suggestions or viewpoints contrary to his or her own?

Presentation Style:

Verbal Communication - Can the instructor's voice be easily heard? Does the instructor raise or lower voice for variety and emphasis? Is the rate of speech too fast or slow? Is the rate of speech appropriate for notetaking? Are speech fillers, for example, "you know" or "in fact," distracting? Does the instructor talk to the class, not to the board?

Non-Verbal Communication - Does the instructor look directly at students? Does the instructor scan the class when asking or responding to questions? Does the instructor focus on particular students or sides of the room? Do facial and body movements contradict speech or expressed intentions? Does the instructor use facial expressions (smile, raised eyebrows), body posture (sitting, standing, fold arms), or body motions (proximity to students, clench fists, pointing) to sustain student interest?

Student Behavior:

Survey the class every five to ten minutes and note the level of student interest and involvement. What are the notetaking patterns in the class (do students take few notes, write down everything, write down what instructor puts on board, lean over to copy each other's notes in order to keep up with lecture)? Are students listening attentively, leaning forward, slumped back in desks, heads on hands? Do students listen or talk when other students or the instructor are involved in discussion? How actively are students involved (asking questions, doing homework, doodling on notebooks, staring out windows)? Are there behaviors which are outside of the mainstream of class activity (random conversations among students, reading materials not relevant to class, passing notes)?

Observation notes can be analyzed following the class and a detailed written assessment of the teaching can be attached to the completed Colleague Classroom Visitation Form (Figure 1). The use of both the rating form and a written assessment of the visitation provides the instructor with useful quantitative and qualitative data regarding his or her teaching effectiveness.

Post-Observation Conference

The post-observation conference is most useful if it occurs within a few days of the classroom observation, while the activities are still fresh in the minds of the teacher and colleague observer. No later than one day following the observation, the colleague should review the notes on the class and complete the Colleague Classroom Observation Form. The colleague observer should then discuss the classroom observation in depth with the teacher. A series of questions with which to initiate a follow-up discussion would include:

1. In general, how did you feel the class went?
2. How did you feel about your teaching during the class?
3. Did students accomplish the goals you had planned for this class?
4. Is there anything that worked well for you in class today— that you particularly liked? Does that usually go well?
5. Is there anything that did not work well—that you disliked about the way the class went? Is that typically a problem area for you?
6. What were your teaching strengths? Did you notice anything you improved on or any personal goals you met?
7. What were your teaching problems—areas that still need improvement?
8. Do you have any suggestions or strategies for improvement?

The colleague observer can reinforce and add to the instructor's perceptions by referring to the log of class events or the rating form.

An analysis and interpretation of the classroom visit, as well as of the post-observation conference, should go to the instructor. It is crucial that the results of observations be shared with the faculty member being evaluated. (Colleague evaluations could also go to a departmental committee or to the chair, depending upon the departmental policies for sharing such information.) It is also crucial that any colleague observation program emphasize the positive, constructive feature of the observation process—the improvement of instruction.

Summary

Nationwide, there is interest among faculty and department chairs in diversifying the kinds and sources of information which are used for both teaching improvement and evaluation. Colleagues can provide unique contributions to both processes, and this paper suggests guidelines and procedures developers need to be aware of when involving colleagues in the assessment of classroom teaching.

Evaluating teaching by drawing on the observations of colleagues in the classroom has the potential to contribute to a more comprehensive assessment and documentation of effective teaching. Offering guidelines for classroom visits by colleagues will help individual faculty and departments in developing procedures, experimenting with and improving different approaches, and evaluating the results. Such efforts would benefit both individual faculty members who are eager to improve their own teaching and departments which are trying to document effective teaching by faculty members who face tenure review. The instructional developer has the expertise to play a key role in developing and im-

plementing the kinds of procedures and programs that will merit faculty acceptance and trust.

References

Berquist, W. H., & Phillips, S. R. (1977). A handbook for faculty development. Vol. 2. Washington, DC: Council for the Advancement of Small Colleges.

Centra, J.A. (1975). Colleagues as raters of classroom instruction. *Journal of Higher Education, 46,* 327-337.

Centra, J. A. (1980). *Determining faculty effectiveness.* San Francisco: Jossey-Bass.

Cohen, P. A., & McKeachie, W. J. (1981). The role of colleagues in the evaluation of college teaching. *Improving College and University teaching, 28,* 147-154.

Diamond, N., Sharp, G., & Ory, J. C. (1978). *Improving your lecturing.* Urbana: Office of Instructional Resources, University of Illinois.

Elbow, P. (1980). One-to-one faculty development. *New directions for teaching and learning, 4,* 25-40.

Flanigan, M. C. (1978). Observing teaching: Discovering and developing the individual's teaching style. *Teaching and Learning: Indiana University, 4,* 1-2.

Seldin, P. (1980). *Successful faculty evaluation programs.* New York: Coventry Press.

Seldin, P. (198). *Changing practices in faculty evaluation.* San Francisco: Jossey-Bass.

Sweeney, J. M., & Grasa, A. F. (1978). Improving teaching through faculty development triads. *Improving college and university teaching yearbook.* Corvallis: Oregon State University Press.

University of Massachusetts. (1977). *The clinic's teaching improvement process: Working materials.* The Clinic to Improve University Teaching. Amherst, MA: Author.

Instructional Development Through A National Industry-Education Partnership

Howard J. Sullivan
Arizona State University

Abstract. A Grade K-12 energy education program was developed, field tested, and installed in the schools with more than a million students in 1984 under an industry-education partnership involving several major energy companies and national education organizations. Nationwide field testing during development yielded mean pretest and posttest scores of 52 and 86 percent across the elementary and high school units. Data from 50,000 students using the program revealed similar overall test scores after its installation in regular classes. A set of ID practices that contributed to the success of the project are recommended for instructional developers.

More than a million American school children studied our country's energy situation during 1984 using a new energy education program developed through systematic, objectives-based instructional development (ID) procedures. Industry-education partnerships involving several major energy corporations and national education organizations were key elements in the program's development and its installation in the schools.

The Energy Source Education Program was developed and field tested over a three-and-one-half-year period from 1980 until late 1983 at a total cost of approximately $1 million. Financial support for its development was provided by 11 energy companies and trade associations, with major funding supplied by Atlantic Richfield Company (ARCO), San Diego Gas and Electric Company, and Westinghouse Electric Corporation. Participating educational organizations included American Federation of Teachers, Joint Council on Economic Education, National Council for the Social Studies, National Education Association, National Parent Teacher Association, and National Science Teachers Association.

Representatives of the education and industry groups formed an Advisory Council which met twice a year in Washington, D.C., to plan and review the subject-matter content and new materials for the program. The education and industry personnel played complementary roles. The educators reviewed the materials for instructional considerations and served as a support base with key educator groups. The industry representatives supplied information about their particular energy field and provided access to specialized consulting help as needed.

The company employed to develop the program was Educational Development Specialists, a Southern California firm experienced in energy education and in the development of industry-sponsored instructional programs for the schools. The project provided unique opportunities to apply and observe systematic ID procedures across the K-12 grade range in a large-scale cooperative industry-education effort.

The remainder of this article describes the Energy Source Education Program, including its development, field testing, and national installation in the schools. Also included is an "Advice to Developers" section, in which several ID practices that were effective in the project are recommended for general use.

Need For The Program

Historically, energy had been so cheap in America until the 1970s that it