A PRELIMINARY EVALUATION STUDY OF AN AUDIO CASSETTE TAPE LECTURE COURSE

by JEROME W. BLANK

(Under the supervision of Professor Melvin H. Weinswig)

The audio cassette tape lecture course technique was recently developed at Extension Services in Pharmacy, University of Wisconsin. A preliminary evaluation study was conducted to determine: 1) if an increase in cognitive knowledge could be demonstrated after the course; 2) if mandatory continuing education requirements influenced examination performance; 3) the strengths and weaknesses of the course and technique; 4) the most-liked and least-liked features and tapes of the course; 5) what relationships existed between examination performance, course evaluation and demographic characteristics of the participants.

The demographic variables examined were: 1) state of residence; 2) year of pharmacy degree; 3) length of pharmacy curriculum; 4) years of pharmacy practice; 5) current practice status; 6) employment status; 7) professional practice setting; 8) hours of practice per week; and 9) the number of pharmacists working in the pharmacy.

Selected pharmacists in Florida and Michigan were offered the course and credit for half-price in exchange for completing the course examinations and an evaluation form. Of the 177 course registrants, 136 completed the

course and project; 69 pharmacists from Michigan with voluntary continuing education requirements, and 67 pharmacists from Florida with mandatory continuing education requirements.

A pretest-posttest design using identical examinations measured the increase in cognitive knowledge. The overall posttest mean (79.5) showed a significant increase over the pretest mean (54.7) on the 100 point examination. The Florida mandatory continuing education requirements did not affect examination performance; no significant difference between Florida and Michigan pharmacists was found on pretest or posttest. Pharmacists who had practiced fewer years scored significantly higher on both pretest and posttest. Hospital pharmacists scored significantly higher than community pharmacists on the pretest but not on the posttest.

Evaluation of the course and project was accomplished with a five-point Likert scale questionnaire which also included some open-ended questions. The pharmacists, indicating strong overall satisfaction with the course and independent study technique, were particularly pleased with the convenience of the notebook, the organization and delivery of the lectures, the good audio quality and the helpfulness of the lecture outlines. However, the pharmacists indicated the majority of the information was not new, the literature references were not useful and it was not easy to find study time. The most-liked features of

the course were related to convenience; 1) of the learning technique; 2) of the materials; and 3) for the student. The few least-liked features mentioned were the inability to question the instructor or to find a specific spot on the tape. The pharmacists expressed a strong preference for clinically oriented tapes. More than 90 percent of the participants reported they would recommend the course to a colleague and about 95 percent of the participants were interested in future participation in the project.

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by

JEROME W. BLANK

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J. W. Blank
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CHAPTER ONE

INTRODUCTION

More knowledge has been discovered during the lifetime of the present adult population than existed at the time of its birth. With this tremendous growth in information and the resulting developments in technology, the current adult generation has been faced with managing a civilization which is substantially different from the one originally transmitted to them.[1] As a result of the rapid changes which develop "... adults who bear the responsibilities of the society in which they dwell must be repeatedly reequipped to meet these responsibilities."[2] The consequence of not keeping up with the changes which occur is that "the well educated youth of today is an obsolete man tomorrow."[3] The adults may reequip themselves by pursuing new information

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[1]Gale Jensen, A. A. Liveright, and Wilbur C. Hallenbeck, Adult Education, Outlines of an Emerging Field of University Study, Adult Education Association of the U.S.A., 1964, p. iv.

[2]Wilbur C. Hallenbeck, "The Role of Adult Education in Society," In: Adult Education, Outlines of an Emerging Field of University Study, Adult Education Association of the U.S.A., 1964, p. 5.

[3]Jensen, Liveright, and Hallenbeck, op. cit., p. iv.

in either a haphazard manner or in an organized fashion. In recent years more adults have been motivated to continue their education in an organized fashion.[4] However, the motivation to learn, like other human characteristics, is not shared equally by everyone, and the motivations which stimulate the pursuit of education differ with the individual.[5]

Motivation for Participation in Continuing Education

Houle has classified adult learners into three categories with respect to their reasons for seeking additional learning: 1) the goal oriented; 2) the learning oriented; and 3) the activity oriented.[6] Examples of goals which might be sought through the pursuit of additional learning are: 1) a certificate; 2) an ability to converse in another language; or 3) the skill to prepare intravenous solutions. Adults who are learning oriented might pursue additional education to study: 1) drug interactions; 2) the social aspects of health care delivery; or 3) antibiotic synthesis. The activity oriented adults might pursue education because

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[4]Hallenbeck, op. cit., p. 14.

[5]Hallenbeck, ibid., p. 14.

[6]Cyril O. Houle, The Inquiring Mind, University of Wisconsin Press, Madison, Wisconsin, 1961, p. 3.

of a desire to: 1) socialize with colleagues; 2) participate in community health care projects; or 3) lead the local pharmaceutical association.

Axford also sought to answer the question of why adults choose to continue their education. While recognizing that an all-inclusive list of motives might be very long, he discussed the following condensed listing:

1. To develop a skill, to improve one's job.
2. To make up a deficiency, complete a certificate, diploma or degree.
3. To become a better citizen.
4. To broaden one's view of the world and of the people in it.
5. To learn about health and how to improve health habits.
6. To learn to be a more effective family member: father, mother, budget-maker, consumer, provider.
7. To develop skills in communication and human relations.
8. To deepen an understanding of a hobby, interest or latent ability.
9. To increase one's income.
10. To meet a requirement demanded by a business, industry or profession.
11. To fill leisure time with something meaningful.[7]

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[7]Roger W. Axford, Adult Education: The Open Door, International Textbook Company, Scranton, Pa., 1969, pp. 1-25.

Pellegrino suggested some health professionals attend continuing education offerings because they feel the "moral obligation" to stay abreast of developments in their profession.[8] For whatever reason, adults probably participate in continuing education to satisfy a need. Maslow has suggested that people are motivated to action by the following hierarchy of needs:

The Physiological Needs
The Safety Needs
The Love Needs
The Esteem Needs
The Need for Self-actualization.[9]

The most basic needs are listed first.

The needs most basic to survival would be pursued before more emotional or philosophical needs are pursued. According to Maslow's theory, the demands which would interfere with or threaten the obtaining of food, clothing, shelter and safety, and thereby threaten survival, would receive the highest priority and the first attention. If continuing education were perceived as essential to survival, in the profession and the professional status was the key to security, then continuing education would

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[8]Edmund D. Pellegrino, "Continuing Education in the Health Professions," American Journal of Pharmaceutical Education 33: (December), 1969, p. 712.

[9]Abraham H. Maslow, "A Theory of Human Motivation," Psychological Review 50: 1943, pp. 370-396.

receive a high priority. If continuing education were not necessary to professional survival, and the lack of participation in continuing education did not threaten professional security, then according to Maslow's theory, continuing education would be pursued after items with higher priority or a more basic nature had been achieved to a necessary degree of satisfaction.

Need for Continuing Education

The pharmacy literature has long expressed the needs for continuing education. Surveys have suggested a wide variety of topics of interest to pharmacists. Some surveys have shown that pharmacists rated business and management subjects high.[10-12] Other surveys have shown that pharmacology and pharmaceutical science advances are of the highest priority in the science areas.[13,14] Bernardi

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[10]Charles W. Hartman, and C. Eugene Watkins, "Opinions on Continuing Education," American Journal of Pharmaceutical Education 27: (Summer), 1963, pp. 426-431.

[11]C. Lee Huyck, "Topics Practicing Pharmacists Prefer on Refresher Programs," American Journal of Pharmaceutical Education 24: (Spring), 1960, pp. 185-190.

[12]Christopher Rodowskas, and Robert Evanson, "Continuing Education in Pharmacy: Motivation and Content," American Journal of Pharmaceutical Education 28: (Summer), 1964, pp. 393-403.

[13]Huyck, op. cit., p. 187.

[14]Rodowskas and Evanson, op. cit., p. 399.

reported that Connecticut pharmacists requested courses in physiology.[15] Still other surveys have cited pharmacist requests for interprofessional relationships and reviews of the effects of legislation on pharmacists.[16,17]

Nakamoto and Verner recently reviewed the continuing education literature in North America for several health professions between 1960 and 1970.[18-22] Their review of

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[15] Vincent W. Bernardi, "Panel: Identification of Specific Content Needs," American Journal of Pharmaceutical Education 33: (December) 1969, pp. 742-744.

[16] Grover C. Bowles, "Continuing Education May Be Required for Pharmacist License," Modern Hospital 113: (October) 1969, p. 130.

[17] Huyck, op. cit., p. 188.

[18] June Nakamoto, and Coolie Verner, A Survey of the Need for Programs to Prepare Members of the Health Professions as Specialists in Continuing Education. W. K. Kellogg Project Report #1, The University of British Columbia, Vancouver, British Columbia, 1972.

[19] June Nakamoto, and Coolie Verner, Continuing Education in Medicine: A Review of North American Literature 1960-1970. W. K. Kellogg Project Report #3, The University of British Columbia, Vancouver, British Columbia, 1972.

[20] June Nakamoto, and Coolie Verner, Continuing Education in Nursing: A Review of North American Literature 1960-1970. W. K. Kellogg Foundation Project Report #4, The University of British Columbia, Vancouver, British Columbia, 1972.

[21] June Nakamoto, and Coolie Verner, Continuing Education in Dentistry: A Review of North American Literature 1960-1970. W. K. Kellogg Project Report #5, The University of British Columbia, Vancouver, British Columbia, 1972.

[22] June Nakamoto, and Coolie Verner, Continuing Education in Pharmacy: A Review of North American Literature 1960-1970. W. K. Kellogg Project Report #6, The University of British Columbia, Vancouver, British Columbia, 1972.

the medical continuing education literature contained recommendations for continuing education programs or plans for national continuing education programs for physicians.[23] Continuing education was considered necessary to keep physicians informed about new techniques and research projects, and to prevent obsolescence. Reviews of the dentistry literature also recognized the importance of continuing education.[24] A review of the literature on nursing continuing education led to the suggestion that nurses' needs were "numerous and diverse."[25]

Pharmacy educators have espoused the merits of continuing education. Wilson recommended professional continuing education for pharmacists in 1940.[26] The 1948 Pharmaceutical Survey by the American Association of Colleges of Pharmacy recommended that pharmacy schools establish divisions of continuing education to provide continuing education for pharmacists in each school's area.[27] Apparently some educators felt that continuing

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[23]Nakamoto and Verner, No. 3, op. cit., pp. 66-67.

[24]Nakamoto and Verner, No. 5, op. cit., pp. 13-16.

[25]Nakamoto and Verner, No. 4, op. cit., p. 69.

[26]Robert Wilson, "A Continuing Program of Education for Pharmacists," The American Journal of Pharmaceutical Education 4: (October), 1940, p. 554.

[27]The General Report of the Pharmaceutical Survey, 1946-49, (Edward Elliott, Director), American Council on Education, Washington, D.C., 1950.

education was very important. Bowers felt "nothing less than the welfare of the profession and the health of the public is involved."[28] Brodie said of continuing education:

> Today, anyone who professes to be qualified to provide a specialized service in the health professions can do so only when his formal education is constantly reinforced by new knowledge produced by research.[29]

Hewitt also attached importance to continuous learning:

> Education and learning are a life process; if we stop we do not stand still--we retrogress as this rapidly changing world leaves us behind. If this is true of general education, it is infinitely and more vitally true of professional education.
>
> Our schools of pharmacy must meet this need by establishing or expanding existing extension programs and refresher courses, and they must make them so vital and attractive that practicing pharmacists will be eager to attend them.[30]

Schools have provided programs in the last 25 years. Apparently some programs have followed Hewitt's suggestion, because a survey of reasons for attending

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[28] Roy A. Bowers, "Postgraduate Education," American Journal of Pharmaceutical Education 23: (Winter), 1959, p. 4.

[29] Donald Brodie, "The Scope of Pharmacy Service in Hospitals," Hospitals 36: (February 16), 1962, p. 62.

[30] Harold Hewitt, "Public Health Requirements Must be the Measure of What and How to Teach Pharmacy," NARD Journal 84: (December 17) 1962, p. 37.

continuing education programs showed subject matter was the most important reason for attending.[31]

Although some schools have apparently developed attractive programs, no evidence has been produced to indicate high percentages of any state's pharmacists attending programs. In pharmacy, as well as medicine, nursing and dentistry, obstacles to participation in continuing education have appeared.

Obstacles To Continuing Education Participation

Reasons for not attending continuing education offerings identified by respondents in one study were: 1) difficulty of finding registered personnel to relieve the pharmacist during his absence; 2) loss of income consequent to time away from the practice; and 3) location of the program in a geographically distant place.[32] Similar obstacles to continuing education program attendance were also cited by Nakamoto and Verner in their surveys of literature in other health professions. Nurses were reported to have declined to attend programs outside local communities, even if fees and expenses were paid, because of family responsibilities.[33] Dentists also cited

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[31]Rodowskas and Evanson, op. cit., p. 399.

[32]Rodowskas and Evanson, op. cit., p. 400.

[33]Nakamoto and Verner, No. 4, op. cit., pp. 26-27.

distance from program site as an obstacle to attendance.[34] Physicians expressed reluctance to leave a busy practice.[35] It would be reasonable to expect pharmacists to decline attending programs on the premise of a demanding professional practice in addition to the abovementioned obstacles to attendance. It seems impossible to eliminate all obstacles to participation in continuing education, but in the last 25 years pharmacy appears to have made progress in overcoming some of these obstacles and improving the convenience of continuing education offerings.

Developments in Pharmacy Continuing Education

Some writers have traced the beginnings of pharmacy continuing education to the Pharmaceutical Survey of 1948.[36-38] The recommendations of the survey challenged

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[34] Nakamoto and Verner, No. 5, op. cit., p. 21.

[35] Nakamoto and Verner, No. 3, op. cit., pp. 26-27.

[36] William Blockstein, "Developing a Program for Continuing Education for a College of Pharmacy," American Journal of Hospital Pharmacy 33: (December), 1969, pp. 767-773.

[37] Charles Braucher, "A Comparative Analysis of Three Years of Continuing Education Activity," American Journal of Pharmaceutical Education 34: (May), 1970, pp. 234-240.

[38] W. Allen Daniels, "Variations in Needs of Pharmacists for Continuing Education," American Journal of Pharmaceutical Education 33: (December), 1969, pp. 729-734.

pharmacy schools to become involved in continuing education.[39] A few universities began to develop continuing education departments and/or continuing education programs after these recommendations were made.

In 1950, Rutgers University developed a pharmacy extension service. This service was designed to establish liaison with various segments of business, industry, professional pharmacy organizations, educators, allied health professions and government agencies which might be able to assist or influence pharmacy. Information of use to pharmacists in New Jersey was obtained from these liaisons. A pharmacy consultant service also was established to assist pharmacists in all phases of professional practice.[40,41]

Also in 1950, the University of Wisconsin School of Pharmacy began its extension services. The first programs were seminars about "Pharmaceutical Economics" and "Ophthalmic Preparations."[42] In the 1950's more pharmacy schools began to offer continuing education programs; but progress in program development appears to

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[39] The Pharmaceutical Survey, op. cit., p. 232.

[40] "Notes and News," American Journal of Pharmaceutical Education 14: (October), 1950, p. 679.

[41] John Voigt, "Pharmaceutical Extension Service," American Journal of Pharmaceutical Education 23: (Winter), 1959, pp. 9-10.

[42] "Notes and News," American Journal of Pharmaceutical Education 14: (October), 1950, p. 679.

have been slow.[43]

In 1954, the American Pharmaceutical Association resolved to "Lend its energetic support to the stimulation of refresher courses for practicing pharmacists and to extend its facilities and assistance to such endeavors whenever possible."[44]

In 1955, The American Association of Colleges of Pharmacy created the Committee on Continuation Studies. The primary purpose of the committee was to study and make recommendations for the development of continuing education for schools of pharmacy.[45] Although the major study recommended by this committee was never funded, the committee did result in a gathering of personnel interested in continuing pharmaceutical education.

In 1960, Patrick Costello reported that 57 of 76 accredited schools of pharmacy had presented 88 days of continuing pharmaceutical education and that five institutions employed fulltime extension officers to run continuing education programs.[46] Six more institutions

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[43]Patrick Costello, "Report of the American Council on Pharmaceutical Education, Inc.," American Journal of Pharmaceutical Education 25: (Winter), 1961, p. 33.

[44]"Education and Licensure: refresher courses," Journal of the American Pharmaceutical Association 15: (October), 1954, p. 634.

[45]Lloyd M. Parks, "Report of the Committee on Curriculum," American Journal of Pharmaceutical Education 19: (Summer), 1955, p. 536.

[46]Patrick Costello, "Report of the American Council on Pharmaceutical Education, Inc.," American Journal of Pharmaceutical Education 25: (Winter), 1961, p. 33.

reported the employment of parttime help for such programs.

By the mid 1960's, it appeared that a national trend toward involvement of the profession in continuing education had developed.[47] It also appeared that program planners were beginning to take steps to take the continuing education programs to the practitioner. In 1963, Philadelphia College of Pharmacy offered a continuing education lecture series to pharmacists by television.[48] The following year St. Louis College of Pharmacy began to offer correspondence courses for continuing education.[49]

Also in 1964, the American Association of Colleges of Pharmacy organized the Section of Teachers of Continuing Education. The organization of the section formally established the importance of continuing education as an integral part of pharmacy education.

In 1966, the first graduate program in pharmacy continuing education was established at the University of

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[47]Robert Armin Buerki, "Historical Development of Continuing Pharmaceutical Education in American Universities," Doctor of Philosophy Dissertation (unpublished), The Ohio State University, Columbus, Ohio, 1972, p. 384.

[48]"Announcements: Pioneer TV Series in Continuing Education for Pharmacists by PCPS," American Journal of Pharmaceutical Education 28: (Winter), 1964, p. 126.

[49]"St. Louis Rx College Offers Course in Pharmacology by Correspondence," Drug Topics 109: (January 25), 1965, p. 24.

Wisconsin.[50] In 1967, mandatory continuing education became a requirement for relicensure in Kansas and Florida.[51]

In 1969, The AACP Section of Teachers focused their annual meetings on the following aspects of program development for continuing education: 1) need determination; 2) department development and funding; and 3) evaluation of continuing education programs.[52] The majority of new programs reported at the meetings appeared to have been directed at the public. Only Barnes discussed correspondence courses for pharmacists.

In 1970, Nakamoto and Verner concluded their study of health science continuing education literature by stating the following challenge to the pharmacy profession:

> Of the several health professions, pharmacy is the most backward with respect to continuing education. The profession must be aroused to

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[50] William Blockstein and August Lemberger, "A Graduate Program in Pharmaceutical Extension," American Journal of Pharmaceutical Education 30: (November), 1966, pp. 473-477.

[51] Kenneth Kirk and Melvin Weinswig, "Mandatory Continuing Education for the Relicensure of Pharmacists," American Journal of Pharmaceutical Education 36: (February), 1972, pp. 48-55.

[52] American Journal of Pharmaceutical Education 33: (December), 1969, pp. 712-826.

> the need for it to ensure the survival of pharmacy as a profession.[53]

Perhaps either this challenge was accepted by the pharmacy profession or the need for continuing education was beginning to make an impression on more members of the profession than ever before. Whatever the reasons might have been, the recent developments in pharmaceutical continuing education give evidence to both the expansion of program developments and the evolution of philosophies for pharmaceutical continuing education.

