

Designing, Producing, and Evaluating an Instructional Telecourse: A Model for Involving the Adult Learner

Marietta Lynn Baba
Assistant Professor, College of
Lifelong Learning
Wayne State University
Detroit, MI 48202

Joy Schermer
Research Associate, School of
Medicine
Wayne State University
Detroit, MI 48202

Norma Shifrin
Associate Professor
University Studies/Weekend
College Program
Wayne State University
Detroit, MI 48202

Abstract: A new model for planning, producing, and evaluating instructional television for the adult learner is described. The core of the model is an instructional design process that involves the interaction of faculty, television professionals, and students in curricular content planning and the development of television scripts. Student input was obtained through the creation of a series of seminars and a practicum on instructional television that involved class members directly in telecourse content development. This instructional design process also created a telecourse format that generated programs capable of holding the attention of home viewers. A method of formative evaluation using student input is also described. Pilot programs were viewed, discussed, and evaluated by students experienced in telecourse learning. The results of the evaluation were used to improve scripts, program organization, and visual content before final studio production began. The finished product was a 50½-hour program series entitled *Changing Life on Earth*, an interdisciplinary life sciences telecourse.

"You took a giant step forward. No doubt about it," said a male voice from the back of the room. "Sure did," said a woman, amid nods from other students. These were the closing minutes of a product evaluation session of the new telecourse *Changing Life on Earth*. Perhaps the previous months of planning and working to develop a creative and innovative approach to an instructional telecourse had, at last, achieved a successful educational experience for the student. The data had now to be tabulated and analyzed.

Introduction

A large array of instructional materials has been developed in recent years but only a small percentage of these products has been subjected to evaluation. (Komoski, 1974).

Experts in the fields of educational technology and instructional design (Cavert, 1974; Gagné & Briggs, 1977) have formulated models that include evaluation as a necessary step in the development of an instructional product. The efforts of the Childrens' Television Workshop (CTW) in the creation of *Sesame Street* (Schramm, 1972) are outstanding and have provided concrete guidelines for the developmental processes used by the State University of Nebraska and the University of Mid-America (Carl, 1976; McBride, 1976).

This paper describes a reality-based developmental process whereby a team

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of content experts, producers, television professionals, evaluators, and adult learners combined their efforts to create an instructional telecourse.

The University Studies/Weekend College (US/WC) Program at Wayne State University (WSU) in Detroit is an experimental program designed to provide lifelong learning to working adults in the metropolitan area. The curriculum design requires instructional tele-

were too complex; many of the programs were so advanced and so poorly organized that students could not follow them.

Although Wardwell (1976) reported that student attitude does not seem to affect learning, Juskevics found that programs that were boring because they were too complex alienated students, who frequently tuned out the rest of the program content. Also, there are dis-

proaches finally resulted in a consensus. The committee chairperson prepared a 50-title outline for the series which covered the content areas. The chairperson's outline was reviewed and revised by the committee.

The next step in content development was the writing of content outlines for each of the 50 programs. Members of the committee wrote outlines in their areas of specialization. Each outline included program objectives and a detailed description of the subject matter to be covered. Once an outline was approved, it was assigned to a committee member, or to another member of the faculty at WSU to expand into a rough draft. When completed, these drafts went through a complex process of review and modification. That process can be outlined as follows:

Step 1. Review by the instructional designer and editor to ensure that programs met the stated objectives, were clearly and sequentially organized, and had an appropriate vocabulary level with visual support of terms and concepts

Step 2. Review by the content committee for theoretical bias, factual accuracy, and clarity of examples

Step 3. Modification according to suggestions of the writer (faculty member)

Step 4. Final reading and approval by the course committee

The flowchart in Figure 1 outlines the initial stages of the instructional design process. The course committee attempted to combine peer review and consensus with a division of labor and expert input in an effort to balance and integrate course content. Each draft thus had the benefit of expert treatment, yet the individual drafts were integrated into a whole that met the overall goals set by the faculty course committee.

These initial stages took several months, because 50 drafts had to be reviewed and modified. Completion of this process meant that drafts were ready to go to the graphic designer but it did not mean that they were complete.

Each draft was submitted to three additional review procedures. These procedures included review and modification by television professionals who added visual and sound components, studio directions and blocking, review and modification by a seminar of students who were studying instructional television, and a final review by a second group of students who evaluated

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courses as a core component of each year's study. Each quarter's course offerings include a telecourse that students view on their home television sets during several alternate time periods each week.

