A Systematic Approach to Faculty Development for Family Practice Faculty

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Although faculty developers often employ a systems approach to instruction when responding to individual faculty members' requests for assistance, they are seldom in a position to use this approach to conduct a unified faculty development program for an entire faculty with hundreds of members. This paper describes a two-year faculty development program in family medicine that used a systems approach to meet identified faculty needs through a series of integrated training efforts.

Following this systematic framework involved several steps: using a needs assessment to identify faculty needs and preferred learning strategies, selecting instructors from local and national experts to conduct workshops and seminars, evaluating the program by examining participants' gains on the workshop/seminar objectives using a one-group repeated measures design employing self-assessments, and using evaluation results to revise faculty training programs to better meet their needs.

An important theme to emerge from the recent literature on teacher education is that a systems approach to instruction substantially improves its effectiveness.[1] The systems approach consists of the following steps employed in a cyclical fashion: (1) define goals, (2) derive objectives, (3) determine entering behaviors, (4) develop plans for instruction, (5) develop plans for evaluation, (6) teach, (7) evaluate, and (8) revise.

Peck and Tucker state that "where [the systems approach] has been applied, the research reports testify almost unanimously to its superiority to older, more diffusely focused kinds of instruction."[1] What Peck and Tucker call the "older, more diffusely focused kinds of instruction" are typically two-component systems consisting of learning activities and testing. The systems approach differs from the older approach in that it emphasizes specifying with clarity the desired outcomes of instruction, usually in terms of goals and objectives. Another key to effective teaching incorporated into the systems approach is preassessment of the learners' status on the goals and objectives. By determining the learners' entering behaviors, it is possible to design instruction to accommodate individual differences. Further, unlike older approaches, the systems approach puts into practice the assumption that ineffective instruction can be modified and revised to produce better learning.[2]

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All of these advantages make a systems approach to instruction an ideal model to follow in planning and conducting faculty development programs. Faculty developers in medicine as well as other disciplines are aware of the usefulness of integrating the components of the systems approach as they work with departmental faculty. They are, however, seldom in a position to use this approach to conduct a unified faculty development program for an entire department with hundreds of members. This paper describes a two-year faculty development program in family medicine that was able to follow a systems approach to meet faculty needs through a series of integrated training efforts.

While the eight steps outlined above are the actual steps followed in a systems approach, the process can best be explained by clustering the steps into four groups: needs assessment (steps 1 through 3), instruction (steps 4 and 6), evaluation (steps 5 and 7), and revision (step 8). Each category is discussed in turn below.

Needs Assessment

Taken together, the three steps of defining goals, deriving objectives, and determining entering behaviors form the needs assessment portion of the systems approach to instruction.

A need can be defined as a "measurable discrepancy (or gap) between current outcomes and desired or required outcomes."[3] Needs assessment is the process for determining the discrepancies. Although there is no one universally accepted model of needs assessment, there is general agreement that at least four steps must be present in a good needs assessment: (1) identify desired outcomes (what should be), (2) determine the present status of the outcomes (what is), (3) choose methods for analyzing discrepancies between "what is" and "what should be," and (4) assign priorities to the discrepancies.[4]

There are alternative means of accomplishing each of these steps. Further, these steps and approaches within each step can be combined in different ways to provide various methods for conducting a needs assessment. For example, for faculty development purposes, identifying desired outcomes could be accomplished through a problem analysis approach in which faculty members simply list abilities they perceive as necessary. Alternatively, a competency model approach would incorporate other sources to generate the list of necessary faculty abilities. Alternative sources might include professional faculty developers, educational literature, or department needs.

Define Goals

The initial step in the needs assessment conducted by the authors was to clarify the goal of the faculty development program. The need for faculty development, in general, has received much attention. This need is particularly felt among members in the discipline of family medicine. Not only do they share the need for training in teaching and administration with other university colleagues, but they are further limited by having little or no training in the area of academic research. These faculty members are asked to accomplish tasks that would be difficult for the most adequately trained and seasoned faculty, including administering budgets, managing clinics, and precepting, as well as maintaining the roles of researchers and model physicians. Further, they are asked to accomplish these tasks under such constraints as understaffing due to shortage of available family practice faculty, unfamiliar backgrounds among faculty members due to the diverse disciplines integrated into family practice, and developing administrative structures due to the increase in numbers and size of departments over the past five years. Thus, the goal of the family medicine faculty development program described in this paper was to help faculty members perform comfortably and effectively in their roles as teachers, academicians, and administrators.