At the AACP Section of Teachers of Continuing Education meeting in Houston, Texas in 1972, the Future Planning Committee submitted Guidelines for Continuing Pharmaceutical Education.[54] The committee report addressed the following topics: 1) definition of continuing education; 2) philosophy of continuing education; 3) organizational needs for continuing pharmaceutical education; 4) determination of need in continuing pharmaceutical education; and 5) program planning in continuing pharmaceutical education. It seemed that this report was the first collective

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[53]Nakamoto and Verner, No. 6, op. cit., p. 34.

[54]"Report of the Future Planning Committee: Guidelines for Continuing Pharmaceutical Education," Proceedings of the Tenth Annual Meeting, American Association of Colleges of Pharmacy Conference of Teachers, Section of Teachers of Continuing Education, April 25, 1972, Houston, Texas, pp. 1-31.

philosophical statement made on continuing pharmaceutical education.

Among the papers presented at the 1972 Houston meeting were considerations of attitudes of some pharmacists toward continuing education, an assessment of educational needs, and a potential interdisciplinary approach to continuing education.[55-57]

Evidence also has been presented of efforts to provide more programs to the pharmacists utilizing mass communications media. Audio cassette tape products, televised programs, and radio-telephone programs have been discussed as means of getting information to the

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[55] Kenneth Kirk, et al., "Attitudes of Women Pharmacists Toward Continuing Education," Proceedings of the American Association of Colleges of Pharmacy, Conference of Teachers, Section of Teachers of Continuing Education, April 25, 1972, Houston, Texas, pp. 29-37.

[56] Wallace Longmire, "The Assessment of Education Needs," Proceedings of the American Association of Colleges of Pharmacy, Conference of Teachers, Section of Teachers of Continuing Education, April 25, 1972, Houston, Texas, pp. 85-93.

[57] Vincent W. Bernardi, "An Interdisciplinary Approach to Continuing Education: Pharmacy and Podiatry," Proceedings of the American Association of Colleges of Pharmacy, Conference of Teachers, Section of Teachers of Continuing Education, April 25, 1972, Houston, pp. 77-84.

practitioner.[58-60] While several examples of mass media programs have been developed, it does seem that more extensive use of the mass media might offer the means to provide the quantity and variety of continuing education programs to satisfy pharmacists' continuing education needs.

Mass Media Incorporation into Continuing Education

While continuing education implementation has developed slowly over the last 25 years, technological developments in the mass communications apparently have resulted in great progress in communications media. Since World War II, it would seem that more progress has

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[58] Jack Arndt and Melvin Weinswig, "Classroom Without Walls: Continuing Education Courses for Pharmacists via Cassettes," Proceedings of the American Association of Colleges of Pharmacy, Conference of Teachers, Section of Teachers of Continuing Education, April 25, 1972, Houston, Texas, pp. 61-68.

[59] Harry Smith, "Use of Closed-Circuit TV With Live Telephonic Question and Answer Sessions in Continuing Education With Emphasis on the Interdisciplinary Approach," Proceedings of the American Association of Colleges of Pharmacy, Conference of Teachers, Section of Teachers of Continuing Education, April 25, 1972, Houston, Texas, pp. 47-57.

[60] Jack Arndt and Melvin Weinswig, "Continuing Education for Health Professionals via the Telelecture Method: An Analysis of Five Years' Experience in Wisconsin," Proceedings of the American Association of Colleges of Pharmacy, Conference of Teachers, Section of Teachers of Continuing Education, April 30, 1973, Scottsdale, Arizona, pp. 67-79.

been made in the dissemination of information than had been made in previous recorded history.

The health professions were not excluded from the information explosion. On the contrary, it appears they were very much involved in the production of volumes of information in this time period. To disseminate the large amount of new information from research and professional practice developments, it seems that the health professions have utilized nearly every mass communications medium developed.

Journals

It appears that the first medium used by the health professions to disseminate large amounts of information was the professional journal. The professional journals were developed for special interest groups. For example, the Journal of the American Medical Association was developed apparently for the physician members of the American Medical Association. The Journal of the American Pharmaceutical Association also was developed for members of the American Pharmaceutical Association. As the amount of information available increased rapidly, a need was created for more journals or more specialized journals. Newer journals and some older publications began to focus on information for special interest groups. For example, the American Druggist included information primarily for the community or retail pharmacist. Chain Store Age

seems to present information primarily for chain store entrepreneurs. Hospital pharmacists have received information for their special interests in the American Journal of Hospital Pharmacy. State pharmaceutical association journals have contained information primarily directed at area and state practitioners.

The advantages of journals for disseminating new information to pharmacists could include: 1) the medium was available when the information explosion began; 2) the journals offered specialized information to a restricted audience; 3) the subscriptions were inexpensive; 4) the materials were easily stored and reusable for future reference; 5) the periodicals permitted the pharmacist to pursue the information when he was motivated and it was convenient for him to do so; and 6) there were not associated expenses such as travel, wages for substitutes, and leaving a busy practice.

The following might be considered disadvantageous to the use of journals for continuing education: 1) information about some subjects might be presented incompletely because of limits placed on article length by journal editors; 2) several journal subscriptions would be required to consider developments in business, law, the pharmaceutical sciences and pharmacology, and professional activities; 3) it would be difficult or impossible to ask questions about published information; 4) the delay in publishing new information might result

in prolonged time periods between discovery of information and dissemination to the practitioner; 5) some pharmacists might have to spend considerable time reading; 6) monthly pursuit of journal information requires discipline to set aside the time to read; and 7) journals usually do not offer directed information on select topics, but generally a potpouri of available articles.

Correspondence Courses

Another method of continuing education which has been supported by some pharmacists has been correspondence study (also called the home study course or correspondence courses). Buerki recently reviewed the early development of pharmacy correspondence courses.[61] It appeared that early correspondence courses were designed to assist pharmacy apprentices in preparing for state board examinations; the courses did not seem to be part of any pedagogical structure. The only evident evaluation of the course was whether the apprentice passed the state board examination. That kind of evaluation would be frivolous unless some measure of the use of the course by the apprentice had been made.

More recently, courses designed by Barnes have been offered by St. Louis College of Pharmacy since 1964.

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[61] Buerki, op. cit.

The first course dealt with general pharmacology and was 14 lessons in length.[62] The lessons were mailed to the pharmacists at the rate of one lesson per month for 14 months. Each lesson was designed to require from four to eight hours of study per month. There were two texts for the course. One text was a general pharmacology text, while the other was a year's subscription to a bimonthly pharmacology journal. Textbook lessons and journal lessons were alternated. New assignments and examinations were not mailed until the multiple choice examination from the previous lesson was returned. Upon completion of the course, a certificate was sent to the student. Because of favorable responses upon evaluation of the course, more courses were developed.

Miller has stated,

> ... there is no educational design which is as sensitive to the individual differences in motivation and learning rate as the correspondence course. The student can proceed at his own pace; he can get attention to his individual particular problems and questions; he is more apt to find that the program provides him with carefully developed, special materials in an organized syllabus; and the teaching is likely to be far more carefully thought through than the average.[63]

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[62] Byron Barnes, "Correspondent - Practical Approach to Continuing Education," Journal of the American Pharmaceutical Association NS7: (January), 1967, p. 22.

[63] Harry Miller, Teaching and Learning in Adult Education, The Macmillan Company, London, 1964, p. 222.

This comment succinctly outlined some of the independent study advantages of correspondence study. Miller has indicated that many adults may choose correspondence courses because of feelings of inadequacy in a demanding classroom situation.[64] Other apparent advantages of this method of study might be: 1) no travel expenses; 2) no loss of work time; 3) no necessity to pay relief pharmacist wages; and 4) no expensive equipment is required to participate in the course. It would seem that all those advantages would have attracted many students. In 1968, Braucher reported there were 3,025 registrants in 22 correspondence courses offered by four colleges of pharmacy.[65] However, those participants were less than five percent of the number of people who received promotions for the courses (73,075). In addition, high dropout rates have been reported for correspondence study.[66] Even Barnes indicated a dropout rate of better than 50 percent for his courses.[67] This

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[64] Ibid., p. 225.

[65] Charles Braucher, "A Comparative Analysis of Three Years of Continuing Education Activity," American Journal of Pharmaceutical Education 34: (May), 1970, pp. 234-240.

[66] Miller, op. cit., p. 224.

[67] Byron A. Barnes, "Continuing Education by Correspondence," American Journal of Pharmaceutical Education 33: (December), 1969, pp. 826-831.

would seem to indicate a less than overwhelming acceptance of this method of continuing education by pharmacists. Perhaps the self-discipline required for participation in these courses discourages some prospective participants.

Television

During the last two decades, the use of television in education has probably received more attention than any other medium. Warner and Bowers reported the first use of broadcast television in postgraduate medical education at the University of Utah in 1954.[68] After the positive response of Utah physicians, other universities began providing broadcast or open-circuit continuing education programs. Nakamoto and Verner reviewed the use of open-circuit television by universities.[69] Among the examples cited were some cooperative efforts among universities to provide continuing education efforts simultaneously to a multi-state area. The patient history-therapeutics discussion or grand rounds format of the lectures presented in these programs met with mixed success.

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[68] Robert Warner and John Bowers, "The Use of Open Channel Television in Postgraduate Medical Education," Journal of Medical Education 29: (October), 1954, pp. 27-33.

[69] Nakamoto and Verner, No. 3, op. cit., pp. 89-96.

A televised lecture series titled "Boston Medical Reports," designed to provide medical education in the New England Region, was initiated in 1964.[70] A significant element of this series was an effectiveness study which provided continuous feedback to program planners for modification of future programs. The series was deemed sufficiently successful to initiate a similar series titled "New England Dental Reports for Continuing Dental Education."[71]

Nursing also has made use of television for professional continuing education. Although there have been some broadcast television programs designed for nurses, closed circuit television seems to have been used more extensively to provide in-service and continuing education programs.[72]

Pharmacy has made less use of television than medicine, nursing, or dentistry, although there have been some

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[70] George J. Robertson, "Television in Continuing Education of the Physician," Annals of the New York Academy of Science 142: (March 31), 1967, pp. 487-492.

[71] Joseph L. Hozid and Beveral G. Spinney, "New England Cental Reports: Continuing dental education on open-circuit television," Journal of the American Dental Association 85: (September), 1972, pp. 645-648.

programs produced. Philadelphia College of Pharmacy was the first to use broadcast television in continuing pharmaceutical education in 1963, bringing a series of lectures to pharmacists in the Philadelphia area.[73] In 1969, Blockstein reported that several states were using television in pharmacy continuing education.[74] Among the schools of pharmacy using television were Purdue University, the University of Minnesota, and the University of Nebraska.

Purdue University and Butler College of Pharmacy use the 13-station Indiana Higher Education Television Network for production of an annual series of eight lectures on a selected topic for the pharmacists of Indiana.[75,76] The University of Minnesota has produced several series of televised continuing education programs on a variety of subjects. These series have been

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[73] "Philadelphia College Offers TV Education," Drug Topics 107: (November 18), 1963, pp. 15 and 26.

[74] Blockstein, 1969, op. cit., p. 769.

[75] Bill Jobe, "Programs to Familiarize the Practicing Pharmacist with the Disease State," American Journal of Pharmaceutical Education 35: (December), 1971, pp. 830-833.

[76] "Regional TV - C.E. Programs," The Indiana Pharmacist 49: (January), 1968, p. 3.

available on tape for interested individuals.[77]

The television medium lends itself well to live visual demonstrations. When the viewing audience can ask questions and participate in discussions, this medium approximates the classroom situation more closely than other mass media techniques available.

If the television medium is not used properly, this could result in expensive failures. For example, if the visual aspect of the medium only shows a person lecturing with an occasional figure or illustration, the audience has been seeing nothing more than a Big Talking Face. If the lecturer was able to deliver the lecture, and also perform some demonstration and perhaps present some graphics, a better production would result.

Another possible disadvantage of television is the expense involved. The equipment is expensive to buy or rent. Broadcast time is expensive. Wages for the technical help necessary to produce the program is expensive.

Another disadvantage of the televised medium, which is associated with any media using broadcast facilities, is the existence of time restrictions. Only certain hours are available for broadcasting. Many of the hours

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[77]William Hodapp and Arnold Walker, "An Experiment in Continuing Education Utilizing Closed Circuit Television," American Journal of Pharmaceutical Education 32: (November), 1968, pp. 625-633.

would be unsuitable for pharmacist participation as, for example, during the normal workday. In addition, pharmacists would have to travel varying distances to reach the reception facility nearest them, unless they personally possessed one of the receiving units.

Radio and Telephone

The utilization of radio and telephone media has been noted in health science continuing education. In 1955, Woolsey initiated the use of two-way radio conferences from the Department of Postgraduate Medicine at Albany Medical College.[78] The program consisted of a two-way lecture to physicians listening in hospitals and other locations throughout the listening range of the non-commercial FM radio network. Since that time, the radio technique has been expanded to include the use of telephone lines carrying the same program to remote areas, perhaps out of the radio broadcast range. The University of Wisconsin has combined the use of radio and telephone to develop the "telelecture" technique.[79]

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[78]Frank Woolsey, "Two-Way Radio and Its Advantages," Annals of the New York Academy of Science 142: (March 31), 1967, pp. 424-427.

[79]Thomas C. Meyer, "Communications in Postgraduate Medical Education," Alabama Journal of Medical Science 7: (February), 1970, pp. 212-216.

According to Woolsey, the method (radio or telephone) "preserves the all important instructor-student relationship since an interchange of questions and answers and discussions takes place almost as easily as it does when individuals are face to face."[80] The method permits students to hear outstanding authorities in specialty areas who may or may not be in residence at the site of the broadcast origin. Through the use of either prerecorded taped lectures or long distance connections, the speaker can make his presentation and then answer questions from the participants via the two-way system. In an evaluation of this format, physicians indicated that 90 percent of all the questions they would like to ask were asked by somebody else in the audience.[81] This indicates that the many participants had most of their questions answered and that it was done in an efficient manner.

The telephone-radio technique also may have another advantage for participants by saving considerable travel time and associated expenses for travel to campus-held seminars and conferences. It also would allow busy health professionals the opportunity to participate in continuing education, but to spend a minimum amount of

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[80] Woolsey, op. cit., p. 424.

[81] Ibid., p. 425.

time away from their busy practice or families. It was previously noted that health professionals have listed the time away from practice or families as a reason for not participating in continuing education programs (see pages 9-10).

Although the radio-telephone techniques do not have the live visual component of the televised system, efficient administrative procedures designed into the programs have enabled the participants to use predistributed visual-aids which enabled participants to follow descriptions.

Woolsey has pointed out the most important disadvantage of this system: the inability to see the teacher during the educational process.[82] Recent technological developments might permit partial resolution of this disadvantage. Using a "slowscan" television technique in combination with special receivers and the telephone equipment, pictures may be displayed on a television screen during the program.[83] The disadvantage of this aspect of program production at the present time has been the expense of the equipment.

The primary advantages of this system include:

1) Widely separated students and instructors can be brought together for the exchange of ideas

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[82]Woolsey, ibid., p. 426.

[83]Meyer, op. cit., p. 215.

and still maintain the student-instructor relationship.

2) Visual aids, predistributed, can be utilized effectively in an inexpensive manner to provide visual descriptions when necessary.

3) Participants may receive instruction with a minimum of travel and time loss.

4) A larger than usual potential exists for outstanding faculty participation since the faculty have no need to travel.

Tape Recordings

The recording of audio signals on magnetic tape is another mass communications medium which has been adapted to education. Early tape recording equipment was expensive and difficult to operate.[84] The recent development of the cassette unit and the development of inexpensive player-recorder units has boosted the popularity and utility of tape recordings for instructional purposes.

Convenience is one of the primary advantages of the cassette unit. The cassette unit houses two spools holding a limited quantity of tape. With no threading

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[84]Herbert Scuorzo, "Teaching with Tape," Grade Teacher 84: (January), 1966, pp. 39-40+.

manipulations necessary, as required with conventional reel-to-reel tape recorders, the compact cassette is easy and convenient to use in an instructional setting, either by the instructor or the students. Like other reel-to-reel tapes, the cassette unit can be re-used when an outdated recording has been erased. Since many of the currently marketed cassette player-recorders operate both by battery and through electrical outlets, both educators and students have a portable and versatile tool.

Cassette tapes have been used in business as well as in non-medical professions. A person can learn to sell, tune a car, and study a variety of subjects such as accounting economics, English, algebra, public speaking, etc., by cassette recordings.[85-87] A "guide" cassette can take you "to see the sights and out-of-the-way places in Europe's capitals and countryside all on your own, when you want, at your own pace."[88] Lawyers who cannot attend all the meetings of the Practising Law Institute (New York) may purchase cassette recordings of the

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[85]"Sounds of Selling," Holiday Inn Magazine (August), 1971, p. 13.

[86]"Do-It-Yourself Tune-Up Cassette," (advertisement) by Coursette System Inc., 202 Circle, New York, N.Y. (undated).

[87]"Automated Learning Program," (advertisement), Travel and Leisure 2: (April-May), 1972, p. 79.

[88]"PanAm Tours on Tape," - source unknown.

proceedings.[89] National Banking Conference highlights are available on cassettes.[90]

Magnetic tape recordings also have been used in school systems. Preschool and primary grades have used tape recorders for music recording and playback, dramatic program presentation, and speech therapy.[91] In secondary schools, tape recordings are widely used in language laboratories where individual students study independently in class or progress at their own rate.[92] Other schools have used multiple outlet systems and individual headsets for playback of prerecorded lectures.[93] Colleges and university professors also use tape recordings. Postlethwait, at Purdue University, developed the audio-tutorial concept, applying it both to individualized learning of didactic materials and also to laboratory situations.[94]

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[89] E. Donald Shapiro, (letter to member of bar) advertisement for Practicing Law Institute, 1972 (no specific date).

[90] "Highlights of the Third National Conference on Bank Security," American Banker, August 25, 1971, p. 6.

[91] Scuorzo, op. cit., p. 39.

[92] Ibid.

[93] Donna Wilson, "Prerecorded Tapes Teach a Whole Class," Grade Teacher 84: (January), 1966, pp. 41-42+.

[94] Samuel Postlethwait, "A Systems Approach to Botany," Audiovisual Instruction 8: 1963, pp. 243-244.

Educators in some health science programs have incorporated the audio-tutorial method of tape recordings into their programs. Instructors at Washington Hospital School of Nursing, responding to a threefold increase in enrollment in a two-year period, adopted the audio-tutorial method. As a result of this and curricular changes, the large enrollment was accommodated and the curriculum was shortened from three years to two years.[95]

Medical instructors in the United States, Great Britain and Australia have made use of tape recordings for classes. In 1969, fourth year medical students at the University of Glasgow participated in an educational experiment in an endocrinology course. Traditionally the course had been taught by a lecturer with a slide demonstration. The experimental class utilized programmed taped-slide presentations in place of the conventional lectures. The students in the experiment significantly improved their position in the class and "reacted favorably to the experiment."[96]

In 1971, Koprowska and associates reported on the development of an audiovisual cytopathology course suitable for self-instruction of students. Most of the

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[95]Mary Deegan, et al., "An Audiotutorial Approach to Learning," Nursing Outlook 16: (March), 1968, pp. 46-48.

[96]Robert Harden, et al., "An Experiment Involving Substitution of Tape/Slide Programmes for Lectures," The Lancet 1: (May 3), 1969, pp. 933-935.

students (sophomores) accepted the new approach to the presentation of the materials.[97] The University of Wisconsin School of Medicine and School of Nursing in cooperation with the Medical Communications Department have developed a number of audio-tutorial slide-tape units which are available for study to medical and nursing students in the campus Medical Library.[98] The University of Wisconsin School of Pharmacy has developed tape-slide audio-tutorial materials and constructed special audio-tutorial laboratory facilities for the students' use.[99]

In Britain, Graves established the Medical Recording Service Foundation which runs a tape library service.[100] Health professionals borrow tapes or tape-slide units for two-week periods at a small fee (approximately 80 cents). The slide audio-tape units can be kept longer or permanently for their cost price. Recently a subscription service was begun.