The telecourses have been used as a basic part of the curriculum since the inception of the Weekend College Program in 1974. The first telecourses were produced rapidly and inexpensively by faculty members who had little or no training in instructional television. As a result, most of the early telecourses relied on the "talking heads" method of content delivery and had few visuals and graphics.

In the questionnaires submitted to students in 1977 to determine the courses' effectiveness, Woodyard and Anderson found that: (a) content of the programs was delivered at too high a level (29%); (b) there was too much material in each program (41%); (c) telecourses were too difficult to understand easily (25%; another 26% were undecided on this question); (d) programs were not interesting (they were boring or "so-so") (39%). When asked what changes in the telecourses would make the content material more effective, students favored: (a) more "lively" productions (71%); (b) more discussion of the applicability of the content to their everyday lives (73%); (c) more review of important points (68%).

Indeed, Juskevics (1978) found that the students' comments about "boring" programs did not mean the programs were too simple; rather, it meant they

tractions at home, where students watch the telecourses, that do not occur in a classroom or laboratory setting. Therefore, it seems that attitude can play a major role in students' learning process.

Armed with students' responses to previous telecourses, a committee of life scientists on the Science and Technology faculty set out to design and produce a new life sciences course. The first action of the committee was to include a professional instructional designer. The course committee developed a new model for planning, producing, and evaluating instructional television in the sciences for working adults. The major components of this model were:

- an instructional design process;
- the use of television professionals in planning and production;
- a new approach to telecourse format;
- a formative evaluation including student role in content development and product evaluation.

The course committee, with the instructional designer, began curriculum planning by determining the overall goals of the new TV series, including major scientific questions that would be presented; the sociocultural contexts that would be explored in presenting data; and other broad pedagogical concerns, such as the demystification of the scientific method.

With goals clarified, each committee member developed a course outline with primary themes clearly stated. Careful study of each outline and much debate on the relative merits of the various ap-