Derive Objectives

The approach used to identify desired abilities for the faculty was to search the literature for information on the competencies needed to fulfill faculty roles. The search resulted in a list of necessary faculty abilities in the areas of teaching, research, administration, and advanced administration.* For example, teaching skills involved

*Other important skills for physician faculty include clinical skills and providing community service. Because these skills are addressed in other forms, the faculty development program described in this paper focuses on teaching, research, general administration, and advanced administration.

such things as assessing the abilities of incoming students, planning instruction, evaluating the instructional process, and evaluating student outcomes. Research skills included activities such as regular reading in one's discipline, conducting research in both laboratory and natural settings, and writing in one's field. The general administration area contained competencies that any faculty member should possess, such as time management skills and the ability to collaborate with others in a group. The advanced administration area was comprised of competencies most likely needed by faculty members with greater administrative responsibilities, such as operating a division according to an explicit organizational plan.[5] The competencies within each of the four areas of teaching, research, general administration, and advanced administration became the objectives for the faculty development program.

Determining Entering Behaviors

With the objectives thus delineated, the next step was to determine the desired level and present status of faculty members on these abilities. In order to accomplish this step, two 5-point scales were generated for each of the abilities identified. The first scale asked faculty members to rate their present skill level, while the second scale asked them to indicate what their skill level should be as a faculty member. (For the advanced administration skill area, those faculty to whom the particular areas did not apply were asked only to indicate at what level a faculty member who does have these responsibilities ought to operate.) Behavioral descriptors for each competency were provided at the poles and in the middle of the scale. These behavioral descriptors ranged from a description of someone who needs a great deal of training in the area to someone who needs no further training.

In addition to having faculty rate their present and desired skill levels in teaching, research, general administration, and advanced administration, the needs assessment asked faculty to provide demographic data and to agree or disagree with various statements regarding their satisfaction with their roles in teaching, research, and administration. Finally, they were asked how interested they were in various faculty development strategies, such as workshops.

A simple, straightforward process identified discrepancies between present and desired ability levels. Next, priorities were assigned to these discrepancies. For each of the four faculty skill areas, two mean ratings were calculated for the respondents as a whole. One mean indicated the average perception of faculty respondents' present skill levels; the other indicated what these faculty thought their skill levels should be. For each of the four faculty skill areas, the discrepancy or educational need was found by subtracting the mean rating of the present skill level from the mean rating of the desired skill level (Table 1). The mean discrepancy ratings were then ranked from highest to lowest discrepancy.

Results of Needs Assessment

The largest discrepancy between present and desired skill levels was in the area of research. This was true for both physician and nonphysician faculty, although a larger discrepancy existed for physician faculty, indicating that they saw a greater need than did their nonphysician colleagues for improvement in research skills. This finding was reinforced by the results of items asking faculty about their satisfaction in teaching, research, and administration. Physician faculty reported that they found research less rewarding than teaching or administration. Further, faculty as a whole reported that research was the area in which they felt least effective, least appreciated, and least comfortable.

Two- to three-day workshops were their preferred learning format and were least disruptive to faculty members' ongoing responsibilities. Workshops have also been shown to be an effective format for physician faculty, particularly when combined with follow-up seminars.[6,7]

Instruction

Based on the results of the needs assessment, the first workshop and seminar series planned was in research. The topics for the workshop and seminar were selected by examining the discrepancies between present and desired abilities for each item in the research category. The most discrepant items (more than 1 point of difference on a 4-point scale), ordered by magnitude of need (discrepancy), were as follows: sampling, data analysis,

Table 1. Mean Ratings and Discrepancies Between Present and Desired Skill Levels Derived From Faculty Needs Assessment

Faculty Group (n=60)	Skill Category* (Scale range: 1-5)			
	Teaching	Research	General Administration	Advanced Administration
Present skill level	3.43**	3.17	3.06	3.66
Desired skill level	4.30	4.23	3.95	4.38
Discrepancy	.87	1.06	.89	.72

*Cronbach's Alpha was used to calculate reliabilities of the scales, which ranged from .75 to .91, the average scale reliability being .84. Content validity of the scales was achieved by literature review and review of the scales' content by experts in faculty development
**Figures are calculated by averaging faculty responses to each item and then calculating the average of item averages for each category

research design, communicating with a consultant, discussions about research, obtaining rewards for research, data collection, and scholarly writing. Table 2 displays the respondents' present and desired skill levels for each individual item under research skills.