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[97] Irene Koprowska, et al., "New Approach to Teaching Cytopathology," Journal of Medical Education 46: (March), 1971, pp. 250-252.

[98] "Audiovisual Materials at the Medical Library," (pamphlet), September 1, 1972. Supplements February 15, 1973 and May 1, 1973. (no pages, no author, mimeographed copy).

[99] The audio-tutorial laboratory was initiated September 17, 1970. The original equipment was supplemented on October 20, 1971. The laboratory has been in use since the 1970-1971 school year.

[100] John Graves, "Experience with a Tape-Slide Service," Scottish Medical Journal 16: (January), 1971, pp. 39-42.

The use of tape recordings in medical continuing education was pioneered by Claron Oakley in California in 1953, with the Audio-Digest Foundation.[101] The format of the tape subscription service presented opinions and statements of teachers and discussions by specialists on selected topics. The tapes, with worldwide distribution, have a 75 percent subscription renewal rate despite the subscription price ($142.50 per year). Although only reel-to-reel tapes were available initially, the Foundation directors recently adopted the audio cassette into the program. Future plans include development of video cassettes.

The combination of cassette tapes and the use of telephone lines is another communications development. Popularly called "Dial Access Systems," the telephone tape service has been available free of charge to select health professionals via a toll-free telephone line.[102] Upon receipt of the information request, an operator selects the appropriate cassette tape either manually or by computer retrieval system and plays the tape over the telephone to the user. As might be expected, the length of tapes in dial access systems are usually of short

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[101] Claron Oakley, "Tape Recordings in Medical Education," California Medicine 104: (June), 1966, pp. 534-537.

[102] Thomas Meyer, et al., "Report of an Experiment in the Use of Telephone Dial Access Tape Recording Library in the Continuing Education of Physicians," unpublished paper, 1969.

duration (eight minutes or less). The single concept information system is designed for quick access and succinct delivery of information. Physicians, and nurses, have dial access systems available to them.[103-105]

Although pharmacists do not yet have dial access systems designed for them, there are audio-cassette products oriented for the pharmacy profession. "Voices 12/60" cassette tapes from the American Society of Hospital Pharmacists provides a monthly 60-minute cassette tape designed to "complement printed publications."[106] "Edutape" for pharmacists offers a similar monthly tape subscription service with accompanying visual aids.[107] "Pharmacy Today" produced by ITP, Inc., offers new drug, legal and management information for pharmacists.[108] The University of North Carolina audio tape service offers

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[103] May Hornback and Helen Brunci, "Party-line for Nurses," Nursing Outlook 16: (May), 1968, pp. 30-31.

[104] Anne Niles, "Definitive Dialing, Nursing Dial Access: A Report of the Planning Year and the First Eighteen Months in Operation," University Extension, Department of Nursing, University of Wisconsin, 1970.

[105] C. Robert Tittle, Jr., "The Dial Access Tape Library: A Method of Continuing Medical Education in Northwestern Ohio," The Ohio State Medical Journal 68: (October), 1971, pp. 871-874.

[106] "Continuing Education Courses at Home," Iowa Pharmacist 27: (August), 1972, pp. 14-15.

[107] "Education via cassette is offered," (advertisement), American Druggist 161: (February 9), 1970, p. 24.

[108] Iowa Pharmacist, op. cit., p. 15.

cassette recordings of speeches, seminars, and lectures by faculty of the College of Pharmacy or visiting dignitaries.[109] Philadelphia College of Pharmacy has produced cassette tapes in their "Pharmatapes" continuing education series.[110]

The University of Wisconsin has developed the concept of the cassette tape lecture course.[111] Each course has several cassette tapes and coordinated printed material. The University of Minnesota has also produced a similar cassette course.[112]

It appears that Arndt and Weinswig developed the cassette lecture technique around several principles. First, an effort has been made in the design of the lectures to simulate the classroom situation. Hopefully this better enables the individual to consider that he is studying in a course of specific subject matter, but at his own convenience, his own pace and in a setting of his choosing. A second organizing principle is the

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[109] Ibid.

[110] Frederick J. Goldstein, "Continuing Education via Cassette Tape," Proceedings of the American Association of Colleges of Pharmacy, Conference of Teachers, Section of Teachers of Continuing Education, April 25, 1972, Houston, pp. 3-12.

[111] Jack Arndt and Melvin Weinswig, "Classroom Without Walls: Continuing Education Courses for Pharmacists via Cassettes," Proceedings of the American Association of Colleges of Pharmacy, Conference of Teachers, Section of Teachers of Continuing Education, April 25, 1972, Houston, pp. 61-68.

[112] Iowa Pharmacist, op. cit., p. 15.

presentation of the course material in a single package designed for storage in a compact unit. When study materials reach the student piece by piece, there is an increased opportunity for the materials to be lost or separated, making organization for studying or review difficult. Another reason for the course concept was to keep similar subject matter in a cohesive educational unit which facilitates future reference and use of that subject matter. Another principle likely to have been considered in the design of the material is the freedom provided the student in choosing the setting and time for continuing education endeavors. As previously mentioned (page 31), the versatility and portability of many cassette players enables the student to continue his education at his convenience.

There might be some disadvantages of importance to the student in the cassette lecture course technique of continuing education. First, the instructor-student relationship is one-way; the instructor delivers the lecture. The student has no chance to question the instructor on material not clear to him. Second, some students might have to purchase recorder-player units to participate in the courses. Third, the independent study technique might be difficult for health professionals to use since the curricula through which they matriculated were highly regimented.

The cassette tape lecture course has only recently been marketed (1972). An effort should be made to evaluate the consumer's attitude toward this new continuing education product. In addition to consumer satisfaction with the technique and product materials, an attempt should be made to determine if, in fact, some degree of learning occurs. A preliminary exploratory study of a test market evaluation of the cassette tape lecture technique might provide useful information for future product development.

Objectives

The objective of this study was to evaluate a cassette tape lecture course in a test market of pharmacists. Specific project objectives were:

a. To determine demographic information which would assist in describing project participants. The following demographic information was requested: 1) year of pharmacy degree; 2) length of pharmacy curriculum; 3) years of pharmacy practice; 4) current practice status; 5) employment status; 6) professional practice setting; 7) hours of practice per week; and 8) number of pharmacists working in the pharmacy.

b. To determine if there was a gain in cognitive knowledge after participation in the course by: 1) pretesting the pharmacists before the course; and 2) administering the final examination designed for the course.

c. To determine if there was a difference in cognitive knowledge achievement between pharmacists in a state with mandatory continuing education requirements and pharmacists in a state with voluntary participation in continuing education.

d. To determine what, if any, relationships existed between posttest achievement and the following variables: 1) year of pharmacy degree; 2) length of pharmacy curriculum; 3) years of pharmacy practice; 4) current practice status; 5) employment status; 6) professional practice setting; 7) hours of practice per week; 8) number of pharmacists working in the pharmacy; and 9) evaluation scores for the cassette course.

e. To determine by a questionnaire the evaluation of participants of the course with respect to the following facets of the course: 1) the materials presented; 2) the information in the course and its presentation; 3) the examinations; 4) the value of the technique for continuing education; 5) the most-liked and least-liked features of the course; 6) the most-liked and least-liked tapes of the course; 7) interest in future participation in cassette tape lecture courses; 8) willingness to recommend the course to a colleague; and 9) a suggested future selling price for similar products.

f. To determine what, if any, relationships existed between the evaluation scores and the following demographic variables: 1) state; 2) year of degree; 3) professional practice setting; and 4) employment status.

CHAPTER TWO

METHODOLOGY

A recently marketed audio cassette tape lecture course was the subject of the study. Data were obtained from a sample of pharmacists known to be currently registered in either Florida or Michigan. The data collecting instruments used in the study were: 1) a registration form; 2) a pretest and posttest; and 3) a post-course evaluation form. Statistical analyses were made using various computer programs.

Project Proposal

The cassette tape lecture courses have been available for about two years. No market acceptability evaluation had been attempted. It was decided to evaluate the product and the course by offering one of the cassette courses to a test market and evaluating its performance and opinions concerning the course materials. This project was carried out in the following steps: 1) one cassette tape course was offered to a selected test market of pharmacists; 2) course registrants were pretested for their familiarity with the course subject matter; 3) participants were tested after having the course materials for two months; 4) the participants were requested to complete an evaluation questionnaire;

5) test scores and evaluation data were analyzed; and
6) participants were notified of their performance.

Course Selection

Several cassette tape lecture courses have been produced by Extension Services in Pharmacy - University of Wisconsin. Selected Topics in Pharmacology was selected as the course to evaluate for three reasons: 1) the subject matter was applicable for all pharmacists; 2) the course was the first produced at Wisconsin; and 3) the subject matter of the course was thought to have the least bias for a particular pharmacy specialty from among those courses available.

The regular selling price for this seven-lecture course was $40. It was decided to offer the course to the test market for only $20, because: 1) half-price would represent a special offer for prospective participants and hopefully improve the rate of response; 2) the money invested in the course by participants, hopefully, would generate sufficient incentive for participants to complete the course and minimize course dropouts; and 3) the income from the participant fees would help defray the costs of the course and project materials.

Course Description

Selected Topics in Pharmacology, a seven-lecture audio cassette tape course was developed and produced by the staff of Extension Services in Pharmacy, University of Wisconsin-Madison in 1972. The seven lectures were designed and recorded by Joseph M. Benforado, M.D. Each lecture covered a selected topic in pharmacology and varied in length from 45 to 55 minutes. The titles of the seven lectures were:

Tape 1 - The Need for a Rational Therapeutics
Tape 2 - Chemotherapy
Tape 3 - Psychotherapeutic Drugs
Tape 4 - The Cardiovascular System
Tape 5 - Fertility
Tape 6 - Diuretics
Tape 7 - The Philosophy of the Therapeutic Nihilist

The course was designed to best fit the needs of individuals who had had some previous professional training in a health discipline and some formal background in pharmacology. The developers of the course thought the material would be a review of information for recent graduates and might be new material for those individuals who obtained their degree more than 20 years ago or who never had a formal course in pharmacology.[1]

[1]See Appendix B, Course Description, this statement originally was phrased by Extension Services in Pharmacy personnel for Selected Topics in Pharmacology to indicate the level of the program they intended.

Each cassette lecture was supplemented with printed handout material consisting of: 1) a lecture outline; 2) clinical case reports and explanatory diagrams; 3) a list of references on the subject matter of the lecture; and 4) a five-question, multiple-choice single-answer "check test" to assist the students with their learning. Answers for all the check-tests were provided at the end of the handout material for the course.

A specially designed three-ring notebook was provided to permit convenient storage and easy access to both the cassettes and supplementary printed materials. The cassettes were stored in a plastic, die-cast panel attached to the back of the front cover of the notebook. The printed materials were stored in the three rings of the notebook.

A final examination was offered with the course to allow participants to determine their achievement with the course material and also to provide a mechanism for accreditation for those health professionals using the course to fulfill mandatory continuing education requirements.

Test Market Selection

One of the objectives of the study was to evaluate the performance of pharmacists in a state which had voluntary continuing education participation and pharmacists in a state which had mandatory continuing

education requirements. Michigan and Florida were chosen to be the states with voluntary and mandatory continuing education requirements, respectively.

Wisconsin was not chosen as a participating state for the study although it was the logical choice because of the origin of the study. There were two reasons for not asking the pharmacists of Wisconsin to participate in the study. First, the course, Selected Topics in Pharmacology, had been presented in its entirety to Wisconsin pharmacists as a continuing education course over the Educational Telephone Network (ETN) in 1971. Therefore, some potential registrants would not have participated while some participants, taking the course for a second time, might have biased the evaluations. Second, the Wisconsin pharmacists might not have evaluated the course with the same candor that other pharmacists would in other states. This was because some Wisconsin pharmacists might have been influenced by past programs of Extension Services in Pharmacy. Also, they might have been inhibited from free expression for fear of hurting the feelings of friends within Extension Services in Pharmacy by making negative comments on possible sensitive subjects.

Michigan was selected from among the states with voluntary continuing education participation for two reasons: 1) Michigan had a large number of resident pharmacists; and 2) there was no organized state-wide

agency that coordinated continuing education efforts for pharmacists.

On the other hand, the firmly established mandatory continuing education program in Florida and the defined participation requirements were reasons for selecting that state. Also, at the time of the study the cassette tape lecture courses were in the process of being approved for continuing education credit in Florida.

Project Endorsements

Endorsements of the project were requested from pharmacy leaders in both Florida and Michigan for the following reasons: 1) to show potential participants that officials associated with organized pharmacy or pharmacy education in their state were aware of the project offering and endorsed its educational nature; and 2) to allay any suspicions by individual pharmacy practitioners or pharmacy educators that the University of Wisconsin Extension Services in Pharmacy was attempting to establish a market in their state to the detriment of existing state-wide continuing education programs.

In Michigan, endorsements were sought from the deans of the three pharmacy schools in the state. A suggested endorsement letter was sent to each of the deans. The Deans of Pharmacy at Ferris State College and the University of Michigan agreed to sign the suggested

endorsement letter. This letter, endorsed by the two deans, was duplicated for distribution with the project offer to Michigan pharmacists.[2]

A request for endorsement of the project also was made with the Michigan Pharmaceutical Association by formal letter to its Executive Secretary. This request was approved by the executive committee of the association, and a letter of endorsement was composed and signed by the Executive Secretary.[3]

An endorsement of the project was requested and received from the Director of Continuing Professional Education at the University of Florida School of Pharmacy. No further endorsements were considered necessary since this individual was both associated with the School of Pharmacy at Gainesville, and in charge of much of the programming for continuing education in the state.[4]

Sample Selection

A current mailing list of registered, resident pharmacists was received from the Continuing Professional

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[2]See Appendix A, for a copy of the endorsing letter signed by the two Deans of Pharmacy from the Schools of Pharmacy in Michigan and which letter was mailed to Michigan pharmacists in the project offering.

[3]See Appendix A, for a copy of the endorsing letter from the Executive Secretary, Michigan Pharmaceutical Association.

[4]See Appendix A, for a copy of endorsing letter from the Director of Continuing Professional Education, University of Florida, School of Pharmacy, Gainesville, Florida.

Education Department of the University of Florida School of Pharmacy and from the Michigan Pharmaceutical Association. The computer printout lists from both sources contained the pharmacist's name and the mailing address.

The Michigan list contained the names of 6,025 resident pharmacists and was divided into two sections: One section contained 3,502 names and addresses of members of the Michigan Pharmaceutical Association. The second section contained the names and addresses of 2,523 pharmacists who were not members. Both sections of the list were arranged in zip code-alphabetical order.

The alphabetically arranged Florida list contained the names and addresses of 3,799 resident pharmacists.

Pharmacist names were systematically selected from the mailing list of each state by the following mechanism. The roll of a die chose the first name from the first six names on the list. Each successive name was selected by moving a sufficient number of spaces down the list such that upon completion of the selection of 1,000 names, the complete list had been covered at least once.

For the Michigan list this worked out to selection of every sixth name. Actual selection resulted in 1,003 names from the Michigan lists. Every fourth name was chosen from the Florida list. A total of 949 names were selected by going through the list once. An additional 51 names were selected by starting through the list a second time, using the same selection system.

A number of organizations, companies, agencies, universities, and university departments were included in both mailing lists. When one such label was selected, it was rejected, and an alternate acceptable name immediately adjacent to the rejected name in the list was chosen.

Project Proposal Mailing

The material mailed to the selected pharmacists in both Michigan and Florida included the following: 1) a cover letter; 2) a description of the course and project; 3) directions for participation; 4) a registration form; 5) a self-addressed, postage-paid return envelope; 6) a registration deadline notice; and 7) a nine-inch by twelve-inch envelope with indicia specially printed for Extension Services in Pharmacy, University of Wisconsin, in which the offering was mailed.[5]

The cover letter explained: 1) the audio cassette tape lecture course technique; 2) the purpose of and need for the study; 3) the special offering of the cassette courses; and 4) instructions for project registration.

The course and project description, combined on a single sheet, explained the nature of the cassette course, Selected Topics in Pharmacology, and the organization and methodology of the project. The self-addressed, postage

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[5]See Appendix B for copies of materials included in the project proposal mailing.

paid return envelope was included because documented studies have shown that such efforts improved the rate of returns of mailed projects.[6,7] The registration form for the project requested the following demographic information: 1) year pharmacy degree was received; 2) length of pharmacy curriculum completed; 3) the number of years practicing pharmacy; 4) employer or employee status; 5) the number of hours currently practicing per week; 6) the professional setting in which practicing; and 7) the number of pharmacists full-time and total, practicing with the participant. Also requested were the respondent's name, address and business telephone number.

The Michigan mailing left the University of Wisconsin Extension mail room in zip code small package order on February 5, 1973. The Florida mailing left the same mail room in a similar fashion on February 8, 1973. The indicized mailing was sent by third class mail because of the size of the mailing and the financial restrictions on the project. The three additional mailings, designed for future steps in the project, were all mailed first-class.

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[6]Abbott L. Ferriss, "A Note on Stimulating Response to Questionnaires," American Sociological Review 16: (April), 1951, pp. 247-249.

[7]A. N. Oppenheim, Questionnaire Design and Attitude Measurement, Basic Books Inc., New York, 1966, p. 32.

The deadline for the course and project registration was February 23, 1973. This date would allow potential participants at least seven days to consider the proposal (assuming one week mailing time) and also enable the project to be conducted within a reasonable time span.

Two weeks after the Michigan mailing, few registrations had been received. Upon contacting six pharmacists by telephone, it was discovered that the mailing had either recently arrived or had not yet arrived. Similar calls to Florida revealed that the mailing had not arrived at most locations. Since the mail delay could affect participation by pharmacists in Florida (because the mailing might not arrive until after the deadline), it was decided to send a follow-up mailing to the Florida sample, extending the deadline to March 1. A cover letter explaining the delay and extending the deadline, a second registration form, and another project description were mailed first class to the Florida sample.[8]

It was later discovered that the mail delay was very long in some cases. One pharmacist in Michigan did not receive the mailing until April 17, 1973. This may have resulted in a smaller return than anticipated.

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[8]See Appendix C, for a sample of the materials in the Florida follow-up mailing.

Late registrations were accepted from Michigan as long as registrations were accepted from Florida. The last registration was received on April 2, 1973. The second deadline was extended because earlier registrants were returning the pretests for the course slower than anticipated.

Pretest Mailing

Upon return of the registration form and fees for the course, a 25-question, multiple-choice, single-answer pretest with a cover letter and a return self-addressed, stamped envelope were mailed to the registrant. The pretest cover letter served three purposes: 1) the registrant was thanked for participating; 2) prompt return of the pretest was requested; and 3) notice was given that the course materials would be mailed upon return of the completed pretest.

The purpose of the pretest was to determine the familiarity of the participants with the information content of the course. The developers of the examination constructed the items to reflect major points in the course information.[9] The pretest questions were identical to the final examination originally designed for the

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[9]Personal communication with Jack R. Arndt, Ph.D., program director for Selected Topics in Pharmacology, February 12, 1973.

course and were used in the same order in the posttest for this project.

When the completed pretest was returned, the course materials were mailed to the participants. Seven registrants from Michigan and four registrants from Florida had to be reminded by telephone to return the pretest.