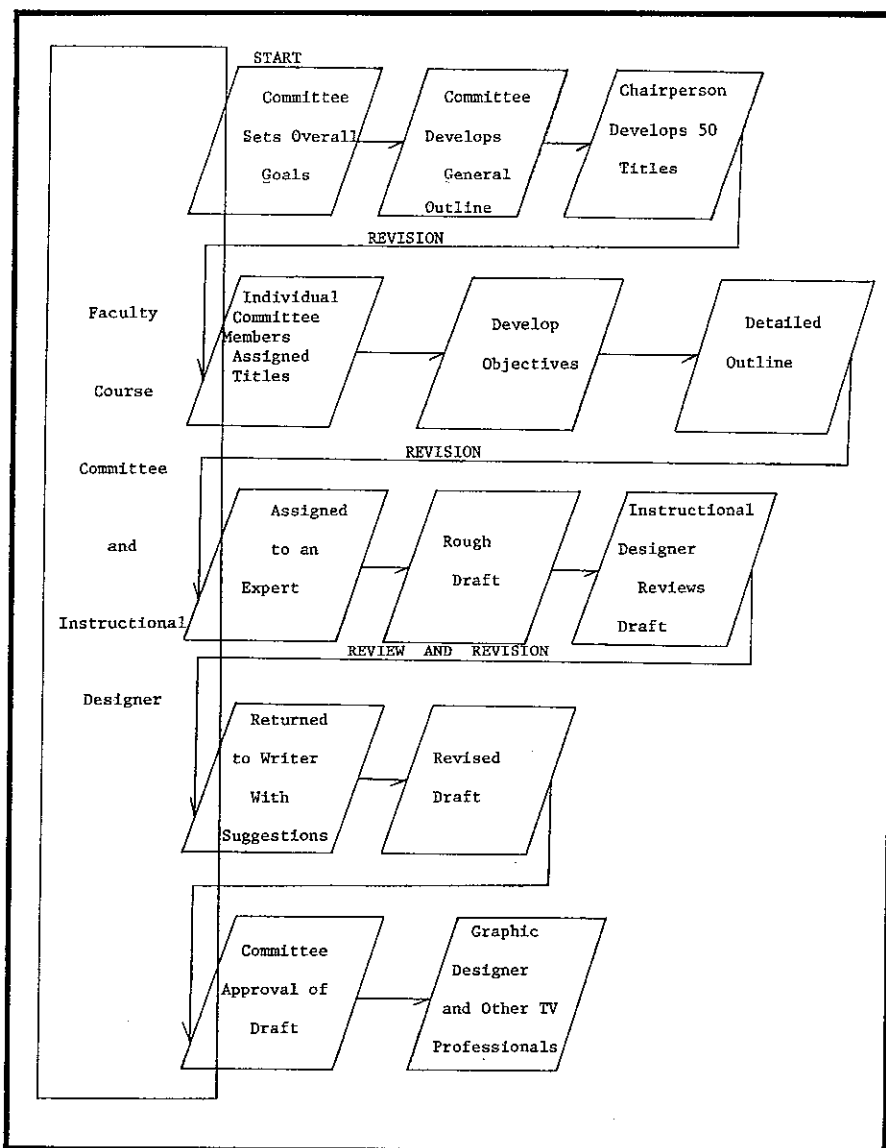


FIGURE 1. Flowchart outlining the initial stages of instructional design for course and for individual scripts.

pilot videotapes and made suggestions for improving final studio scripts.

Use of Television Professionals

In the past, faculty members in the program had attempted to plan, design, and produce telecourses on their own. Fortunately, the committee was now in a position to expend its energy on curriculum development and to hire a team of specialists to help design the final product and produce the series.

The professionals who were hired included: a *visual consultant* to locate and secure slides and films to illustrate the content appropriately; several *graphic designers* to create graphics (e.g., charts, diagrams) designed by the faculty; a *director* to put the raw mate-

rials together in the studio; an *associate producer* to ensure that all materials arrived on time, to take care of all legal problems, to handle the details of the budget, and to act as general liaison between the technical members of the team and the faculty committee; an *evaluator* to carry out formative evaluation of the series; and a *moderator* to host the series and serve as the TV instructor.

The difficult problem of getting the large, diverse team coordinated and working together was solved by establishing a "triumvirate" of directors: a faculty person in charge of curriculum development, a television director responsible for in-studio activities, and an associate producer responsible for locating and obtaining material resources originating outside the studio. The three

directors coordinated the activities of their particular groups of professionals. They met to decide on major issues, but directors had final authority in their areas of expertise. They were in the television studio during all production sessions. As a result of the team approach, each of the groups of professionals had to compromise on some things because of considerations raised by other members of the team. For example, at times faculty members had to make adjustments in the scripts due to time constraints. They handled this problem by deciding that all script additions were to consist of an expansion of the review or summary portion of the program.

The team approach constantly generated new problems of coordination. A flowchart was developed to route each script through the maze of people working on the series. Figure 2 represents a somewhat idealized summary of each script's movements.

New Approach to Telecourse Format

Because the students' attitude toward the teleseries had a great deal to do with the learning process, the television format was designed to appeal to students and keep them watching. "Format" includes the noncurricular elements affecting delivery of content—elements such as visuals, moderator, and style of delivery. The course committee discussed alternative formats and approaches with the instructional designer and several professional instructional technologists. The decisions made about format became an integral part of the rest of the preproduction planning and of the production itself. The following is a description of the most important format considerations and decisions.

The Professional Moderator. Although there is disagreement concerning the relationship between student appeal, use of trained presenters, and student achievement (Juskevics, 1978; Kanner, 1958; Myers, 1961; Wardwell, 1976), the course committee decided that a professional moderator would improve student appeal. The use of a nonscientist as moderator did require the preparation of verbatim scripts, a laborious process with the advantage of allowing review, modification, and planning of detailed visualization. Although the moderator chosen was effective, her lack of scientific training meant that she had difficulty interpreting some of the