In all, five different workshops with companion seminars were conducted, based on the needs assessment results: one on research, two on teaching, and two on administration. The instructors for each workshop and seminar were drawn from among local and national experts. Instructors were selected according to the content to be taught and their demonstrated ability to work effectively with family practice faculty members. The number of participants for each workshop ranged from 15 to 30; for seminars, from 7 to 12.*

Evaluation

A one-group, repeated measures design was employed to compare the participants' mastery of the abilities prior to each workshop or seminar with their mastery of those abilities after the workshop or seminar. In addition, an instrument that asked for judgments about aspects of the workshop was administered at the end of the workshop. Time, cost, and other practical constraints precluded the use of a pretest-posttest control group design.

The primary data gathering instruments were the participant questionnaires (PQs), which asked for participants' self-ratings of their abilities before and after the workshop or seminar. Because of their advantages in cost and efficiency, self-assessments are often seen by evaluators as the method of choice. Generally, self-assessments show moderate correlations with achievement or performance measures.[9,10] It appears, however, that people may rate their own abilities somewhat higher than is warranted by their performance tests and also somewhat higher than they are rated by others, such as peers, superiors, or subordinates.[11] Inflated self-ratings are less a problem for evaluation purposes than for purposes such as selection for employment, since the crucial concern in evaluation studies is usually change in ability levels.

An additional consideration when using self-report instruments in a pretest-posttest design is response shift bias, a phenomenon identified by

*The many steps followed in planning and conducting each workshop and seminar are discussed in detail elsewhere[6,8] and will not be addressed here.

Table 2. Faculty Members' Ratings of Present and Desired Skill Levels for Each Item in the Research Category

Research Skills	Present Skill Level	Desired Level	Discrepancy
Identify and formulate research questions	3.42	4.32	0.90
Identify research designs (eg, experimental, quasiexperimental, time series)	3.01	4.27	1.26
Determine sample size and strategy	2.67	4.10	1.43
Describe data collection procedures	3.05	4.18	1.13
Analyze and interpret data	2.68	4.03	1.35
Locate consultants	3.21	4.20	0.99
Effectively utilize consultants	3.06	4.22	1.16
Write research reports	3.40	4.45	1.05
Organize research presentations	3.61	4.46	0.85
Present research	3.95	4.58	0.63
Discuss research with colleagues	3.01	4.17	1.16
Keep current in discipline by reading journals	3.30	4.23	0.93
Keep current in discipline through nonliterature sources	3.06	4.03	0.97
Identify and obtain rewards for research	3.01	4.15	1.14
Overall	3.17	4.23	1.06

Howard.[12] Response shift bias represents a combination of history and instrumentation effects whereby the workshop itself engenders changes in the rater's internal standards for rating himself or herself. If the rater's standards change as a result of participating in the workshop, it cannot be assumed, for example, that a preworkshop rating of 3 and a postworkshop rating of 3 represent no change. Rather, the rater might have learned more about the topic during the workshop and then applied more stringent standards when rating his or her ability after the workshop. Response shift bias is an important phenomenon to control in any evaluation study, since it can undermine the validity of reported gains. Considering the possibility of response shift bias, the workshop and seminar evaluations used both a preworkshop self-rating of abilities and a retrospective preworkshop rating (ie, at the end of the workshop participants were asked to rate their preworkshop abilities). By comparing preworkshop ratings with retrospective preworkshop ratings, it was possible to determine the magnitude of response shift bias. Although research on response shift bias would lead one to expect it to occur in the workshop and seminar evaluations described in this paper, the data showed that response shift bias was negligible.