Questionnaire Development

The evaluation questionnaire was designed to measure the attitudes of course participants regarding the strengths and weaknesses of the cassette tape lecture course. It was decided to develop a questionnaire using a five-point Likert scale for most attitude measurements. A few open-ended questions were included to permit the participants space to express likes and dislikes. In addition, participants were encouraged to make comments on the backs of the pages of the questionnaire.

Attitudes toward the following subjects were solicited: 1) the course materials; 2) the information and its presentation; 3) the examinations and checktests; 4) the audio cassette technique; and 5) the project. Other questions sought information about the factors liked the most and liked the least about using the cassette tapes for continuing education. In addition, identification of the most and least liked tapes were sought. For future marketing information, questions were

asked about: 1) previous use of cassettes in continuing education programs; 2) interest in future participation in cassette tape lecture courses; and 3) a suggestion of a reasonable selling price for future courses.

Three faculty members and five graduate students in pharmacy continuing education and pharmacy administration reviewed the questionnaire. After clarifying or eliminating questions and adjusting the length of the instrument, the questionnaire was re-evaluated and approved by the faculty members and two of the graduate students.

Posttest

As previously mentioned, the posttest was identical to the pretest, except for the cover sheet. The questions were designed to test the major points of information provided in the course lectures.

The posttests were mailed first-class with the evaluation forms to the participants eight weeks after they were sent the course materials. The cover letter and the cover sheet on the posttest requested that the posttest and evaluation forms be completed and returned before the date stamped on the cover sheet. This date allowed the individual ten days to two weeks to complete the forms. A minimum of four days after the requested return date, personal reminder postcards were mailed,

requesting return of the forms by a specific date. Four to seven days after the postcard-requested return date passed, a telephone call requesting return of the forms was placed to delinquent participants. Arrangements were made with those participants who requested extensions for various reasons. Occasionally, a compromise was arranged between the requested extension and the time restrictions for the projected completion of the study.

Methods of Data Analysis

Questionnaire responses were coded and key-punched onto computer cards. Demographic and course evaluation data for each individual were put on one card. Pretest and posttest answers of each individual were punched onto a second card for test question item analysis. The computer facilities of the Madison Academic Computer Center at the University of Wisconsin were used to organize the responses into meaningful information. The STATJOB series of computer programs were used on the Univac 1108 computer. The CROSTAB2 program prepared the cross-tabulation tables.[10] Tabulations of mean averages were made using the NWAY1 and ONEWAY1 programs.[11] Some

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[10] CROSTAB2: Data Tabulation, Academic Computer Center, Madison, Wisconsin, September, 1972.

[11] One-way Analysis of Variance - ONEWAY1, Madison Academic Computer Center, Madison, Wisconsin, November 1, 1966.

of the cross-tabulations were tested for significance at the five percent level of significance.[12] Means for the data were tested for significance using an F-test analysis at a five percent level of significance.[13]

Limitations of the Study

Financial restrictions of the study prevented complete sampling of all pharmacists in the states chosen for the survey and the involvement of more than two states. This limited not only the number of participants, but masked the true indication of participation by pharmacists in each state. Other limitations of this study include: 1) some participants in Michigan knew the author and this could have biased their responses; 2) lack of time and money to send follow-up letters to Michigan pharmacists after the discovery of the slow movement of the offer by mail could have reduced the potential sample size; 3) respondents interpreting words or terms differently than were originally intended; 4) incomplete questionnaires were returned by some respondents; 5) misjudgements in coding the responses to open-ended questions could have been made; and

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[12] Preliminary NWAY1: General Analysis of Variance, The University of Wisconsin Computing Center, Madison, March, 1970.

[13] See Appendix D for a discussion of the F-test and a sample of the computer printout of the F-ratio.

6) mechanical errors in transferring data from coding sheets to computer input cards could have been made. Other limitations will be discussed as they appear throughout the study.

CHAPTER THREE

DESCRIPTION OF THE SAMPLE

The preliminary mailing was sent to 2,003 pharmacists in Michigan and Florida. There were 266 undeliverable returns between the two states. A total of 177 pharmacists registered for the course, 91 from Michigan and 86 from Florida.

It had been anticipated that a greater number of pharmacists from Florida would register for the course than from Michigan because the course offered Florida pharmacists 14 hours of continuing education credit. A total of 15 hours of credit is required for the Florida annual pharmacy license renewal. Although a greater number of Michigan pharmacists registered for the course, a greater percent of the Florida pharmacists who received the mailing registered for the course. Apart from the number of undeliverable offers in Florida, there may have been other reasons why more Florida pharmacists did not register for the course. Perhaps many Florida pharmacists have sufficient number of convenient, inexpensive continuing education opportunities available to warrant rejection of this offer. Perhaps the stipulation that credit for the course was contingent upon successful completion of the final examination for the course discouraged some pharmacists. On the other hand, some

Michigan pharmacists, who also were registered in Florida, may have been attracted to the course because it offered them a convenient opportunity to satisfy most of the continuing education requirement for their annual Florida license renewal.

The evaluation of the cassette course was based on the data of 69 pharmacists from Michigan and 67 pharmacists from Florida who completed the project in the allotted time. The 41 pharmacists who did not finish the project either did not complete the pretest or failed to return either the posttest or the evaluation form in the allotted time. Two Michigan pharmacists did complete the evaluation form, but refused to complete the posttest.

Table 1 summarizes the sample derivation for Michigan and Florida pharmacists. Subsequent analyses will describe demographic characteristics of the 136 participants.

TABLE 1

SAMPLE OF PHARMACISTS

	Pharmacists		
	Florida	Michigan	Total
Mailed Offering	1000	1003	2,003
Not Deliverable	210	56	266
Received Mailing	790	947	1,737
Registered for Course	86	91	177
Percent Response	10.9	9.6	10.2
Completed Course	67	69[a]	136
Percent Completion	77.9	75.8	76.8

[a]67 pharmacists completed the final examination. Two pharmacists refused to complete the final examination, but did complete the evaluation form. Their evaluations were included in the analysis.

Year of Pharmacy Degree

The 136 participants received their pharmacy degrees over a fifty year range, from 1922 to 1972. Table 2 shows that 34.6 percent of the pharmacists received their degree prior to 1953; 36.0 percent received their degree between 1953 and 1962; and 29.4 percent received their degree in the last ten years.

A higher percentage of the Florida pharmacists (37.4 percent) than the Michigan pharmacists (31.9 percent) received their degree prior to 1953. Similarly, the segment of the Florida participants who received their

degrees between 11 and 20 years ago (40.3 percent) was larger than the same segment of the Michigan sample (31.9 percent). However, more of the Michigan participants (36.2 percent) received their degrees in the last ten years than the Florida participants (22.4 percent). Thus, the Michigan sample is younger than the Florida sample.

TABLE 2

COMPARISONS OF YEAR OF PHARMACY DEGREE BETWEEN FLORIDA AND MICHIGAN PHARMACISTS

Range of Degree Years	Pharmacists: Florida N	Florida %	Michigan N	Michigan %	Total N	Total %
1922-1932	5	7.5	1	1.5	6	4.4
1933-1942	3	4.5	4	5.8	7	5.2
1943-1952	17	25.4	17	24.6	34	25.0
1953-1962	27	40.3	22	31.9	49	36.0
1963-1972	15	22.4	25	36.2	40	29.4
	67	100.0	69	100.0	136	100.0

Years of Pharmacy Practice

The pharmacists as a group had practiced pharmacy an average of 16.9 years at the time of the study. The Florida pharmacists had practiced significantly longer (19.3 years) than the Michigan pharmacists (14.5 years). This would be expected from the findings in Table 2.

Table 3 shows the causes of this difference to be the following: 1) a greater portion of the Florida participants (10.5 percent) than the Michigan participants (4.4 percent) had practiced more than 30 years; 2) a greater portion of the Florida participants (64.2 percent) than the Michigan participants (50.7 percent) had practiced between 11 and 30 years; but 3) a larger portion of the Michigan sample (44.9 percent) than the Florida sample (23.9 percent) had practiced ten years or less.

It might be speculated that the Michigan sample, with more recent graduates, might have included more pharmacists who had had previous exposure to the types of information presented in the cassette course and, consequently, might score better on the pretest than the Florida sample.

TABLE 3

COMPARISON OF YEARS OF PRACTICE BETWEEN MICHIGAN AND FLORIDA PHARMACISTS

Range of Years of Practice	Pharmacists: Florida N	Florida %	Michigan N	Michigan %	Total N	Total %
10 years or less	16	24.2	31	44.9	47	34.8
Between 11 and 20 years	29	43.9	18	26.1	47	34.8
Between 21 and 30 years	14	21.2	17	24.6	31	23.0
Between 31 and 40 years	3	4.5	2	2.9	5	3.7
More than 40 years	4	6.1	1	1.5	5	3.7
	66[a]	100.0	69	100.0	135	100.0
Average	19.3 years		14.5 years		16.9 years	
F = 4.95	Critical value = 2.43					

[a]One pharmacist did not report his years of practice.

Length of Pharmacy Curriculum

The pharmacists from Michigan and Florida graduated from curricula of different lengths over the fifty year period from 1922 to 1972. Both Michigan and Florida samples in this study have higher percentages of graduates from curricula of four years or longer than either of the states reported in the state census data of the National Association of Boards of Pharmacy.[1] Although the Michigan

[1]"Licensure Statistics, Census," 1973, National Association of Boards of Pharmacy, Chicago, Illinois.

sample has a greater percentage of graduates from curricula of five or more years (39.1 percent) than the Florida sample (22.4 percent), the percentage of pharmacists from both states which have completed degrees of four or more years exceeds 90 percent. Table 4 summarizes the data on the lengths of curricula from which Florida and Michigan pharmacists graduated.

TABLE 4

COMPARISON BETWEEN FLORIDA AND MICHIGAN OF THE PERCENTAGES OF PHARMACISTS GRADUATING FROM CURRICULA OF DIFFERENT LENGTHS

	Pharmacists			
Length of Curriculum	Florida		Michigan	
	Sample	State[a]	Sample	State[a]
	%	%	%	%
2 or 3 years	4.5	16.6	2.9	18.5
4 years	68.7	78.1	56.5	80.1
5 or more years	22.4		39.1	
Other	4.4	5.3	1.5	1.4
Total	100.0	100.0	100.0	100.0
Sample Size	67	4,354	69	5,740

[a]State census data from "Licensure Statistics, Census," 1973, National Association of Boards of Pharmacy, Chicago, Illinois.

Since the participants from each state seem to have completed more years of education than the average pharmacist from the respective states, it might be

speculated that more of the participants from each state may have had exposure to the information presented in the course than the average pharmacist in each state. One potential difference this comparison might suggest is that the participants from each state might score higher as a group on the pretest than would all pharmacists from each state.

The data also might suggest that pharmacists with more formal education are more apt to participate in continuing education. However, there were insufficient data collected in this study to either substantiate or refute this speculation.

Practice and Employment Status

The participants were asked if they were currently practicing pharmacy. Table 5 shows that 90.4 percent of the pharmacists reported they were currently practicing pharmacy. Of the 13 participants who reported they were not currently practicing, nine had received their degrees in the last twenty years. It might be speculated that they were only temporarily unemployed or were pursuing another occupation.

Of these 13 pharmacists, nine reported they were working no hours per week, while the remaining four reported some hours per week. This apparent inconsistency is due to the fact that the four pharmacists were employed, but not as pharmacists.

TABLE 5

COMPARISON OF THE CURRENT PRACTICE STATUS BETWEEN PHARMACISTS FROM FLORIDA AND MICHIGAN

Practice Status	Pharmacists					
	Florida		Michigan		Total	
	N	%	N	%	N	%
Currently Practicing	57	86.4	65	94.2	122	90.4
Not Currently Practicing	9	13.6	4	5.8	13	9.6
	66[a]	100.0	69	100.0	135	100.0

[a]One pharmacist did not report his current practice status.

The percentage of Florida pharmacists who were not practicing (13.4 percent) was higher than the corresponding figure for Michigan pharmacists (5.8 percent). This could be attributed to the mandatory continuing education requirement for Florida pharmacists. Those pharmacists not currently practicing still must participate in continuing education in order to maintain their license.

The participants also were asked to indicate if they were employers or employees, and 28.7 percent reported they were employers. One hospital pharmacist classified himself as an employer, indicating he was charged with the employment of personnel in more than one institution. All other employers were community pharmacists. With one exception, all pharmacists not currently practicing

pharmacy indicated they were employees. The one exception considered himself an employer because he was supplying the financing for the pharmacy business although he was no longer practicing pharmacy. The employer/employee classification by the pharmacists who were not currently practicing seemed reasonable. These pharmacists probably could return to practice whenever they wished and their selection of the status they would assume probably would be accurate.

Table 6 shows there was a greater portion of employers in the Michigan sample (31.9 percent) than in the Florida sample (25.4 percent). This might reflect two situations. First, more employers may have been contacted in Michigan than in Florida. Second, the course may have been more attractive to Michigan employers than to Florida employers because it offered a convenient mechanism for Michigan employers to refresh their pharmacology knowledge, whereas the Florida employers may have had other adequate opportunities to refresh their pharmacology knowledge.

TABLE 6

COMPARISON OF REPORTED EMPLOYMENT STATUS BETWEEN PHARMACISTS FROM FLORIDA AND MICHIGAN

Reported Status	Pharmacists Florida N	%	Michigan N	%	Total N	%
Employer	17	26.6	22	31.9	39	29.3
Employee	47	73.4	47	68.1	94	70.7
	64[a]	100.0	69	100.0	133	100.0

[a]Three people did not report their employment status.

Pharmacists' Professional Practice Setting

The pharmacists were asked the professional setting in which they were practicing. Table 7 compares the sample with the state census statistics with respect to professional setting as determined by NABP census information and project information, respectively. Comparison of the percentages of community and hospital between the state NABP census and the sample breakdown for Florida shows similar distributions. In the Michigan sample, however, there was a higher percentage of hospital pharmacists than was reflected by the NABP data for all of Michigan. In Michigan, 10.8 percent of all the pharmacists practiced in the hospital environment. The percentage of hospital pharmacists in the Michigan sample

was much higher (31.9 percent). Consequently, the sample percentage of community pharmacists (65.2 percent) was lower than the total state percentage (85.7 percent). There was no apparent reason for the high percentage of hospital pharmacists in the Michigan sample.

TABLE 7

COMPARISON OF THE PROFESSIONAL SETTING PERCENTAGE BREAKDOWN BETWEEN FLORIDA AND MICHIGAN PHARMACISTS IN THE STATE AND SAMPLE

Professional Setting	Pharmacists				
	Florida		Michigan		Total
	State	Sample	State	Sample	Sample
	%	%	%	%	%
Community	85.3	88.1	85.7	65.2	76.5
Hospital	8.2	9.0	10.8	31.9	20.6
Other	6.5	2.9	3.5	2.9	2.9
Total	100.0	100.0	100.0	100.0	100.0
Sample size	4,354	67	5,740	69	136

[a]State census data from "Licensure Statistics, Census," 1973, National Association of Boards of Pharmacy, Chicago, Illinois.

Table 8 shows the comparison of the year of receipt of degree between hospital and community pharmacists. Where only 23.1 percent of the community pharmacists graduated between 1963 and 1972, 50.0 percent of the hospital pharmacists graduated in that time period. Of the community pharmacists, 76.9 percent graduated before 1963, but only 50.0 percent of the hospital pharmacists graduated before 1963. This table shows that the hospital pharmacists as a group were younger than the community pharmacists.

TABLE 8

COMPARISON OF YEAR OF RECEIPT OF DEGREE BETWEEN HOSPITAL AND COMMUNITY PHARMACISTS

Range of Years Degree Received	Pharmacists	
	Community %	Hospital %
1963-1972	23.1	50.0
1953-1962	38.4	28.6
1922-1952	38.5	21.4
Total	100.0	100.0
Sample size	103	28

Hours of Practice Per Week

The responding pharmacists reported they practiced pharmacy an average of 42.4 hours per week. Table 9 shows that 80.9 percent of the group practiced full-time, defined as a minimum 40-hour work week. Although these data show Florida pharmacists averaged more hours per week (44.4) than Michigan pharmacists (40.5), this difference was not significant. An equal number of participants from each state worked less than full-time or were not practicing at all. Although a greater percentage of the Michigan sample worked full-time, the actual hours per week of Florida pharmacists was slightly higher and resulted in a higher weekly average than accrued for the Michigan pharmacists.

TABLE 9

COMPARISON OF HOURS OF PHARMACY PRACTICE PER WEEK BETWEEN FLORIDA AND MICHIGAN PHARMACISTS

Range of Hours per Week	Pharmacists					
	Florida		Michigan		Total	
	N	%	N	%	N	%
More than 50 hours	20	30.8	19	27.5	39	29.1
40 thru 49 hours	33	51.0	38	55.1	71	53.0
1 thru 39 hours	7	10.8	8	11.6	15	11.2
Not Practicing	5	7.4	4	5.8	9	6.7
	65[a]	100.0	69	100.0	134	100.0
Average Hours per Week	44.4		40.5		42.4	
F-Ratio = 1.71 Critical value = 3.90						

[a]Two Florida pharmacists did not provide hours per week data.

Although there is a higher percentage of hospital pharmacists in the Michigan sample and the total group of pharmacists was younger than the pharmacists from each of the states, the sample appears to be representative of pharmacists from the two states. With the exception of the high percentage of hospital pharmacists in the Michigan sample, the samples from each state appear comparable for purposes of this study.

CHAPTER FOUR

THE EXAMINATIONS

The examination for the course was designed by Extension Services in Pharmacy personnel and the course lecturer to enable the students to demonstrate cognitive learning of the course materials. Boyle and Jahns defined the concern of the cognitive domain of behavior as the recall or recognition of knowledge and the development of intellectural skills and abilities.[1] Cognitive learning, therefore, would be evidenced by recall or recognition of knowledge of which the student became aware and understood in the course of study. In this project, attainment of cognitive knowledge by the participants was measured when the students completed the posttest for the course. Also, in this project a pretest, identical to the posttest, was administered to determine two types of information. First, the pretest performance hopefully would give an indication of the familiarity of the participants with the course material before exposure to the course. Second, a comparison of the pretest performance with the posttest performance

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[1]Patrick G. Boyle, and Irwin R. Jahns, "Program Development and Evaluation," In: Handbook of Adult Education, ed. by Smith, et al., The Macmillan Company, 1970, p. 64.

would indicate not only the change in cognitive knowledge level with respect to the information in the course, but also might provide indications of possible strengths and weaknesses in the course.

As previously mentioned, the examinations were 25-question multiple-choice, one-answer tests. The examinations were scored on the basis of 100 total points for each exam; therefore, each question was worth four points. No partial credit was given on any question. A score of 60 was selected as a passing grade by the program director and department chairman of Extension Services in Pharmacy.

The Pretest

The pretest mean for the 136 participants was 54.7. Table 10 shows that the pretest scores spanned a range of 60 points, from a high score of 88 to a low score of 28. Despite the wide range and a few scores in the 80's, only 48 of the 136 participants earned a passing grade on the examination.

TABLE 10

PRETEST EXAMINATION RESULTS

	Florida	Michigan	Total
Pretest Average	52.9	56.5	54.7
Range of Scores	80-28	88-32	88-28
Number of R.Ph.	67	69	136
Number with passing score	18	30	48
Percent who passed	26.8	43.5	35.2

F-Ratio for Pretest Averages = 3.71 (c.v. = 3.90)

These results can be interpreted several ways. First, the pharmacists may not have concentrated on the pretest examination, knowing from the stipulations in the course offering that only a satisfactory posttest performance was necessary for course credit.