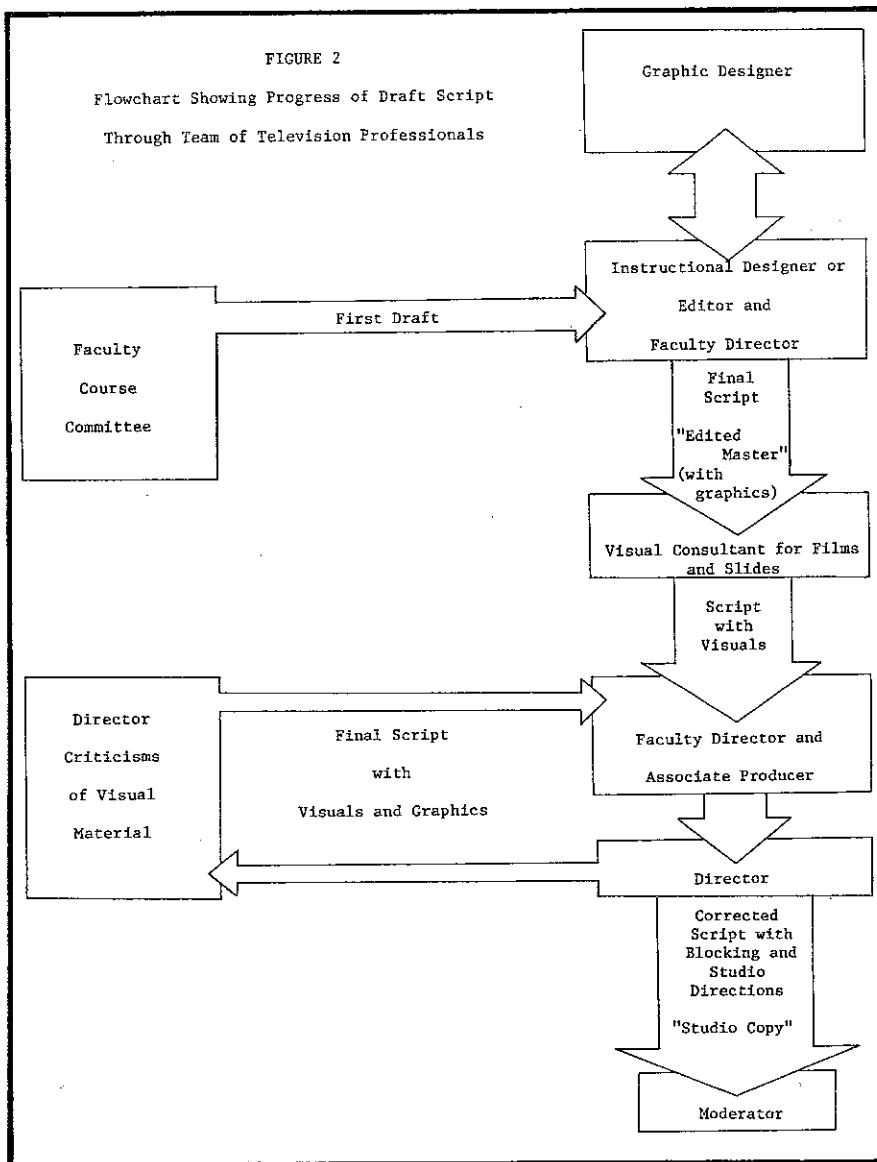


FIGURE 2. Flowchart showing progress of draft script through team of television professionals.

material and thus was often unable to impart the correct emphasis.

Maximum Use of Visuals. A small staff of visual consultants searched the art departments of local libraries and the *Encyclovideo Catalogs* for visual materials. Faculty members encouraged the staff's criticisms and suggestions about scripts. When pictures were lacking, a cartoonist drew what was needed.

The editor reviewed all scripts and listed and ordered necessary slides. The faculty director designed and ordered graphics for each script. Visual consultants were able to criticize and change the original decisions because script writers made a number of errors: requesting too many visuals for a short

segment of copy; requesting slides over copy better handled as straight lecture; requesting slides when copy could be more effectively explained by a graphic; failing to key copy to visual materials so viewers could clearly see the relationship between visuals and script.

Organization, Redundancy, and Review. The pedagogical literature (Gagné, 1977; Schramm, 1972) shows that a certain amount of carefully planned redundancy in instructional materials enhances the learning process. The following methods were developed to incorporate redundancy and review into the series: immediate repetition of complex concepts or graphics, review of major points at end of programs, and

summary programs throughout the series.

Student Contributions

The faculty committee responsible for *Changing Life on Earth* devised a two-stage process of formative evaluation using student participation which doubled as a learning experience for faculty and students.

Formative evaluation with student participation increased the complexity of the instructional design process because it occurred simultaneously with review and modification of script drafts by television professionals. The flowchart in Figure 2 shows the complete process of instructional design including the formative evaluation components where student contributions were sought. The following sections of the paper describe the two-stage process of student input which included a student seminar and a product evaluation.

Content Development

In the first stage, the course committee designed a multiquarter seminar for 10 senior students. During the course of the seminar, students received a basic education in instructional technology, an education that gave them the tools to review, criticize, and suggest improvements in the new TV programs. Because none of the programs were in studio production during the seminar, it was possible to use student suggestions to modify and improve scripts, visuals, and format.