Thus, having given attention to the potential

biases associated with self-assessments, they were selected to provide most of the evaluative data on the effectiveness of the workshops and seminars. While it is often appropriate to consider sources other than self-assessment in an evaluation design, planners felt that, for faculty development purposes, it was particularly important for faculty to make their own judgments, since adults will reject programs they view as irrelevant.[13]

Participants were given the preworkshop or preseminar participant questionnaire (PrePQ) before beginning the first day's activities. The PrePQ was designed to assess participants' perceived skill level on each of the workshop or seminar objectives. Participants were asked to rate their present skill level on a 6-point scale, ranging from "not at all able" to "extremely able." That the instruments were comprised of the same objectives which structured each workshop and seminar provides evidence for the content validity of the PrePQs. (In the case of the research workshop, concurrent validity was supported by a correlation of .53 with a multiple choice achievement test, which itself had an internal consistency of .69 using the Kuder-Richardson Formula 20.) The PrePQs had internal consistency reliability coefficients ranging from .56 to .96, using Cronbach's Alpha formula.

At the end of the last day of the workshop or seminar, the respective postworkshop or postseminar participant questionnaire (PostPQ) was administered. The PostPQs consisted of three sections: demographic information, self-ratings, and workshop reactions. Gathering demographic information made it possible to describe the participants. The second part of the PostPQ was identical to the PrePQ. It consisted of the workshop or seminar objectives and, again, asked participants to rate their ability on each objective using the 6-point scale described above. This time two ratings were required: preworkshop and postworkshop skill levels. The third part of the PostPQ asked participants for judgments about the quality and suitability of the workshop, including ratings of objectives, faculty, organization, and other aspects.

Results of Evaluation

For each workshop or seminar, pre-post comparisons were made of participants' average self-ratings on the total test that assessed their ability to do the activities covered by the respective courses.* Subscales were constructed for most tests by clustering ratings for objectives relating to the same goal. For all workshops and seminars, subscale means increased by more than one standard deviation unit, with some of the subscales and all the total test means increasing by more than two standard deviation units. Further, t test results show all increases to be statistically significant at the .05 or higher level. Despite a possible tendency to overestimate one's abilities both on the PrePQ and the PostPQ, the gains were interpreted as evidence of the overall success of the workshops and seminars. Table 3 displays the participant self-ratings for one of the faculty development workshops. Finally, participants' ratings on suitability, quality, and eight other characteristics of the workshops or seminars were used to better organize subsequent workshops.

Revision

Based on the level of mastery of each skill and comments by participants, new workshops and seminars, as well as other formats, are being devised for future faculty development efforts. For example, evaluation results from the teaching workshop led to the establishment of an individualized consulting program for faculty to assist them in their teaching responsibilities. The individualized consultation model differs from previous faculty development efforts in that it is characterized by one-to-one meetings with faculty to discuss their philosophies and goals of teaching and by classroom observation by the consultant.[14,15]

In summary, a systems approach provided a framework for designing, implementing, and evaluating an entire two-year faculty development program. Following this systematic framework resulted in an integrated series of training efforts that (1) were designed around needs identified by participants, (2) used learning strategies preferred by

*Retrospective preworkshop ratings are not reported separately here since they did not differ significantly from actual preworkshop ratings.

Table 3. Mean Preworkshop and Postworkshop Self-Ratings by Faculty Participants (n=27) in the Research Workshop and Correlated t Test Values

Scales (Corresponding to Workshop Goals)**	Preworkshop* Mean Rating	Preworkshop* Standard Deviation	Postworkshop* Mean Rating	Postworkshop* Standard Deviation	Mean Gain	t Value†
Refining a research question	2.67	.98	4.54	.59	1.87	−12.05
Reviewing the literature	2.43	1.00	4.79	.67	2.36	−13.98
Creating a research design	1.91	.93	4.31	.91	2.40	−12.05
Developing a sampling plan	2.54	1.22	4.01	.90	1.47	−12.23
Choosing a method of data collection	2.48	1.03	4.42	.80	1.94	−11.20
Interpreting the results	2.41	.90	3.91	.76	1.50	−11.29
Using research consultants	2.59	.91	4.46	.68	1.87	− 9.32
Total test	2.46	.88	4.33	.62	1.87	−15.44

*Participants rated themselves on a 6-point scale from "not at all able" (1) to "extremely able" (6)
**Reliabilities for the scales and total test were computed using the Cronbach Alpha formula. The scale coefficients ranged from .78 to .96 for the pretest and from .72 to .94 for the posttest. Reliabilities for the total test were .96 preworkshop and .94 postworkshop
†All values are significant at the .001 level

participants, (3) used instructors who were experienced in both the relevant content and the chosen teaching format, and (4) evaluated participants' gains on the objectives as well as their judgments about such things as instructors' skills and faculty suitability.

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