A second interpretation of the pretest data might suggest that the examination was such a rigorous review that it was difficult to answer the questions correctly. Until the posttest results were compared with the pretest results, this speculation obviously could be neither corroborated nor refuted.

A third interpretation, and perhaps the most realistic, was that the pharmacists who volunteered for the course lacked the information in the course because of gaps in their pharmacology background. The gaps in

background could have occurred because of either inadequate academic training or an extended period between their training and this refresher opportunity.

Upon comparison of the pretest results between the samples from Florida and Michigan, no significant difference was found between the state averages, although the average of Michigan pharmacists was 3.6 points higher than the Florida pharmacists. Therefore, the difference between the mean scores for the two states could be attributed only to chance.

When the pretest performance was compared with the years of practice, no significant differences were found between the states, but a significant difference was found among the pharmacists when divided by years of practice. Table 11 shows that the graduates with ten years of practice or less scored the highest on the pretest. The averages of the other two groups decreased as the years of practice increased. Using the Scheffe[2] post hoc comparison, the significant difference was found to occur between pharmacists practicing ten years or less and those practicing more than ten years. A reasonable explanation for this difference is that many of the recent graduates from pharmacy schools probably covered pharmacological principles in a pharmacology course as a

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[2]See Appendix D for a description of the Scheffe post hoc procedure.

pharmacy student. They would be expected to perform better on the examination than the older pharmacists who either may have forgotten the principles or may not have been exposed to the principles, depending on their education.

TABLE 11

COMPARISON OF PRETEST RESULTS WITH YEARS OF PRACTICE

Years of Practice	Mean Score	Sample Size[b]	F-Ratio	Critical Value
10 years or less[a]	59.3	47	5.78	3.06
Between 11 and 20 years	53.7	47		
More than 20 years	50.8	41		

[a]Scheffe comparison showed significant difference between pharmacists practicing 1-10 years and all others.

[b]One pharmacist did not report his years of practice.

Seeking further corroboration of the time-related difference just described, comparisons of pretest scores of graduates of curricula of different lengths were made. Table 12 shows a similar relationship existed as was demonstrated with years of practice. The longer the curriculum a pharmacist completed, the higher was the average pretest score. Although no significant difference was found between pharmacists graduating from

curricula of four years or longer, the graduates of the two and three-year curricula scored significantly lower than the other groups of participants. This difference appeared to reflect a lack of exposure to the pharmacological principles of this course in their curricula and a failure by the graduates of the older, shorter curricula to re-educate themselves. It might also suggest that the older pharmacists, although not as well trained in pharmacological principles, had not perceived the need of pharmacology or the use of pharmacology information in their daily practice of pharmacy. Perhaps the pharmacists never had been shown the use of the pharmacological information in their pharmacy practice either in their undergraduate curriculum or in past continuing education programs.

TABLE 12

COMPARISON OF PRETEST PERFORMANCE OF PHARMACISTS WHO GRADUATED FROM CURRICULA OF DIFFERENT LENGTHS

Length of Curriculum (in years)	Mean Score	Sample[b] Size	F-Ratio	Critical Value
5 or 6 years	57.0	43	3.23	3.06
4 years	54.0	86		
2 or 3 years[a]	46.7	6		

[a]Scheffe comparison revealed a significant difference existed between pharmacists completing 2 or 3 year curricula and all others completing longer curricula.

[b]One pharmacist did not supply length of pharmacy curriculum from which he graduated.

Another pretest comparison revealed a significant difference in performance between pharmacists in hospital and community pharmacy settings. Table 13 shows that hospital pharmacists scored significantly higher on the pretest than did the community pharmacists. This difference might reflect more frequent use of pharmacological information by hospital pharmacists than by community pharmacists. However, the previous pretest comparisons reflected differences related to educational background and years of practice. When the years of practice data on community and hospital pharmacists were considered in Table 14, the results seemed to lend credence to the possibility that the difference which occurred between hospital and community pharmacists on pretest performance was related to the age of the pharmacists as well as his educational background. Of the hospital pharmacists in this study, 50 percent graduated in the last ten years and 78.6 percent graduated in the last 20 years. Compare these figures to the 23.1 percent of the community pharmacists that graduated in the last ten years and the 61.5 percent that graduated in the last 20 years. It seemed possible that the overall averages for professional setting might be affected by the years of practice or length of curriculum as much as by professional setting.

TABLE 13

COMPARISON OF PRETEST PERFORMANCE BETWEEN HOSPITAL AND COMMUNITY PHARMACISTS

Professional Setting	Mean Score	Sample[a] Size	F-Ratio	Critical Value
Community	53.5	103	5.03	3.90
Hospital	60.0	28		

[a]Four pharmacists did not provide professional setting information or could not be classified in these two categories.

A comparison was made of pretest scores of community and hospital pharmacists divided according to years of practice. The results as shown in Table 14 corroborate previous findings. A significant difference was found between mean pretest scores for community and hospital pharmacists. Similarly, a significant difference was found among the pretest mean scores of pharmacists practicing pharmacy for different lengths of time. However, no significant difference was found among the groups when both categories were considered simultaneously.

TABLE 14

COMPARISON OF PRETEST MEAN SCORES OF PHARMACISTS IN COMMUNITY OR HOSPITAL PROFESSIONAL SETTINGS ACCORDING TO THE NUMBER OF YEARS OF PHARMACY PRACTICE

Professional[a] Setting	Years of Pharmacy Practice[b] 10 years or less	11 to 20 years	More than 20 years
Community	58.7	52.1	49.3
Hospital	62.6	57.0	56.8

[a]F-Ratio between professional settings = 4.31 (c.v. = 3.90)

[b]F-Ratio among years-of-practice groups = 3.39 (c.v. = 3.06)

The consistency of the difference in performance between community and hospital pharmacists was noted as the hospital pharmacists scored higher on the pretest in every category of years of practice. Similarly, the groups of pharmacists who had practiced pharmacy for more years scored lower on the pretest than groups of pharmacists who had not practiced as long.

Comparisons of pretest performance and other demographic variables were performed. Table 15 shows no significant difference was found when the employers and employees pretest performances were compared, but the employees average (55.5) was higher than the employers average (53.6). Table 15 also shows no significant

difference was found when the averages of those pharmacists currently practicing pharmacy were compared with the average of those pharmacists not currently practicing. Similarly, no significant difference was found among groups of pharmacists who were working different ranges of hours per week. Table 15 shows those pharmacists working 60 hours or more per week had the lowest average score (50.2) of all the groups on the pretest. Those not currently practicing pharmacy scored slightly better (51.6) than the previous group who had worked longer hours. Those pharmacists who worked less than 40 hours per week had a higher average (54.1) than those pharmacists working 50-59 hours per week (53.2), but those working 40-49 hours per week had the highest average (56.5).

TABLE 15

PRETEST PERFORMANCE COMPARED ON THE BASIS OF DEMOGRAPHIC CHARACTERISTICS

Comparison	Mean Score	Sample Size	F-Ratio	Critical Value
Employment Status				
Employer	53.6	39	0.74	3.90
Employee	55.5	94		
Current Practice Status				
Currently Practicing	55.1	122	0.49	3.90
Not Currently Practicing	52.3	13		
Hours/Week of Practice				
60 hours or more	50.2	13	0.55	2.43
50-59 hours	53.2	26		
40-49 hours	56.5	71		
Less than 40 hrs.	54.1	15		
Not Practicing	51.6	9		

Table 16 shows pretest performance by pharmacists compared on the basis of the number of full-time and total pharmacists working in the business unit. Participants from pharmacies with two full-time pharmacists scored higher (55.8) than participants from pharmacies either with only one full-time pharmacist (53.8) or with three full-time pharmacists (52.4), but not as high as participants from pharmacies with four or

more full-time pharmacists (56.2). However, the differences among these groups was not significant. Similarly, the participants from pharmacies in which there were two or three total pharmacists performed better on the pretest (55.7) than either those pharmacists from one-man pharmacies or those pharmacists from pharmacies employing four or more pharmacists (54.0). Again the differences were not significant. Apparently, working with other pharmacists did not increase a pharmacist's knowledge of pharmacology. It would seem that pharmacists working together would share their uses of pharmacology information and ask their colleagues for supplementary information as questions arose. A reasonable explanation might be that pharmacists do not use pharmacology in their practice.

TABLE 16

COMPARISON OF PRETEST PERFORMANCE AMONG GROUPS OF PHARMACISTS DIVIDED ON THE BASIS OF FULL-TIME AND TOTAL PHARMACISTS WORKING IN THE BUSINESS UNIT

Comparison	Mean Score	Sample Size	F-Ratio	Critical Value
No. of Full-Time Pharmacists/Unit[a]				
1 pharmacist	53.8	36	0.40	2.66
2 pharmacists	55.8	51		
3 pharmacists	52.4	19		
4 or more	56.2	22		
Total Pharmacists in Business Unit[b]				
1 pharmacist	52.3	14	0.86	3.06
2 or 3 R.Ph.	55.7	79		
4 or more	54.0	36		

[a]Eight pharmacists did not supply information on the number of pharmacists working full-time.

[b]Seven pharmacists did not supply information on the total number of pharmacists working in the pharmacy.

The importance of the pretest differences would be determined by the posttest differences which developed. If differences observed in pretest performances were not found after analysis of posttest performances, it would seem to indicate that study of the course materials could reduce the knowledge gaps found after the pretest.

If, after the posttest was completed, the same significant differences were noted, it would indicate that these differences could not be rectified by completion of this course within the restrictions of this project.

The Posttest

The posttest mean for the participants was 79.5. Table 17 shows posttest scores spanned a range of 56 points, from a perfect score of 100 to a low score of 44. Only four people failed to achieve a posttest score of 60 and the consequent credit for the course. The average gain over the pretest was 24.2 points which indicated significant increases in cognitive knowledge performance as a result of completing the course. Only one individual had a lower posttest score than that achieved on the pretest, that difference being four points. The greatest improvement in score over the pretest by an individual was 52 points.

TABLE 17

POSTTEST SCORES AND COMPARISON WITH PRETEST SCORES

	Florida	Michigan	Total
Posttest Average	79.3	79.7	79.5
Average gain over the pretest	26.4	23.2	24.8
Range of scores	100-48	100-44	100-44
Number of R.Ph.	67	67	134
Number with passing score	66	64	130
Percent with passing score	98.5	95.5	97.0
No gain in score	2	2	4
Decrease in score	0	1	1

The Florida pharmacists might have been expected to score better because they should have been more concerned about earning continuing education credits to maintain their licenses. The posttest averages for the two states' samples were within a point of each other. This indicated that the achievement level for the pharmacists from a state with voluntary continuing education participation was not different from the achievement level of pharmacists in a state where continuing education participation was mandatory for annual relicensure.

The significant increase in examination score should be gratifying to the program planners. However,

interpretation of the test results must be viewed with the following precautions. Since identical pretest and posttest examinations were used, some residual recognition of questions from the pretest might have occurred while the course materials were studied and the final examination was completed two months later. Arguments which weigh against this proposition are the following: 1) the participants had no reason to suspect an identical pretest and posttest would be administered; 2) the two-month time period between the pretest and the posttest should have allowed sufficient time for extinction of memory of specific test questions; and 3) the awareness that final examination achievement was the basis for course credit and that pretest results were gathered for background information should have minimized the importance and emphasis of the pretest.

The examination itself should be examined with respect to validity and reliability. Such an investigation was considered beyond the scope of this preliminary study. However, the following information on particular performance on individual examination items was collected: 1) comparison of answers on the pretest and posttest for each item of the examination; and 2) ranking of the pretest and posttest items by percent correct answers and also by percent gain of correct answers from pretest to posttest.[3]

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[3]See Appendix E for posttest data and ranking of posttest questions by participant performance.

The results showed that 13 of 25 questions were answered correctly by less than 50 percent of the participants on the pretest. On the posttest, however, there were only two items not answered correctly by 50 percent of the participants, and only three items were not answered correctly by 60 percent of the participants. Since ten of the posttest examination items were answered correctly by more than 90 percent of the participants and five of those items showed percent gains of 50 percent or more, it would seem reasonable that the participants' gains in cognitive knowledge were a result of the course and that the examination tested material found in the course. However, substantiation of these data must await experimentation with a control-group-pretest-posttest design.

Several comparisons of pretest results with demographic variables were made to determine possible relationships affecting examination performance. Those comparisons were repeated with the posttest results. Two of the comparisons of posttest performance with demographic variables revealed significant differences in the comparison.

When posttest performance of graduates of curricula of different lengths was examined, a significant difference was found. Table 18 indicates the significant difference was found to be between the graduates of two

TABLE 18

COMPARISON OF POSTTEST RESULTS WITH LENGTH OF CURRICULUM AND YEARS OF PHARMACY PRACTICE

Comparison	Mean Score	Sample Size	F-Ratio	Critical Value
Length of Curriculum				
5 or 6 years	82.9	42	5.16	3.06
4 years	78.3	85		
2 or 3 years[a]	70.0	6		
Years of Practice				
10 years or less[b]	84.4	46	8.65	3.06
11 to 20 years	78.7	46		
More than 20 years	75.8	41		

[a]Scheffe comparison indicated graduates of 2 or 3 year curricula scored significantly lower than graduates of curricula of 4 years or longer.

[b]Scheffe comparison indicated pharmacists with ten years or less of practice scored significantly higher than pharmacists who had practiced more than 10 years.

and three-year pharmacy curricula and graduates of curricula of four years or more. Examination of the posttest averages of participants from the various curricula shows that the average for all groups was greater than the passing score of 60. The small group of graduates (6) from two and three years curricula averaged 8.3 and 12.9 points lower on the posttest than did graduates of four-year and five or six-year curricula,

respectively. This indicated that the pharmacists that graduated from the two- or three-year curricula did not reach the same level of cognitive knowledge with the course materials as the graduates of the longer curricula. This finding must be considered in light of the following considerations.

First, the sample size of only six graduates from two- and three-year curricula in this project was small. Individual scores in this group weighted the group average more strongly than if the group had been of comparable size to the groups with which it was compared.

A second consideration in this comparison might relate to the zeal with which the pharmacists from the different groups pursued the material in the course. Perhaps the older pharmacists did not perceive the acquisition of the knowledge of the course as important as did the younger pharmacists. It must be recognized that these older pharmacists had practiced pharmacy for several years without much emphasis on continuing education. Although much attention has been accorded to continuing professional education in recent years, these older pharmacists might not have perceived the necessity for continuing education as being as important as the younger pharmacists and also might not have felt professionally threatened without it.

The third consideration relates to the educational background of the pharmacists. It was possible that the

older pharmacists, graduates of the two- and three-year curricula, may not have been exposed previously to the pharmacology considered in this course. The graduates of more recent curricula most likely had the benefit of more pharmacological instruction. Since these graduates performed significantly better on the examinations for this course than graduates of the older, shorter curricula, it might be reasonable to conclude that the older pharmacists were inhibited from performing better on the examinations because of more extensive deficiencies in their pharmacological education.

Another consideration which might be applicable is related to the time limits imposed on the participants. Perhaps the older pharmacists had more trouble completing the course in the two months allotted in this project than the younger pharmacists did.

The second comparison in Table 18 compared posttest performance with years of practice and showed a significant difference among the groups of pharmacists. The significant difference, discovered with an F-test and located with the Scheffe post hoc procedure, indicated that pharmacists with ten years or less experience scored significantly higher on the posttest than did pharmacists who had practiced longer than ten years. It also was noted that examination performance decreased as the number of years of practice increased.

These results indicate that pharmacists practicing for more than ten years might not have the motivation to score as high as the more recent graduates. Or, they may have forgotten a greater portion of the pharmacology they learned in school or learned less pharmacology in school than those pharmacists that graduated in the last ten years. It also might indicate that they might have had more difficulty learning the information in the course than the recent graduates. Some consideration should be given to the prospect of providing courses with different degrees of detail and difficulty to update those pharmacists with gaps in their background and knowledge. Albany College of Pharmacy has already implemented such refresher courses.[4] These refresher courses were designed for pharmacists who had graduated before 1955. Selected topics by different speakers covered subjects in special dosage forms (pphthalmic preparations), clinical disease states (congestive heart failure), therapeutic classes of drugs (diuretics) and pharmacy law (review of pharmacy law). The courses were presented one evening of the week over a several month period.

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[4] "Pharmacy in Review," Albany College of Pharmacy, Union University, Albany, New York, 1971 (September-December), Kenneth S. Griswold, Director. This was a refresher course "structured especially for those pharmacists who graduated prior to 1955, but all pharmacists and medical technologists" were welcome.

Comparison of posttest performance by pharmacists in community and hospital pharmacy as divided by the years of pharmacy practice corroborated earlier posttest comparisons. No significant difference was found between posttest mean scores for hospital and community pharmacists. However, a significant difference was found among groups of pharmacists practicing pharmacy for different lengths of time. Table 19 shows the comparison of means for the posttest scores of the categories just described. It should be noted that hospital pharmacists scored higher than community pharmacists in every category of years practiced although there was no significant difference between hospital and community pharmacists posttest means.

TABLE 19

COMPARISON OF POSTTEST PERFORMANCE BY PHARMACISTS IN COMMUNITY AND HOSPITAL PHARMACY AS DIVIDED BY YEARS OF PHARMACY PRACTICE

	Years of Pharmacy Practice[b]		
Professional[a] Setting	10 years or less	11 to 20 years	More than 20 years
Community	83.7	78.3	74.7
Hospital	84.6	80.0	80.0

[a]F-Ratio between professional settings = 1.36 (c.v. = 3.90)

[b]F-Ratio among years-of-practice groups = 3.26 (c.v. = 3.06)

Other comparisons of posttest performance and demographic variables revealed no other signficant differences as shown in Table 20. Other demographic variables with which posttest results were compared were: professional setting, employment status, current practice status, and hours of practice per week.

The lack of significant differences in posttest performances between pharmacists in different professional settings was interesting considering the significantly higher pretest scores of hospital pharmacists than achieved by community pharmacists. Hospital pharmacists did score higher on the posttest (82.5) than community pharmacists (78.6), but the difference was no longer significant. This would indicate that community pharmacists were capable of the same level of performance as hospital pharmacists with these course materials. The disappearance of the difference might also indicate that the community pharmacists were more interested in scoring satisfactorily on the posttest than they had been on the pretest.

TABLE 20

COMPARISON OF POSTTEST RESULTS BY DEMOGRAPHIC VARIABLE

Comparison	Mean Score	Sample Size	F-Ratio	Critical Value
Professional Setting				
Community	78.6	103	0.90	3.90
Hospital	82.5	27		
Employment Status				
Employer	78.6	39	0.74	3.90
Employee	80.4	92		
Current Practice Status				
Currently Practicing	80.2	120	0.98	3.90
Not Currently Practicing	76.0	13		
Hours of Practice Per Week				
More than 60 hours	82.5	13	0.73	2.66
50-59 hours	77.9	26		
40-49 hours	80.6	69		
Less than 40 hours	78.0	15		
Not Practicing	77.3	9		

Perhaps the disappearance of the significant difference might reflect hospital pharmacists being more familiar with the terminology of the material before the course, but after study of the course materials the community pharmacists were able to demonstrate as much

familiarity with the material as hospital pharmacists.

The posttest performance indicates community pharmacists could learn, but maybe they do not use the information in practice. Maybe they had just forgotten the information on the pretest from lack of use. A followup measurement in six months or one year might help substantiate this speculation as well as determine if the pharmacists had reason to use or refer to the course materials after they had participated in the course. Other future investigations should determine if equivalent performance by pharmacists from different professional settings occurs with different subject matter.