During the first quarter of the seminar, a weekly workshop met to review the theory and method of instructional television. Each week the workshop featured a guest lecturer speaking on various instructional television topics. Students learned that instructional telecourses should include clearly stated objectives, correspondence of objectives and content, logical organization, concise and interesting copy, visual materials clearly supporting content, and appropriate content level and amount of material. The class reviewed programs from different types of videotaped telecourses, including early US/WCP telecourses. Everyone participated in a critical analysis of the tapes viewed.

Students applied the knowledge they had gained in a minipracticum at the end of the first quarter, in which they were randomly assigned one scientific concept that was to be used in the first

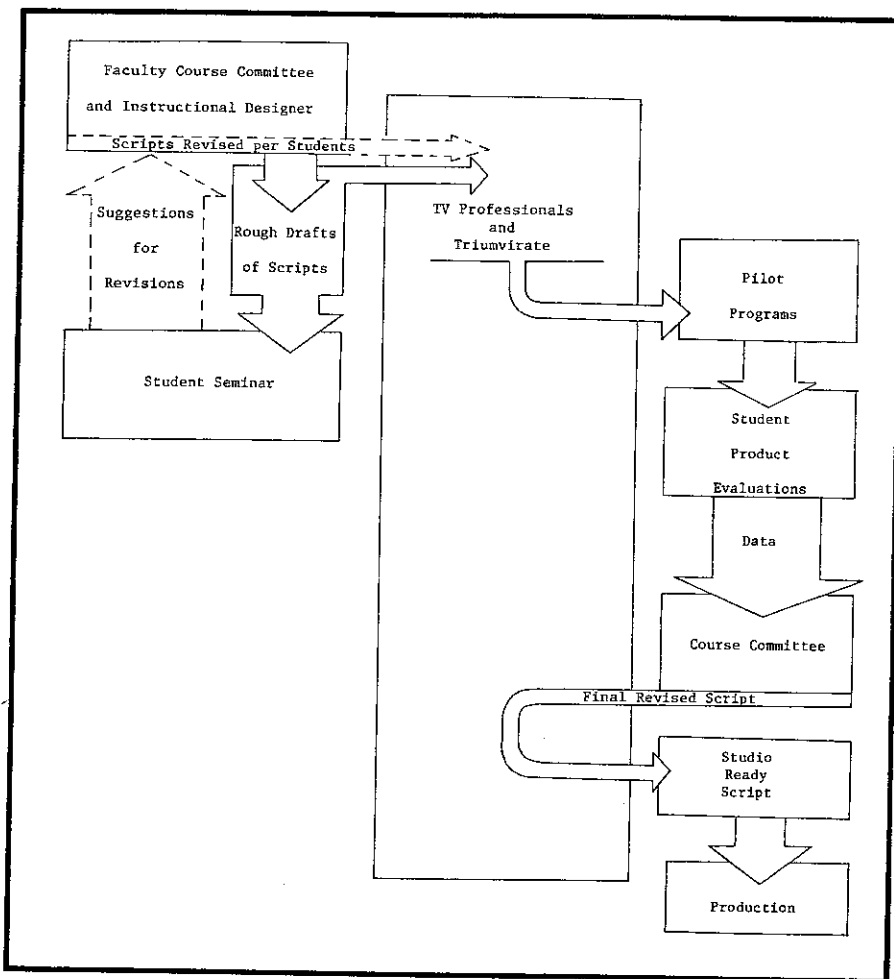


FIGURE 3. Flowchart outlining complete instructional design process, including formative evaluation using student input.

unit of the new series. They conducted research on the concept and wrote a content outline explaining how they would treat this concept in a TV program. Each content outline included objectives, format, and visual suggestions. After content outlines were reviewed and approved by the seminar instructor, students implemented their ideas by writing a script and developing a storyboard to go with it. Probably the most useful aspect of the first quarter's work was the fact that faculty members involved in the seminar received a thorough, basic education in instructional television. This basic education proved invaluable as faculty members worked to organize concepts, write scripts, and design graphics. The close interaction between students and faculty during the first quarter and the long critique sessions at the end of each workshop also provided the course committee with an opportunity to understand students' interests and per-

spectives in a way that had not been possible through the use of questionnaires.