Table 20 also showed that employees scored higher (80.4) on the posttest than employers (78.6), but the differences were not significant. Also, pharmacists currently practicing scored higher (80.2) on the posttest than those pharmacists not currently practicing (76.0), but the difference was not significant.

The pharmacists working more than 60 hours per week, having scored lower than other pharmacists on the pretest, scored higher on the posttest (82.5) than pharmacists working 50 to 59 hours (77.9), 40 to 49 hours (80.6) or less than 40 hours per week (78.0). Little can be concluded from this information since the differences among the groups were not significant.

Table 21 shows that no significant differences were found when pharmacists' posttest performances were compared on the basis of number of full-time pharmacists and total number of pharmacists working in the pharmacy in which they practiced. It is interesting to note, however, that pharmacists in one-man stores or where there was only one full-time pharmacist scored the highest on the posttest.

TABLE 21

COMPARISON OF POSTTEST RESULTS ON THE BASIS OF NUMBER OF PHARMACISTS PRACTICING PER PHARMACY

Comparison	Mean Score	Sample Size	F-Ratio	Critical Value
No. of Full-Time Pharmacists/Unit[a]				
1 pharmacist	81.6	36	1.04	2.66
2 pharmacists	78.6	50		
3 pharmacists	76.4	19		
4 or more	80.8	21		
Total Pharmacists in Business Unit[b]				
1 pharmacist	80.3	14	0.56	3.06
2 or 3 pharmacists	80.1	78		
4 or more	78.1	35		

[a]Eight pharmacists did not supply information on the number of pharmacists working full-time.

[b]Seven pharmacists did not supply information on the total number of pharmacists working in the pharmacy.

Table 22 shows a composite pretest and posttest means comparison between various subgroups of the sample. Three significant differences were found in pretest means: 1) among pharmacists graduating from curricula of different lengths; 2) among pharmacists practicing pharmacy for different lengths of time; and 3) between pharmacists practicing in different professional settings. A significant increase in cognitive knowledge was apparent upon comparison of overall pretest mean with the overall posttest mean.

TABLE 22

PRETEST AND POSTTEST PERFORMANCE BY PHARMACISTS IN VARIOUS CATEGORIES

Category	Category Mean Scores	
	Pretest	Posttest
Overall Mean	54.7	79.5
State		
Florida	52.9	79.3
Michigan	56.5	79.7
Years of Practice		
10 years or less	59.3	84.4
Between 11 and 20 years	53.7	78.7
More than 20 years	50.8	75.8
Length of Curriculum		
5 or 6 years	57.0	82.9
4 years	54.0	78.3
2 or 3 years	46.7	70.0

(Cont.)

TABLE 22 - Cont.

Category	Category Mean Scores Pretest	Posttest
Professional Setting		
Community	53.5	78.6
Hospital	60.0	82.5
Employment Status		
Employer	53.6	78.6
Employee	55.5	80.4
Current Practice Status		
Currently Practicing	55.1	80.2
Not Currently Practicing	52.3	76.0
Hours of Practice Per Week		
60 hours or more	50.2	82.5
50-59 hours	53.2	77.9
40-49 hours	56.5	80.6
Less than 40 hours	54.1	78.4
Not Practicing	51.6	77.3
No. of Full-Time Pharmacists		
1 Pharmacist	53.8	81.6
2 Pharmacists	55.8	78.6
3 Pharmacists	52.4	76.4
4 Pharmacists	56.2	80.8
Total Pharmacists in Business Unit		
1 Pharmacist	52.3	80.3
2 or 3 Pharmacists	55.7	80.1
4 or more Pharmacists	54.0	78.1

CHAPTER FIVE

THE EVALUATION

Evaluation Questionnaire Analysis

The evaluation questionnaire was designed to gain some insight into the attitudes of the participants toward the course, Selected Topics in Pharmacology, which they had completed. As previously noted, the following facets of the course were evaluated: 1) the course materials; 2) the information and its presentation; 3) the examination and checktests; 4) the audio cassette technique; and 5) the research project.

Expression of agreement with a particular facet of the course might be construed as advice by the market that that facet should be continued in future cassette tape course offerings. Indications of disfavor with a particular facet of the course might serve as advice for change with respect to that aspect of the product.

The individual evaluations of each question were averaged and the mean for all participants determined as well as the mean for various subgroups of pharmacists participating in the study. Each questionnaire item was reviewed individually.

The following rating system for the evaluation items was used:

5 - Strongly Agree
4 - Agree
3 - Neutral
2 - Disagree
1 - Strongly Disagree

One pharmacist in the study completed the evaluation form incorrectly such that no rating score could be obtained for any of the rated evaluation statements. This pharmacist resided in Florida, practiced in a community pharmacy as an employee pharmacist and received his degree in 1924. Therefore, unless otherwise noted, the sample size for particular subgroups will be as follows: 1) Florida pharmacists (66); 2) community pharmacists (103); 3) employee pharmacists (93); and 4) graduates before 1933 (5).

Evaluation Statements

EVALUATION STATEMENT 1: The notebook for storing the materials was convenient.

The overall mean rating of 4.60 indicated the pharmacists were pleased with the convenience of the notebook storage unit. This statement received the highest mean rating of any of the questionnaire items. Except for one individual, all participants agreed or strongly agreed with the statement.

Table 23 shows Michigan pharmacists rated the notebook significantly higher than did Florida pharmacists. There was no apparent reason for the difference. Perhaps

the Florida pharmacists, having had to participate in continuing education offerings in the past, were more conservative in their ratings than Michigan pharmacists who were under no mandate to continue their education. In light of the high rating for notebook convenience by both states, the difference would seem to have little importance. It would seem sufficient at this point to note that the notebook was accepted as convenient.

TABLE 23

COMPARISON OF EVALUATION OF NOTEBOOK CONVENIENCE RATINGS BETWEEN FLORIDA AND MICHIGAN PHARMACISTS

	Mean Rating	Sample Size	F-Ratio	Critical Value
Florida	4.51	66	3.92	3.90
Michigan	4.68	69		
Overall mean rating	4.60			

EVALUATION STATEMENT 2: The lecture outline helped me follow each lecture.

The overall mean rating of 4.17 indicated the pharmacists thought the lecture outlines provided in the handout materials were helpful. Only three pharmacists disagreed with the statement and no one disagreed strongly. Eight pharmacists were neutral to the statement, choosing

neither to agree nor disagree. Table 24 shows no significant differences were found when comparisons were made: 1) between Florida and Michigan Pharmacists; 2) between community and hospital pharmacists; and 3) among pharmacists receiving their degrees in different periods of time.

TABLE 24

COMPARISON OF RATINGS: THE LECTURE OUTLINES HELPED ME FOLLOW EACH LECTURE

Comparison	Mean Rating	Sample Size	F-Ratio	Critical Value
State				
Florida	4.12	66	0.79	3.90
Michigan	4.22	69		
Professional Setting				
Community	4.18	103	0.00	3.90
Hospital	4.18	28		
Year of Degree				
1920-1932	4.40	5	0.60	2.43
1933-1942	4.29	7		
1943-1952	4.21	34		
1953-1962	4.02	49		
1963-1972	4.28	40		
Overall mean rating	4.17			

The overall mean rating reflects the strength of agreement with this statement. All groups of pharmacists that were considered agreed with the statement with very

little variation in ratings. This rating should suggest to the course designers that lecture outlines would be a helpful facet of future courses.

These results do not imply any evaluations of the length or detail of the outlines. Further investigations would be necessary if it were considered important to have more information about the acceptability of the level of the outlines. The favorable rating indicated that the inclusion of lecture outlines did assist the student in following the tape lectures.

EVALUATION STATEMENT 3: Sufficient handout material was presented with each lecture.

The overall mean rating of 3.62 indicated agreement that sufficient handout material was presented with each lecture, but there was less than unanimous agreement. Table 25 shows no significant differences were found when comparisons were made: 1) between Florida and Michigan pharmacists; 2) between hospital and community pharmacists; and 3) among pharmacists receiving their degrees in different periods of time.

TABLE 25

COMPARISON OF RATINGS: SUFFICIENT HANDOUT MATERIAL WAS PRESENTED WITH EACH LECTURE

Comparison	Mean Rating	Sample Size	F-Ratio	Critical Value
State				
Florida	3.55	66	0.96	3.90
Michigan	3.70	69		
Professional Setting				
Community	3.63	103	0.10	3.90
Hospital	3.57	28		
Year of Degree				
1920-1932	3.80	5	0.31	2.43
1933-1942	3.71	7		
1943-1952	3.79	34		
1953-1962	3.45	49		
1963-1972	3.65	40		
Overall mean rating	3.62			

The lack of unanimous and strong support for this statement might indicate an expression of opinion by the participants that the handouts for the course were not deficient, but might be accepted more favorably if they were more extensive. On the other hand, the rating could indicate there were too many handout materials. Some effort should be made to determine more carefully what information might be excluded from the handout material.

EVALUATION STATEMENT 4: The information in the handout material was presented clearly.

The overall mean rating of 3.84 indicated the pharmacists agreed that the information in the handout material was presented clearly. Only eight people disagreed with this statement and no one disagreed strongly. Table 26 shows no significant differences were found when comparisons were made: 1) between Florida and Michigan pharmacists; 2) between community and hospital pharmacists; and 3) among pharmacists who received their degrees in different periods of time.

TABLE 26

COMPARISON OF RATINGS: THE INFORMATION IN THE HANDOUT MATERIAL WAS PRESENTED CLEARLY

Comparison	Mean Rating	Sample Size	F-Ratio	Critical Value
State				
Florida	3.74	66	2.36	3.90
Michigan	3.93	69		
Professional Setting				
Community	3.81	103	0.34	3.90
Hospital	3.89	28		
Year of Degree				
1920-1932	4.00	5	0.83	2.43
1933-1942	4.14	7		
1943-1952	3.85	34		
1953-1962	3.65	49		
1963-1972	3.98	40		
Overall mean rating	3.84			

Although strong agreement with this statement was not evident, a general agreement and lack of disagreement was indicated. Perhaps two considerations would be appropriate. First, the participants may have had some insecurity with respect to use of the word "clearly." Hesitation and deliberation over the investigator's meaning for this adverb might have resulted in some individuals changing their positive or negative statement to one of neutrality.

It also might be construed from the overall rating and from the lack of differences of opinion among the comparisons, that the pharmacists understood the lecturer's use of the material, but that the material, by itself, could have been more self-explanatory.

EVALUATION STATEMENT 5: The information in the handout material helped me understand the lecture.

The overall mean rating of 3.92 indicated general agreement among the pharmacists that the handout material helped the student understand the lecture. Table 27 shows the three subgroup comparisons made: 1) between pharmacists in Florida and Michigan; 2) between pharmacists in different professional settings; and 3) among groups of pharmacists who received their degrees in different periods of time.

TABLE 27

COMPARISON OF RATINGS: THE INFORMATION IN THE HANDOUT MATERIAL HELPED THE PHARMACISTS UNDERSTAND THE LECTURE

Comparison	Mean Rating	Sample Size	F-Ratio	Critical Value
State				
Florida	3.77	66	4.60	3.90
Michigan	4.06	69		
Professional Setting				
Community	3.92	103	0.03	3.90
Hospital	3.89	28		
Year of Degree				
1920-1932	4.00	5	1.07	2.43
1933-1942	4.43	7		
1943-1952	3.88	34		
1953-1962	3.88	49		
1963-1972	3.90	40		
Overall mean rating	3.92			

The first comparison between pharmacists in Florida and Michigan showed a significant difference between the ratings for each state. Although the ratings for each state showed agreement with the statement, Michigan pharmacists rated the helpfulness of the handout material higher than the Florida pharmacists. Twenty Michigan pharmacists agreed strongly with the statement, but only six Florida pharmacists chose to agree strongly with the statement. Three Michigan pharmacists disagreed with the statement, while five Florida pharmacists disagreed

strongly. No comments were made by the pharmacists about their disagreements and no other apparent reasons would account for the difference. Perhaps the Florida pharmacists were more conservative in their evaluation of the materials, because there was added importance for them to complete the course to satisfy their continuing education requirements.

The other two comparisons which were made between pharmacists in different professional settings and among groups of pharmacists receiving their degree in different time periods, revealed no significant differences among the groups as shown in Table 27. At this point it seems sufficient to note that there was general agreement that the information was helpful, although Florida pharmacists were more conservative in their rating of this statement than Michigan pharmacists.

EVALUATION STATEMENT 6: The information in the lectures will be useful in my pharmacy practice.

The overall mean rating of 3.95 indicated general agreement among the pharmacists that the information in this course would be useful in the practice of pharmacy. As shown in Table 28, no significant differences were found when the following comparisons of ratings were made: 1) between Florida and Michigan pharmacists; 2) between community and hospital pharmacists; 3) among groups of pharmacists who received their pharmacy degrees in

TABLE 28

COMPARISON OF RATINGS: THE INFORMATION IN THE LECTURES WILL BE USEFUL IN THE PRACTICE OF PHARMACY

Comparison	Mean Rating	Sample Size	F-Ratio	Critical Value
State				
Florida	3.92	66	0.11	3.90
Michigan	3.97	69		
Professional Setting				
Community	4.00	103	0.69	3.90
Hospital	3.86	28		
Year of Degree				
1920-1932	4.20	5	0.31	2.43
1933-1942	4.00	7		
1943-1952	4.03	34		
1953-1962	3.84	49		
1963-1972	3.98	40		
Employment Status				
Employer	3.80	39	1.78	3.90
Employee	4.00	93		
Overall mean rating	3.95			

different time periods, and 4) between employer and employee pharmacists.

It was previously noted that perhaps hospital pharmacists scored higher on the examinations because they used pharmacology more than community pharmacists. This seemed to imply they knew some of the material before the course. If they knew some of the information

before the course and were already using the material, they may have rated the information in the lectures on the basis of the information which they did not know and were not already using in their practice. No attempt was made to determine how the pharmacists thought they might use the information in their pharmacy practice. Future investigations might attempt to determine if and how the course information actually was used in pharmacy practice.

EVALUATION STATEMENT 7: The majority of information presented in the tapes was new to me.

The overall mean rating of 2.93 indicated the pharmacists disagreed mildly with the idea that the majority of the information presented in the tapes was new. Table 29 shows no significant difference was found when ratings were compared: 1) between Florida and Michigan pharmacists; and 2) between ratings of pharmacists in different professional settings. However, there was a significant difference among pharmacists who received their pharmacy degrees in different periods of time.

TABLE 29

COMPARISON OF RATINGS: THE MAJORITY OF INFORMATION IN THE COURSE WAS NEW TO ME

Comparison	Mean Rating	Sample Size	F-Ratio	Critical Value
State				
Florida	2.90	66	0.20	3.90
Michigan	2.97	69		
Professional Setting				
Community	3.00	103	2.08	3.90
Hospital	2.71	28		
Year of Degree				
1920-1932	4.00	5	5.33[a]	2.43
1933-1942	3.14	7		
1943-1952	3.24	34		
1953-1962	3.02	49		
1963-1972	2.40	40		
Overall mean rating	2.93			

[a]Scheffe procedure showed the difference to be between pharmacists who graduated from 1963-1972 and all other groups of pharmacists.

The pharmacists graduating in the last ten years (1963-1972) disagreed most strongly (2.40 group mean) with this statement. In general, pharmacists who graduated more than ten years ago agreed with the statement or rated it neutral. This result indicates achievement of a course design goal of the program designers; the course appeared to be a review of

information for recent graduates, but was new information for those people graduating more than ten years ago or who had never taken a course in pharmacology.

Although it would be difficult to assure the validity of the information, it would be meaningful to determine how much of the information in the course had been presented previously to those people who graduated more than ten years ago. Perhaps those people had only forgotten the information. Such a longitudinal study would be interesting, but also very difficult to control.

EVALUATION STATEMENT 8: The literature references were useful for answering questions which developed during the course.

The overall mean rating of 2.89 indicated the pharmacists did not agree that the literature references were useful for answering questions which developed during the course. Table 30 shows no significant differences were found between ratings by pharmacists in Michigan and Florida. Comments received by pharmacists on this question indicated: 1) the references were not readily accessible to them in their circumstances; and 2) too much time was required to search out and read the references. Although these comments were made by a very few pharmacists, the low ratings for this statement might reflect similar, unexpressed sentiments by other pharmacists. The inclusion of references in future courses should be reconsidered; at least the inclusion of

references in the same format. More information about the references which were available and which were inaccessible might have been useful. Perhaps some of the pertinent inaccessible information should have been supplied with the handout material.

TABLE 30

COMPARISON OF RATINGS BETWEEN FLORIDA AND MICHIGAN PHARMACISTS ON THE USEFULNESS OF THE LITERATURE REFERENCES FOR ANSWERING QUESTIONS WHICH DEVELOPED DURING THE COURSE

State	Mean Rating	Sample Size	F-Ratio	Critical Value
Florida	2.89	64[a]	0.001	3.90
Michigan	2.90	67[b]		
Overall mean rating	2.89			

[a]Two pharmacists did not rate the literature references.

[b]Two pharmacists did not rate the literature references.

EVALUATION STATEMENT 9: The audio quality of the tapes was good.

The overall mean rating of 4.24 indicated the pharmacists agreed that the audio quality of the tapes was good. Table 31 shows no significant difference was found between the ratings of Florida and Michigan pharmacists.

TABLE 31

COMPARISON BETWEEN RATINGS OF FLORIDA AND MICHIGAN PHARMACISTS ON THE GOOD AUDIO QUALITY OF THE TAPES

State	Mean Rating	Sample Size	F-Ratio	Critical Value
Florida	4.31	66	1.08	3.90
Michigan	4.17	69		
Overall mean rating	4.24			

There were some isolated complaints about poor or garbled sound and malfunctioning cassettes. In those cases where individual cassettes were reported defective, new cassettes were sent to the participant. Of the two "malfunctioning cassettes" which were returned, one was indeed defective. There seemed to have been a manufacturing defect in the construction of the cassette which resulted in an inoperative cassette. The second

cassette reported to be defective and which was returned, functioned properly when tested on two different tape recorders.

The two other assertions that the audio sound was distorted or scratchy could have resulted from the playback equipment being: 1) supplied with inadequate power to run at optimum speed resulting in a distorted sound; or 2) dirty or dusty resulting in a scratchy sound.

The complaints which have been registered appear to have been isolated instances. No general complaint about the audio quality was indicated; rather there was agreement that the audio quality of the tapes was good.

EVALUATION STATEMENT 10: The lecture topics were covered in sufficient detail.

The overall mean rating of 3.77 indicated a general agreement with the statement by the pharmacists. Table 32 shows no significant differences were found when ratings were compared between: 1) Florida and Michigan pharmacists; and 2) community and hospital pharmacists. A significant difference was found, however, among ratings of groups of pharmacists who had received their pharmacy degrees in different periods of time.

TABLE 32

COMPARISON OF RATINGS: THE LECTURE TOPICS WERE COVERED IN SUFFICIENT DETAIL

Comparison	Mean Rating	Sample Size	F-Ratio	Critical Value
State				
Florida	3.80	66	0.21	3.90
Michigan	3.74	69		
Professional Setting				
Community	3.82	103	2.01	3.90
Hospital	3.57	28		
Year of Degree				
1920-1932	4.40	5	2.65[a]	2.43
1933-1942	3.71	7		
1943-1952	3.85	34		
1953-1962	3.96	49		
1963-1972	3.40	40		
Overall mean rating	3.77			

[a]Scheffe procedure showed the difference to occur between pharmacists who received their degree from 1953-1962 and those graduates from 1963-1972.