The second quarter, or 10-week session of the seminar, consisted of a practicum, the heart of student contribution to the series. In the practicum, students worked in teams of two or three. Each team's objective was the thorough review and improvement of two or three of the programs in the new telecourse. The teamwork approach provided a greater range of student involvement in each of the programs reviewed. Each team was provided with scripts, visual suggestions, and graphics for the assigned programs. The team prepared a thorough critique of the program, basing its evaluation on the criteria outlined during the first quarter. Where necessary, teams rewrote or reorganized scripts, called for clearer definitions or alternate examples, designed new graphics, or submitted pictures other than those suggested by faculty mem-

bers. The students' critiques and modifications were submitted to the faculty committee and the faculty director carefully went over each team's comments.

Although students found the scripts to be well organized and to contain clear objectives and well defined terms and concepts, they noted that the new programs were still boring. This time, however, boring had a different meaning than in earlier evaluations. Students had previously called a program boring when they had difficulty following the content and had thus lost interest. Now, though students could understand the content, they felt that programs were still not applicable to their everyday needs and interests and did not spark their desire to learn. The programs lacked the ability to capture viewers' imaginations and motivate them to learn new material.

After lengthy discussion, the faculty committee decided that every script should be reviewed and modified to capture student interest early in each program. The most important suggestion made by the students was that each program, regardless of content, should begin with a clear statement of the relationship of the topic to the human condition. Each program was modified to introduce content in an interesting manner through a series of statements or questions that focused the planned content on the students' lives or problems of interest to students. Scripts were also edited to focus content on the human condition at several points throughout the program and at the conclusion of each program.

Product Evaluation

A faculty committee member met with the instructional designer to plan, design, and develop the evaluation of the first draft of the study guide, and of the completed telecourse program. The purpose of the evaluation was to confirm or deny the suggestions of content experts and to give the faculty committee the opportunity to obtain descriptive and judgmental information directly from students about the value of the instructional components.

Evaluation objectives were:

1. To determine the effectiveness of the program and obtain opinions and preferences of the students.
2. To determine whether the study guide was adequate as a supplement to the television program; i.e., that it con-

tained sufficient information and direction for the student, was well organized, written at appropriate vocabulary level, and so forth.

3. To obtain suggestions for activities to be conducted in the weekly workshop.

In addition, it was necessary to determine how much viewers had learned. To obtain this information, an objective reference test was developed as part of the experimental situation.

for the TV program and workshop. To maintain student anonymity and provide a means of cross-checking data, each packet was assigned a code number.

The faculty person in charge of curriculum development was interested in knowing what the students learned from this exposure to the television program and print materials. An objection was made to testing the students because the time allotted would not permit them to

for each part when necessary, and provided additional copies of materials if students found anything missing. The entire evaluation session, including viewing of the 26-minute videotape, took approximately 3 hours.

Results

Thirty-one students participated in the evaluation. The demographic profile showed that the majority of students were employed young adults who had previously received course material by television in biology and other subjects. This experience with instructional television enabled them to make comparisons with the materials under study and, therefore, valuable recommendations. In addition, the questionnaires revealed that most of the students held favorable attitudes toward the use of television in education. Therefore, they were not negatively biased in their responses.

Tabulation of all closed responses revealed that at least 23 students responded to each question. This high yield of responses suggested that the responses were representative of the opinions of the students as a whole. Therefore, conclusions, recommendations, and actions taken to modify the components were considered valid.

Objective 1: To determine the effectiveness of the television programs. The forced closed responses on "Content" and "Form" (see Table 1) indicated a high level of effectiveness in all areas. The question, "Did you take notes? If no, why not?", received no response from the students; thus, it was unclear why notes were not taken. However, the predominance of level four and five responses indicated support of the television program in its existing form.

The middle range (level three) responses in the area of "level of difficulty" indicated a need to look at not only the level of content but choice of words; words that needed to be simplified or explained. However, the response to the question, "Did you understand the words used?" would seem to negate this as a problem for the students.

Analysis of the students' responses to seven open questions showed that the students approved the on-camera narrator, found her devoid of any annoying speech or personal mannerisms, and gave support to her continued participation in the series. Because 19 students found the program interesting and not

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Before the evaluation, four programs had been produced. *Features of the Living Systems: Metabolism* was chosen by the faculty committee for evaluation because the production elements and content were considered satisfactory.

The study guide that was to accompany the programs was drafted. Its components were:

1. Introduction to the course
2. Introduction to the study guide
3. Program objectives and outline
4. Study questions
5. Supplementary materials

The subjects were students enrolled in the University Studies/Weekend College. Gagné and Briggs (1977) state that in a formative evaluation, only 8 to 24 students are needed. In order to avoid the problems of selection and to obtain as much feedback as possible, it was decided to use two classes: a morning class of 12 students and an evening class of 19. The evaluation was to be conducted at the first class meeting of the quarter, so that it would not interrupt the regular course schedule. A demographic profile of the subjects was obtained by means of a questionnaire.