Upon further examination of the comparison of ratings based on year of degree, with the Scheffe post hoc procedure, the difference was found to occur between pharmacists who received their degree from 1953 through 1962 and those recent graduates who received their degree from 1963 through 1972. This difference had no apparent

basis when considering all the ratings shown in Table 32. Examination of the mean rating for graduates from 1920-1932 revealed that graduates of that decade rated the detail of the lecture topics highest among the various groups. Upon inspection it would appear logical that the significant difference would be between this, the oldest graduates, and the most recent graduates because the difference between the group means is largest for this comparison. However, the small group size and the large variance for the pharmacists in the 1920-1932 decade rendered the difference with the most recent graduates insignificant. It must be remembered that the Scheffe procedure guarantees to find the significant differences, but does not guarantee that the differences will be logical.

Examination of data comparing evaluations of this statement and posttest performance in Table 33 shows that 88.9 percent of the participants not agreeing with this statement scored 80 or better on the posttest.

TABLE 33

POSTTEST PERFORMANCE COMPARED WITH EVALUATION OF LECTURE TOPICS BEING COVERED IN SUFFICIENT DETAIL

Rating	Percent of Pharmacists in Posttest Range 40-59	60-79	80-91	92-100	Total
Strongly Agree	0	6.0	6.0	0.8	12.8
Agree	3.0	20.2	29.3	8.3	60.8
Neutral	0	3.8	12.0	3.8	19.6
Disagree	0	0.8	2.4	1.5	4.7
Strongly Disagree	0	0	2.4	0	2.4
	3.0	30.8	52.1	14.4	100.3
Sample Sizes	4	41	69	19	133

This information indicates that disfavor with the statement did not correlate with low or unsatisfactory grades on the posttest. Agreement with the statement was made by 73.5 percent of those evaluating the statement. A neutral rating was made by 19.5 percent of the evaluating participants. Considering all this previous information, it would seem reasonable to conclude that the majority of pharmacists were satisfied with the level of detail of the course.

EVALUATION STATEMENT 11: The lecturer spoke at a comfortable pace.

The overall mean rating of 4.24 indicated that the pharmacists agreed with this statement. Table 34 shows no significant difference was found when the following comparisons were made: 1) between ratings of pharmacists from Florida and Michigan; 2) between ratings of pharmacists practicing in different professional settings; and 3) among groups of pharmacists who received their pharmacy degree in different periods of time.

TABLE 34

COMPARISON OF RATINGS OF THE COMFORTABLENESS OF THE LECTURER'S SPEAKING PACE

Comparison	Mean Rating	Sample Size	F-Ratio	Critical Value
State				
Florida	4.30	66	1.01	3.90
Michigan	4.19	69		
Professional Setting				
Community	4.26	103	0.34	3.90
Hospital	4.18	28		
Year of Degree				
1920-1932	4.40	5	0.31	2.43
1933-1942	4.43	7		
1943-1952	4.27	34		
1953-1962	4.25	49		
1963-1972	4.18	40		
Overall mean rating	4.24			

Some individual difference of opinion was expressed in regard to the question of "comfortable" delivery by the lecturer. At least three pharmacists apparently thought the lecturer spoke too comfortably as they indicated that the lecturer's voice put them to sleep. One Michigan pharmacist dropped out of the course. Another Michigan pharmacist and a Florida pharmacist used that explanation to partially account for their tardiness in returning the final examination for the course. There was no reason to doubt their comments as individuals, but it must be noted that no indications were given to describe the environment chosen by these pharmacists in which to study the course materials. Some future investigation might consider the effects of study environment on the degree of success achieved with the cassette tape lecture course materials and the evaluation of the lecturer.

EVALUATION STATEMENT 12: The lectures were well organized.

The overall mean rating of 4.25 indicated that the participants agreed the lectures were well organized. Only two pharmacists disagreed with the statement. Neither of those individuals offered an explanation for his disagreement. Table 35 shows no significant differences were found when the following comparisons of ratings were made: 1) between pharmacists in Michigan

and Florida; 2) between community and hospital pharmacists; and 3) among groups of pharmacists receiving their degree in different periods of time.

TABLE 35

COMPARISON OF RATINGS: THE LECTURES WERE WELL ORGANIZED

Comparison	Mean Rating	Sample Size	F-Ratio	Critical Value
State				
Florida	4.27	66	0.21	3.90
Michigan	4.22	69		
Professional Setting				
Community	4.23	103	0.66	3.90
Hospital	4.33	28		
Year of Degree				
1920-1932	4.40	5	0.46	2.43
1933-1942	4.14	7		
1943-1952	4.35	34		
1953-1962	4.27	49		
1963-1972	4.13	40		
Overall mean rating	4.25			

Since the overall rating of 4.25 was a strong agreement with the statement, it seemed reasonable to conclude that the lecturer's presentations were carefully designed and presented to the participants. Considering this rating and the previously agreeable rating on the

pace of lecture delivery, it would seem reasonable to conclude the lecturer had done a good job of presenting the material.

EVALUATION STATEMENT 13: The lecturer used familiar terminology throughout his lectures.

The overall mean rating of 4.01 indicated the pharmacists as a group agreed that the lecturer used familiar terminology. Only 3.7 percent of the participants disagreed with the statement and another 11.1 percent gave the statement a neutral rating. Table 36 shows no significant differences were found when the following comparisons of ratings on this subject were made: 1) between pharmacists from Florida and Michigan; and 2) among groups of pharmacists who received their pharmacy degrees in different periods of time.

A significant difference was found between hospital and community pharmacists. Hospital pharmacists more strongly agreed (4.29 rating) that the lecturer used familiar terminology throughout the lectures than the community pharmacists with a 3.93 rating.

TABLE 36

COMPARISON OF RATINGS: THE LECTURER USED FAMILIAR TERMINOLOGY THROUGHOUT HIS LECTURES

Comparison	Mean Rating	Sample Size	F-Ratio	Critical Value
State				
Florida	4.00	66	0.06	3.90
Michigan	4.03	69		
Professional Setting				
Community	3.93	103	6.10	3.90
Hospital	4.29	28		
Year of Degree				
1920-1932	3.60	5	1.07	2.43
1933-1942	3.86	7		
1943-1952	3.97	34		
1953-1962	4.00	49		
1963-1972	4.15	40		
Overall mean rating	4.01			

Such a difference might be explained by considering two factors. First, the hospital pharmacists as a group graduated more recently than the community pharmacists. It might be speculated that most of the hospital pharmacists had a recent course in pharmacology which would have exposed them to most of the terminology in the course. On the other hand, the community pharmacists, as a group, having graduated longer ago than the hospital pharmacists, probably had less pharmacology training and less previous exposure to the terminology and principles

in this cassette tape lecture course.

A second factor which might have influenced the ratings is the terminology used in the professional setting. In the community pharmacy, there may be less frequent exposure to pharmacological and medical terminology than in the hospital pharmacy professional setting.

A comparison was made between the years of practice and the professional practice setting to determine if a significant difference could be related to professional setting and years of practice. Table 37 shows there was indeed a significant difference between hospital and community pharmacists. Again, no significant difference was found among the pharmacists divided according to their years of practice. Similarly, Table 37 shows no difference was found relating the combination of both professional practice setting and years of practice. From these results a suggestion could be made for program planners to consider changing terminology for future courses aimed at a specific professional setting.

TABLE 37

COMPARISON OF RATINGS: PHARMACISTS IN DIFFERENT PROFESSIONAL SETTINGS, DIVIDED BY YEARS OF PHARMACY PRACTICE RATING THE FAMILIARITY OF TERMINOLOGY USED IN THE LECTURES

Professional Setting	Years of Pharmacy Practice[b]		
	Less than 10	11 to 20	More than 20
Community[a]	3.97 (30)	3.97 (37)	3.85 (33)
Hospital	4.29 (14)	4.13 (8)	4.60 (6)

[a]F-Ratio for comparison of professional settings was F = 6.50 (c.v. = 3.90).

[b]F-Ratio for comparison of years of pharmacy practice was F = 0.40 (c.v. = 3.06).

EVALUATION STATEMENT 14: The course was presented at the knowledge level of most pharmacists.

The overall mean rating of 3.83 indicated the pharmacists as a group agreed that the course was presented at the knowledge level of most pharmacists. Only 6.7 percent of the respondents disagreed with the statement, and 19.2 percent of the respondents rated the statement neutral.

Table 38 shows no significant differences in ratings were found when the following comparisons were made:

1) between pharmacists in Florida and Michigan;

2) between pharmacists in community and hospital pharmacy;

and 3) among groups of pharmacists who received their pharmacy degrees in different periods of time.

TABLE 38

COMPARISON OF RATINGS: THE COURSE WAS PRESENTED AT THE KNOWLEDGE LEVEL OF MOST PHARMACISTS

Comparison	Mean Rating	Sample Size	F-Ratio	Critical Value
State				
Florida	3.88	66	0.55	3.90
Michigan	3.78	69		
Professional Setting				
Community	3.82	103	0.00	3.90
Hospital	3.82	28		
Year of Degree				
1920-1932	3.80	5	0.18	2.43
1933-1942	4.00	7		
1943-1952	3.91	34		
1953-1962	3.78	49		
1963-1972	3.80	40		
Employment Status				
Employer	3.56	39	5.90	3.90
Employee	3.91	93		
Overall mean rating	3.83			

There was a significant difference in ratings between employer and employee pharmacists. The employee pharmacists agreed with the statement to a significantly greater extent than the employers. There might have been two

factors which affected the difference in ratings: 1) the number of years of practice of each group; and 2) a possible difference in responsibilities and interests between employers and employees. First, there was a greater percentage of employee pharmacists who received their degrees in the last ten years (39.4 percent) than employer pharmacists (23.1 percent). There was a greater percentage of employer pharmacists who graduated more than 20 years ago (43.6 percent) than there was of employee pharmacists (29.8 percent). These data indicate that the younger pharmacists might rate the statement higher because of more exposure to the principles in their academic training. However, the comparison made of ratings of pharmacists who had received their degree in different periods of time showed no differences among the groups.

Another factor which might have contributed to the difference would be possible differences in interests of employers and employees. The employers may have more interest in business subjects because of their responsibilities than the employee pharmacists. It must be kept in mind, however, that the participants in this course were volunteers. Therefore, the employers in this project did have some interest in the subject matter of the course.

The reasons extended for explanation of the difference between the employers and employees are highly

speculative and would require more extensive research and detailed explanations by the participant pharmacists to associate these reasons with the suggested explanations.

Comparing posttest achievement with the pharmacists' evaluation of the knowledge of the course, it was found that disagreement with the statement was not associated with low posttest performance. Table 39 shows that six of the nine people who had disagreed with the statement scored 80 or higher on the posttest. All people who disagreed with the statement passed the course, scoring 60 or better. Agreement with the statement by 73.3 percent of the participants indicated that the majority of pharmacists thought the course was presented at a knowledge level suitable for most pharmacists.

TABLE 39

COMPARISON OF THE POSTTEST PERFORMANCE AND THE EVALUATION OF THE KNOWLEDGE LEVEL OF THE COURSE

Rating	Percent of Participants in Posttest Range				
	40-59	60-79	80-91	92-100	Total
Strongly Agree	0.8	3.8	9.8	1.5	15.9
Agree	2.2	18.9	29.6	6.8	57.6
Neutral	0	5.3	9.1	5.3	19.7
Disagree	0	2.3	3.8	0.8	6.8
Strongly Disagree	0	0	0	0	0.0
	3.0	30.3	52.3	14.4	100.0
Sample Size	4	40	69	19	132

EVALUATION STATEMENT 15: The checktests were helpful in review of the lecture materials.

The overall mean rating of 3.99 indicated that the pharmacists agreed that the checktests were helpful in reviewing the lecture materials. Only 3.7 percent of the respondents disagreed with the statement and only 11.8 percent rated the statement neutral. Table 40 shows no significant differences were found when the following comparisons of ratings of groups of pharmacists were made: 1) between pharmacists from Florida and Michigan; 2) between community and hospital pharmacists; and 3) among groups of pharmacists who had received their pharmacy degrees in different periods of time.

TABLE 40

COMPARISON OF RATINGS: THE CHECKTESTS WERE HELPFUL IN REVIEW OF THE LECTURE MATERIALS

Comparison	Mean Rating	Sample Size	F-Ratio	Critical Value
State				
Florida	3.92	66	1.11	3.90
Michigan	4.06	69		
Professional Setting				
Community	4.00	103	0.05	3.90
Hospital	4.03	28		
Year of Degree				
1920-1932	4.20	5	0.20	2.43
1933-1942	4.00	7		
1943-1952	3.97	34		
1953-1962	4.00	49		
1963-1972	3.98	40		
Overall mean rating	3.99			

The agreement with this statement would warrant continued inclusion of the checktests in future cassette tape course productions. Comparison of the posttest performance with evaluation of the checktests in Table 41 showed that the four individuals who did not pass the course agreed that the checktests were helpful. Apparently the tests were not helpful enough. At the same time, the five individuals who did not agree that the checktests were of value, scored between 60 and 88 on the posttest. Of the 19 people who scored between 92 and 100 on the posttest, 18 evaluated the checktests favorably and the other person rated the statement neutral. Since only 3.7 percent of the respondents disagreed with the statement and since 84.2 percent of the participants agreed the checktests were of value, the program planners should be advised that this facet of the course should be continued in future versions of these courses.

TABLE 41

COMPARISON OF POSTTEST ACHIEVEMENT WITH CHECKTEST EVALUATION

Rating	Percent of Pharmacists in Posttest Ranges				
	40-59	60-79	80-91	92-100	Total
Strongly Agree	0	9.0	9.7	1.5	20.2
Agree	3.0	15.0	33.9	12.0	63.9
Neutral	0	5.2	6.0	0.8	12.0
Disagree	0	0.8	1.5	0	2.3
Strongly Disagree	0	0.8	0.8	0	1.6
Total	3.0	30.8	51.9	14.3	100.0
Sample Size	4	41	69	19	133

EVALUATION STATEMENT 16: The final examination questions were presented clearly.

The overall mean rating of 3.80 indicated the pharmacists agreed that the final examination questions were presented clearly. While 25 pharmacists rated the statement neutral, only eight pharmacists disagreed with the statement.

Table 42 shows no significant differences were found when comparisons of ratings of the following groups of pharmacists were made: 1) between pharmacists in Florida and Michigan; 2) between pharmacists in community

and hospital pharmacy; and 3) among groups of pharmacists who received their pharmacy degrees in different periods of time.

TABLE 42

COMPARISON OF RATINGS: THE QUESTIONS ON THE FINAL EXAMINATION WERE STATED CLEARLY

Comparison	Mean Rating	Sample Size	F-Ratio	Critical Value
State				
Florida	3.77	66	0.14	3.90
Michigan	3.82	69		
Professional Setting				
Community	3.73	103	2.99	3.90
Hospital	4.00	28		
Year of Degree				
1920-1932	3.80	5	0.93	2.43
1933-1942	3.43	7		
1943-1952	4.00	34		
1953-1962	3.75	49		
1963-1972	3.75	40		
Overall mean rating	3.80			

It might be reasonable to suspect that pharmacists who did not score well on the exam might not agree with this statement. However, when the pharmacists completed this evaluation form, they had no way of knowing how they had performed. Examination of the posttest

performance of the eight pharmacists who had disagreed with the statement revealed these pharmacists had scored between 72 and 92 on the posttest. There did not appear to be a correlation between low posttest score and disagreement with the statement. Without stronger disagreement with the statement, it may be concluded that the test questions were presented clearly.

EVALUATION STATEMENT 17: The final examination was representative of the course materials.

The overall mean rating of 3.84 indicated that the examination questions were representative of the course material. While 13.3 percent of the respondents rated the statement neutral and only 7.4 percent disagreed with the statement, 79.3 percent of the respondents agreed with the statement.

Table 43 shows that no significant difference was found when the ratings of pharmacists from Florida and Michigan were compared.

There was no strong disagreement with the statement. It would seem reasonable to conclude that the program director and the lecturer had constructed an examination which represented the course material.

TABLE 43

COMPARISON OF RATINGS: THE FINAL EXAMINATION WAS REPRESENTATIVE OF THE COURSE MATERIAL

State	Mean Rating	Sample Size	F-Ratio	Critical Value
Florida	3.76	66	1.64	3.90
Michigan	3.92	69		
Overall mean average	3.84			

EVALUATION STATEMENT 18: The final examination was long enough to indicate if I had learned anything.

The overall mean rating of 3.71 indicated the pharmacists only moderately agreed with this statement. Although only 12 pharmacists disagreed with the statement and another 27 rated the statement neutral, the rating of the length of the examination did not receive a strong vote of agreement.

As shown in Table 44, comparisons of ratings between Florida and Michigan pharmacists showed no significant difference in ratings.

TABLE 44

COMPARISON OF RATINGS: THE FINAL EXAMINATION WAS LONG ENOUGH TO INDICATE IF I HAD LEARNED ANYTHING

State	Mean Rating	Sample Size	F-Ratio	Critical Value
Florida	3.71	66	0.002	3.90
Michigan	3.71	69		
Overall mean rating	3.71			

This evaluation could indicate to program planners that the 25-question, multiple-choice examination was long enough. However, tacit acceptance of this conclusion should not be made because participants had no alternative with which to compare the examination and the overall mean rating of 3.71 did not indicate strong agreement.

Consideration of the evaluation of examination length in light of posttest performance did little to clarify the previous data. Table 45 shows that nine percent of the pharmacists who completed the posttest disagreed with the suitability of the examination length. All nine percent of the disagreeing pharmacists passed the course. On the other hand, the three percent of the participants who failed to pass the course all agreed that the examination was long enough. Although the length of the examination was not seriously questioned, the lack of

strong agreement on the statement should suggest to program directors of future courses that this question should be re-examined with future courses.

TABLE 45

COMPARISON OF POSTTEST PERFORMANCE AND EVALUATION OF LENGTH OF THE EXAMINATION

Rating	Percent of Participants in Posttest Range				
	40-59	60-79	80-91	92-100	Total
Strongly Agree	0	3.8	6.0	0	9.8
Agree	3.0	16.5	32.3	9.8	61.6
Neutral	0	6.8	9.8	3.0	19.6
Disagree	0	3.0	3.8	1.5	8.3
Strongly Disagree	0	0.8	0	0	0.8
	3.0	30.9	51.9	14.3	100.1
Sample Size	4	41	69	19	133

EVALUATION STATEMENT 19: It was easy to find time to study.

The overall mean rating of 2.96 indicated mild disagreement with the statement. While 23.8 percent of the participants rated the statement neutral, 37.2 percent of the pharmacists disagreed with the statement. The remaining 39.0 percent of the pharmacists agreed with

the statement.

Table 46 shows no significant differences were found when comparisons of ratings were made: 1) between community and hospital pharmacists; 2) among groups of pharmacists who had received their pharmacy degrees in different periods of time; and 3) between employer and employee pharmacists. A significant difference was found, however, between Florida and Michigan pharmacists.

Comparisons on the basis of professional setting showed both community and hospital pharmacists disagreed with the statement. Similarly there was disagreement with the statement by both employers and employees. Comparison of ratings on the basis of year of receipt of pharmacy degree shows two of the five groups disagreed with the statement, two groups were neutral, and the fifth group agreed with the statement. Despite the disagreement among the groups, the ratings were not significantly different.