An evaluation tool developed by Forrester and Zakia (1974) provided a model for the format of evaluation to be used. Written as well as oral responses were desired.

At the beginning of the evaluation session, each student (evaluator) received a packet of printed materials. It included the questionnaire, the introductory and outline portions of the study guide, and corresponding response sheets, as well as response sheets

use the learning materials as if in the actual learning situation, where they would have reviewed the study guide, used the study questions to advantage, and read the supplementary materials.

In spite of the questionable validity of the results, an objective-referenced test was developed. This test was administered as a pre- and posttest to the morning class and as a posttest only to the evening group. Campbell and Stanley (1966) have shown that students learn from taking a test. If a test is administered both as a pretest and posttest, there is doubt about whether the difference in scores results from exposure to the instructional package or to the pretest itself. Administration of a posttest only and a comparison of the two posttests can help determine whether learning has occurred from the instructional package.

Thus, evaluation sessions would include response sheets, study guide, pre- and posttests, and a television program viewing. Prior to each session, the in-class teacher briefly explained the evaluation, and students were allowed to withdraw if they wished. An audio-cassette recorder and two 60-minute tapes were on hand to capture oral comments.

Two persons conducted each evaluation session. One, a member of the faculty committee who was familiar to the students, described the evaluation process. It was stressed that the instructional sequence was being evaluated, not the students. The second person timed each sequence, compared it to the trial run, curtailed the time being taken

TABLE 1. Closed responses to the televised program.

Content	Not well		Very well			Total responses
	1	2	3	4	5	
How well did the objectives for the program agree with what was taught?			5	10	13	28
How well did the level of difficulty match your level?		1	7	12	7	27
Did you understand the words used?		2	3	11	12	28
How well did the examples help clarify the material?		1		12	15	28
Was the program organized?	1	1	3	10	15	30
Did the material encourage you to think?	2	2	2	9	14	29
How well did the study guide work with the TV program?		2	4	8	13	27
How would you rate the overall value of the program?	1		4	7	16	28

Amount of Information Given

Not enough: 0 Enough: 26 Too much: 1

Form	Yes	No	Total
Were the visuals (pictures, films, graphics) effective?	24	2	26
Were enough visuals used?	22	5	27
Were the graphics easily read?	23	4	27
Did you take notes?	10	14	24
If no, why not?	0	0	0
Would you feel it necessary to view the tape again in order to understand the material?	6	17	23

confusing, the developers felt encouraged.

From the "Additional Comments" section of the questionnaire came two valuable points: a request for repeat of important elements in the program and a plea for "same wording" of the narrator's script and the study guide.

The oral comments that followed often repeated what had been written on the closed responses.

Objective 2: To determine whether the study guide was adequate as a supplement to the television program. In the *Introduction to the Course* the explanation of the goals and the importance of the course did not receive high ratings. Here was an area where the goals and rationale of the course should be strengthened and more clearly defined.

Open written comments on the *Intro-*

duction to the Course offered few suggestions. Some were related to administration of the course, instructors' names, grading, course requirements, and so forth. Comments reinforced a need for a more clearly stated rationale for the course. Some students expressed concern about the amount of previous knowledge or experience necessary to understand the subject matter covered in this course. This concern suggests the need for a statement of prerequisites. The *Introduction to the Study Guide* rated adequate to high in content and form.

Open written comments revealed acceptance of the study guide as it was presented. Oral comments substantiated this. It was suggested that the glossary be enlarged and placed at the beginning of each unit.

Objective 3: To elicit suggestions for activities to be conducted in the weekly workshop. In their closed responses, students favored a close relationship between the workshop and the content of the week's programs. They also agreed that their own participation in the workshop was important.

Open comments reiterated a feeling that the workshop should center on elements in the TV programs not understood by the students. There was disagreement about the use of additional materials.

Response to the idea of a textbook was unanimously negative. Comments about the supplementary readings indicated a willingness to read them but not to have them on hand.

Pretest and Posttest Results

In considering the results of the objective-referenced pretest and posttest, two factors should be kept in mind. The main thrust of this product evaluation was to seek student opinions and preferences about the print and nonprint components of the television course. In addition, the evaluation session as planned, and as limited by time, would not allow the students to use the learning materials in the same way as if they had been studying.

Pre- and posttests were administered to the morning group of 12 students. The pretest was given after the students had read the *Introduction to the Course* and *Introduction to the Study Guide*. The posttest was administered following response to the videotape.

Of the 12 students present, two were not considered in the final tabulation because they did not complete both tests. No follow-up was made to determine why they did not complete the tests. In the second group of 19, three students did not take the posttest.

For Group 1, the mean score increased from 31.4 for the pretest to 41.1 for the posttest. For Group 2, the mean for the posttest was 38. The variance for Group 1 (10 students) pretest was 400.8

and films was included to ensure that students would grasp the main points of the visual material. In response to recommendations, pertinent graphics were repeated during the programs, at the end of each program if time permitted a substantial review, and in the summary programs. As students had suggested, the moderator was coached to move more frequently, to wear clothes in contrast to the background, and to assume a more relaxed conversa-

These contributions from the learners enabled the developers to make sound decisions concerning course design, to gear the materials toward student learning, and to strengthen the supplementary/complementary relationship between the print and nonprint components. The evaluation process reinforced and emphasized the need to focus learning materials on the learner, rather than developing materials acceptable only to other faculty members.

The peer review process of instructional design was a valid and important step in the development of learning materials since it precluded a single-theory or one-sided approach to the topic.

The students who participated in this evaluation voiced the need for repetition, reinforcement, limitation on the amount of information covered in one session, and emphasis of important points. These requests parallel basic concepts of learning theory.

What were the weaknesses of this evaluation? The major weakness was the attempt to accomplish too many objectives within the scope of a single evaluation. Obtaining student opinions and preferences about the TV program, study guide, and workshops was important. It was also important to obtain information about the learning that took place. Which was more important is debatable. Ideally, both should have been done but at different times with different students.

Conclusion

The results of this evaluation were a vote of confidence for the course developers and producers of the *Changing Life on Earth* television series. The manner in which this series was developed paid dividends to both the students and the program creators. Students who participated were inspired by the fact that they were contributing to the development of a course for future students. Faculty members had the valuable experience of developing a course in conjunction with students, and of observing students' responses to the learning components they developed.

Finally, for those in the teaching/learning field, the production of this series resulted in a developmental and evaluative model that could serve as a guide in the creation of instructional components in other educational environments.

"Faculty members had the valuable experience of developing a course in conjunction with students, and of observing students' responses to the learning components they developed."

(*SD*-20.01) as compared to the posttest of 241.6 (*SD*-15.5). The variance for Group 2 (16 students) posttest was 521.4 (*SD*-22.8).

The number of students who mastered each program objective demonstrated where the test was not clearly written or where the content of the program needed more definition. Where student responses were poor, the faculty committee examined the program content and decided to include more elaboration and emphasis.

Use of Evaluation Results

The written and oral comments of the students about the television program were summarized and presented to the faculty member in charge of curriculum development who shared the information with the television director and associate producer. The comments concerning the study guide were directed to the faculty member responsible for writing the study guide.

In response to the student evaluation (Objective 1), the television production staff reviewed all graphics for clarity. Additional graphics were ordered to introduce objectives and to summarize conclusions. Two methods of emphasizing points on graphics—use of highlights and pointers—were increased because of student requests for such aids. Attempts were made to keep superimpositions on the screen long enough for reinforcement and to make the background of sufficient contrast for the words to stand out clearly. More use of voice-over as accompaniment to slides

tional approach and facial expression.

There was some concern that because the study guide (Objective 2) was written in outline form, students might find it too terse. They overwhelmingly approved of the form but asked that sentences be used when the use of phrases could not clearly convey the meanings intended. This procedure was incorporated into the construction of the study guide examples. Other suggestions subsequently included in the study guide were listing the guest speakers and contributors to each program and introducing new vocabulary *before* each program. Each unit introduction included a list of the technical words in the unit programs, and these were defined in the glossary at the end of the study guide.

Students' suggestions for activities to be conducted in the weekly workshop (Objective 3) resulted in the decision to make available for the workshop demonstration copies of many of the slides appearing on the television programs, and to design projects involving students with the material.

In addition, an instructor's guide, listing selected program slides and recommended projects, was to be provided for all teachers in the course.

Summary and Recommendations

What has been gained by this experience? The developers learned the value of having students react to the learning components while these components were still in the developmental stage.

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