TABLE 46

COMPARISON OF RATINGS: IT WAS EASY TO FIND TIME TO STUDY

Comparison	Mean Rating	Sample Size	F-Ratio	Critical Value
State				
Florida	3.24	66	9.67	3.90
Michigan	2.70	69		
Professional Setting				
Community	2.96	103	0.40	3.90
Hospital	2.82	28		
Year of Degree				
1920-1932	3.40	5	0.52	2.43
1933-1942	2.86	7		
1943-1952	3.03	34		
1953-1962	2.86	49		
1963-1972	3.00	40		
Employment Status				
Employer	2.77	39	1.25	3.90
Employee	2.99	93		
Overall mean rating	2.96			

The significant difference between Florida and Michigan pharmacists might be related to continuing education responsibilities of the pharmacists in the two states. Florida pharmacists had mandatory requirements to participate in continuing education. Recognizing these requirements, they may have been resigned to committing some time to their continuing education

activities, whether they were motivated to continue their education or not. On the other hand, Michigan pharmacists had no mandatory continuing education requirements to fulfill. Although they did volunteer to participate in this project, the requirement to commit the necessary amount of time to complete the cassette tape course may have exceeded the time estimates which some of the Michigan pharmacists made when they registered for the course.

The general disagreement or lack of agreement might also be related to the continuing education habits of the pharmacists. Although there was insufficient information to either substantiate or refute this possibility, it is possible that pharmacists who had not participated regularly in continuing education found some difficulty in allocating time for completing the course.

EVALUATION STATEMENT 20: The two months allowed for study of the course materials was sufficient time.

The overall mean rating of 3.28 indicated that the pharmacists agreed very slightly with this statement. Only 24.4 percent of the pharmacists rated the statement neutral, but 25.8 percent disagreed with the statement. The remaining 49.8 percent of the respondents agreed with the statement.

Table 47 shows that no significant differences were noted among the ratings when the following comparisons

were made: 1) between Florida and Michigan pharmacists; 2) between community and hospital pharmacists; and 3) among groups of pharmacists who received their pharmacy degrees during different periods of time.

TABLE 47

COMPARISON OF RATINGS: THE TWO MONTHS ALLOWED FOR STUDY OF THE COURSE MATERIALS WAS SUFFICIENT TIME

Comparison	Mean Rating	Sample Size	F-Ratio	Critical Value
State				
Florida	3.38	66	0.97	3.90
Michigan	3.19	69		
Professional Setting				
Community	3.29	103	0.22	3.90
Hospital	3.18	28		
Year of Degree				
1920-1932	3.60	5	0.24	2.43
1933-1942	3.50	7		
1943-1952	3.32	34		
1953-1962	3.16	49		
1963-1972	3.33	40		
Overall mean rating	3.28			

Since the ratings by the pharmacists did not show agreement with the statement, there might be reason to suspect that the project length was too short, not only for those that expressed their disagreement, but also

may have pressed those individuals who rated the statement neutral.

EVALUATION STATEMENT 21: The cassette tape lecture technique was a valuable learning experience.

The overall mean rating of 4.47 indicated the strong agreement by the pharmacists for this statement. Only three percent of the participants rated the statement neutral or disagreed with the statement. Table 48 shows no significant differences were found when the following comparisons of ratings were made: 1) between Florida and Michigan pharmacists; 2) between community and hospital pharmacists; and 3) among groups of pharmacists who received their pharmacy degree in different periods of time.

Comparison of evaluations of this statement with performance on the final examination could not be made because of a lack of sufficient negative ratings. It should be sufficient to note that 96.3 percent of the participants agreed with the statement and 41.1 percent of the total agreed strongly with the statement.

These results might serve as a strong general endorsement of the cassette tape lecture continuing education technique for both the program planners and the pharmacist colleagues of the participants.

TABLE 48

COMPARISON OF RATINGS: THE CASSETTE TAPE LECTURE TECHNIQUE IS A VALUABLE LEARNING EXPERIENCE

Comparison	Mean Rating	Sample Size	F-Ratio	Critical Value
State				
Florida	4.42	66	0.94	3.90
Michigan	4.52	69		
Professional Setting				
Community	4.51	103	0.84	3.90
Hospital	4.39	28		
Year of Degree				
1920-1932	4.60	5	0.16	2.43
1933-1942	4.57	7		
1943-1952	4.50	34		
1953-1962	4.45	49		
1963-1972	4.45	40		
Overall mean rating	4.47			

EVALUATION STATEMENT 22: Overall the course was a satisfactory learning experience.

The overall mean rating of 4.36 indicated the participants agreed with this statement. Only two people disagreed with the statement and another five chose a neutral position. A total of 46.0 percent of the participants agreed strongly with the statement.

Table 49 shows that no significant differences were found when the following comparisons of ratings were made: 1) between Florida and Michigan pharmacists; 2) between community and hospital pharmacists; and 3) among groups of pharmacists who received their pharmacy degree in different periods of time.

TABLE 49

COMPARISON OF RATINGS: OVERALL THE COURSE WAS A SATISFYING LEARNING EXPERIENCE

Comparison	Mean Rating	Sample Size	F-Ratio	Critical Value
State				
Florida	4.38	66	0.08	3.90
Michigan	4.35	69		
Professional Setting				
Community	4.00	103	1.87	3.90
Hospital	4.21	28		
Year of Degree				
1920-1932	4.60	5	1.20	2.43
1933-1942	4.71	7		
1943-1952	4.27	34		
1953-1962	4.43	49		
1963-1972	4.28	40		
Overall mean rating	4.36			

The evaluations of the pharmacists appear to indicate this cassette tape lecture course was a satisfactory learning experience, even in light of the shortcomings indicated by some of the pharmacists. The shortcomings were: 1) the course material was not new; 2) the project time was not long enough; and 3) it was difficult to find time to study or use the references. This evaluation should indicate to program planners that this cassette tape lecture course was well received by the participants and, in general, might serve as a model for future programs.

EVALUATION STATEMENT 23: I would recommend the cassette tape lecture technique of continuing education to a colleague.

The overall mean rating of 4.38 indicated agreement of the pharmacists with this statement. Only four pharmacists indicated they would not recommend the technique to a colleague. Also, only five pharmacists rated the statement neutral. The small amount of disagreement coupled with the 93.3 percent agreement with the statement offered further indication to program planners that the cassette tape lecture technique was a pleasant experience for most of the participants in this project. The willingness to recommend the technique to a colleague by such a large majority of the participants certainly does not indicate disfavor or disappointment in the course.

When the pharmacists were asked if they were interested in participating in future cassette tape lecture courses, 94.8 percent indicated they were interested in future participation. Although this course appears to have been an unfavorable first encounter for 3.7 percent of the participants, 80.1 percent apparently were pleased with their first encounter. Of the 16.2 percent of the participants who indicated they had previously participated in cassette tape courses, 90.9 percent indicated interest in future participation. With 94.8 percent of the participants interested in future participation and only 5.2 percent not interested in future participation, there appears to be further indication that the course and technique were a pleasant experience for most of the participants.

TABLE 50

COMPARISON OF PHARMACISTS ON THE BASIS OF PREVIOUS PARTICIPATION IN CASSETTE TAPE CONTINUING EDUCATION AND EXPRESSION OF INTEREST IN FUTURE PARTICIPATION

	Number	Percent
Pharmacists with previous participation		
Interested in future participation	20	90.9
Not interested in future participation	2	9.1
	22	100.0
Pharmacists with no previous participation		
Interested in future participation	109	95.6
Not interested in future participation	5	4.4
	114	100.0

Evaluation of the "Most-liked" and "Least-liked" Tapes

In another attempt to determine the strong and weak points of this cassette tape course, the participants were asked to indicate the most-liked and least-liked tapes. These evaluations were reviewed with the following four considerations. First, the participants' evaluations of individual tapes were understood to be rankings of parts of a product which had received a very satisfactory overall reception. Second, it was realized

that without adequate comment by the participants, no basis for the ratings might be evident. Third, if particular tapes were found to have an unusually frequent rating as most- or least-liked, these reports might advise program planners to study those tapes for the characteristics which were either most-liked or least-liked to the participants in the course. Fourth, some pharmacists indicated they could not make such an evaluation for most-liked tape (n = 17) and least-liked tape (n = 15).

Table 51 indicates that the pharmacists rated Tapes 1 and 7 most frequently as the least-liked tapes. Both Tape 1, "The Need for a Rational Therapeutics" and Tape 7, "The Philosophy of the Therapeutic Nihilist" were tapes which dealt to some extent with a philosophic approach to a subject. This approach was in contrast to the more clinically oriented pharmacological presentations in the other five tapes.

The most-liked tape evaluations appeared to mirror almost opposite evaluations of the least-liked tapes. The more clinically oriented tapes 2 through 6 received the highest ratings. Singled out most frequently for praise was Tape 4 "The Cardiovascular System."

TABLE 51

EVALUATIONS OF THE MOST-LIKED AND LEAST-LIKED TAPES

Tape Title	Most-Liked Tape N	%	Least-Liked Tape N	%
1. The Need for a Rational Therapeutics	3	2.5	45	37.2
2. Chemotherapy	10	8.4	5	4.1
3. Psychotherapeutic Drugs	20	16.8	2	1.6
4. The Cardiovascular System	42	35.1	2	1.6
5. Fertility	20	16.8	6	5.0
6. Diuretics	22	18.6	6	5.0
7. The Philosophy of the Therapeutic Nihilist	2	1.8	55	45.5
	119[a]	100.0	121[b]	100.0

[a]17 participants did not make a selection.

[b]15 participants did not make a selection.

Although no basis for the choices for the most- and least-liked tapes was requested, or offered by the pharmacists, it would appear that the preference for the clinically oriented tapes was clearly indicated. Perhaps the pharmacists were saying that the material in Tapes 1 and 7 contained the least amount of information that could be directly applied in their practice.

The Least-Liked Factor

The pharmacists were asked to indicate the one factor they liked least about the course. They responded with many different least-liked factors. Table 52 shows that the factor most frequently mentioned was the inability to ask the lecturer questions during the course or lectures. Eight participants also noted it was difficult to find a particular place on the tape. Another eight participants mentioned factors which were coded as inadequate project administration. Six participants did not like the tone of the lecturer's voice. Of the remaining least-liked factors which appeared most frequently the following were related to the course materials: 1) inadequate lecture outlines; 2) references were unavailable; 3) poor audio quality of the tapes; and 4) the project material should have been more practical. The other most frequently mentioned least-liked factors appeared to be individually oriented problems: 1) it was necessary to obtain a tape recorder; 2) too much self-discipline was required; 3) studying takes time; and 4) the project or course was too long.

Comments could be made about each factor mentioned at least three times. However, this preliminary study does not provide adequate detail to amplify and clarify the reasons for listing of the least-liked factors. At this point, it should suffice to note that the

TABLE 52

RANKING OF THE LEAST-LIKED FACTORS MOST FREQUENTLY INDICATED BY THE PARTICIPANTS IN THE COURSE

1. Cannot ask question (21)[a]
2. Difficult to find a point on the cassette tape (8)
3. Inadequate project administration (8)
4. Tone quality of the lecturer (6)
5. It was necessary to obtain a tape recorder (5)
6. Inadequate lecture outlines (5)
7. Too much self-discipline required (5)
8. Studying takes time (4)
9. References were unavailable (3)
10. Audio quality of the tapes (3)
11. Project or course was too long (3)
12. Material should be more practical (3)

[a]The number in parentheses is frequency of occurrence of the factor.

[b]38 people did not supply a least-liked factor.

[c]24 people made 18 other miscellaneous selections as least-liked factors, none being nominated more than two times.

participants most frequently recognized two shortcomings of the cassette tape teaching technique: 1) there was no mechanism to ask the instructor questions; and 2) it was difficult to quickly locate a specific point in the lecture without having to search for the point on the tape by starting and stopping the recorder between advances and reverses of the tape.

Since 38 people provided no answer or indicated they could find no least-liked factor, and since the selections of least-liked factors were diverse with no factors being mentioned frequently besides the previously discussed shortcomings of the cassette technique, it could be concluded that there were no clearly indicated shortcomings of this particular cassette tape course.

The Most-Liked Factor

The pharmacists were asked to indicate the one factor they liked most about using cassette tapes for continuing education. As shown in Table 53 the five most frequently mentioned factors accounted for the selections of 77.2 percent of the participants. It appeared easy for the students to mention something they liked about the course or technique, because only 4.4 percent of the participants offered no answer.

TABLE 53

RANKING OF THE MOST-LIKED FACTORS INDICATED BY THE PARTICIPANTS IN THE COURSE

1. Convenience of the technique (46)[a]
2. Opportunity to repeat the lecture (25)
3. Opportunity to use in free time (19)
4. Student could select his own pace for learning (9)
5. Listening, as opposed to reading, as a learning technique (6)
6. No travel was necessary (4)
7. The classroom learning situation was approximated (3)
8. The technique was time-saving (3)
9. Student has a permanent record to keep (2)
10. The information was practical (2)

[a]The number in parentheses is the frequency of the indication of that factor.

[b]There were 11 other answers not coded into the above categories. Six participants provided no answer.

The most frequently mentioned most-liked factor was the convenience associated with continuing education by this technique, chosen by 35.4 percent of the respondents. The selection of convenience by such a large portion of the class might possibly infer a relief at not being encumbered by pedagogical restrictions associated with time, place and curricular structure of other educational programs. The choice also might indicate pleasure at the opportunity for pharmacists to continue their education when it was convenient for them, not convenient for others.

The opportunity to repeat the lecture was reported as the most-liked feature by 19.2 percent of the participants. Another 14.6 percent of the respondents appreciated the opportunity to use the cassette course in their free time. Other selections of factors also considered some element of student convenience: 1) the student could learn at his own pace; 2) no travel was necessary; 3) the technique was time-saving; and 4) participants had a permanent record of the lectures.

It appears the most frequently mentioned type of most-liked factor was convenience for the students. Other miscellaneous factors did not center on any single types of suggestion, but were all related in some way to convenience.

Future Market Price Recommended
by Course Participants

The participants were asked what price they thought a similar cassette tape lecture course should sell for in the future. The average of all the participants suggested prices was $34.70, and the range of prices went from $10 to $85. In an effort to gain some indication of opinions of various subgroups, the price was broken down into three categories as shown in Table 54. The ranges were chosen on the basis of being below the current market range ($1-29), the current market range ($30-49), and above the current market range ($50 or more). When comparing suggested prices of employers and employees it was found that 40.6 percent of employers were in favor of a price lower than the current range, but only 21.9 percent favored a higher price. Of the employees, 39.3 percent favored a lower price and 16.7 percent suggested a price higher than the current market price.

In comparison of suggested prices by pharmacists in different professional settings, it was found that 38.9 percent of community pharmacists and 42.9 percent of hospital pharmacists suggested prices lower than the current market price, while only 17.8 percent of the community pharmacists and 19.1 percent of hospital pharmacists favored higher prices.

TABLE 54

FUTURE PRICE RANGE SUGGESTIONS BY COURSE PARTICIPANTS

Category of Participant	Sample Size	Percent of Row in Range		
		$1-29	$30-49	$50 or more
State				
Florida	62	38.7	32.3	29.0
Michigan	56	41.1	35.7	23.2
Professional Setting				
Community	90	38.9	43.3	17.8
Hospital	21	42.9	38.1	19.0
Employment Status				
Employer	32	40.6	37.5	21.9
Employee	84	39.3	44.0	16.7

On these bases, it seemed that the vast majority of pharmacists favored a market price in the current range or lower. A minority of participants suggested a higher selling price. There is no indication that a lower market price would increase the number of participants, but the majority of the participants indicated a future price not higher than the current market price.

This finding must be tempered with two considerations. First, the participants received the course for $20 which might have prejudiced their suggestion. Second, most of these people are businessmen concerned with expenses and profits. A natural inclination on their part would be

minimizing expenses. Perhaps the business perspective influenced them to suggest a low future selling price. This market seemingly indicated only one suggestion: do not increase the selling price for comparable courses in the future.

CHAPTER SIX

SUMMARY AND CONCLUSIONS

Continuing education for pharmacists has been assuming increasing importance in recent years. The pharmacist must keep pace with drug development and advances in therapeutics in order to provide the most assistance to patients and physicians.

Each participant in continuing education has his or her own motivation for participating. Whatever the need that generated the motivation, the need was accorded sufficient priority for the individual to exert some effort to satisfy the need. Obstacles to participation in continuing education often are deemed sufficiently important to prevent participation. In the last 25 years increasing efforts have been made to provide continuing education opportunities for pharmacists. Also, in recent years continuing education for pharmacists has been sufficiently important to result in mandatory continuing education requirements in some states.

As the mass media were incorporated into health science education over the last quarter century, they were also gradually incorporated into health science continuing education. Efforts to provide convenient continuing education opportunities for pharmacists have

developed from seminar refresher programs to a complement of program opportunities which now include most media devices and techniques.

Several schools of pharmacy and organizations have recently developed continuing education opportunities utilizing audio magnetic tape. Extension Services in Pharmacy, University of Wisconsin, developed a new concept using audio tapes--the cassette tape lecture course. Five courses have been produced to date. An evaluation of one of these courses by a test market of pharmacists was planned to determine: 1) if a gain in cognitive knowledge could be demonstrated; 2) what the strengths and weaknesses of the course are; 3) if mandatory continuing education and other demographic variables appeared to affect performance on the examinations or evaluation of the course.

The project was completed in the following steps: 1) a selected course was offered to a selected test market of pharmacists; 2) course registrants were pretested to determine their familiarity with the course information; 3) after study of the course materials for two months, the participants received the final examination and an evaluation form; 4) test scores and evaluation data were analyzed; and 5) participants were notified of their performance.

A seven-lecture cassette tape course, Selected Topics in Pharmacology, was chosen as the best course to offer a test market. The seven cassette lectures were supplemented by: 1) lecture outlines; 2) diagrams; 3) references; and 4) a "checktest." Both the cassettes and the supplementary printed materials were stored in a specially designed notebook. The final examination for the course was administered both as the pretest and the posttest.

Pharmacists from Florida and Michigan were chosen as the test market. Florida pharmacists must complete 15 hours of continuing education each year in order to maintain their license. Michigan pharmacists participate in continuing education voluntarily.

From the list of names and addresses of Michigan pharmacists supplied by the Michigan Pharmaceutical Association, 1,003 pharmacists were systematically selected to receive the special course offering. Similarly, names of 1,000 Florida pharmacists were selected from the list of Florida pharmacists provided by the Director of Pharmacy Continuing Education, University of Florida, College of Pharmacy. The project proposal mailed to the 2,003 pharmacists contained: 1) the offer of the course at half-price; 2) a course and project description with letters of endorsement; 3) a registration form with return envelope and 4) an application deadline.

Of the 177 registrants for the course, 91 were from Michigan and 86 were from Florida. Evaluation of the course was based on the 69 Michigan pharmacists and 67 Florida pharmacists who completed the project.

The 136 participants received their pharmacy degrees over a fifty year range. Approximately two-thirds of the pharmacists received their degrees since 1953. The Florida and Michigan samples were similar with respect to distribution of years of degree although the Michigan sample had more recent graduates. This was also indicated when years of pharmacy practice were tabulated. Although the pharmacists had practiced an average of almost 17 years, Michigan pharmacists had practiced an average of almost five years less than Florida pharmacists.

More than 90 percent of the pharmacists had graduated from curricula of four years or longer. The curriculum data were similar for Michigan and Florida although Michigan had fewer two or three-year graduates and more five-year graduates.

Approximately ten percent of the participants were not currently practicing pharmacy: 13.6 percent of the Florida sample and 5.8 percent of the Michigan sample. Approximately 70 percent of the participants were employees with equal numbers of employees in both states. The Michigan sample had more employers than the Florida sample.

More than three-quarters of the participants practiced in community pharmacy. About 21 percent of the participants practiced in the hospital setting. The Florida sample was very comparable to state census totals. The percentage of hospital pharmacists in the Michigan sample, however, was higher than the percentage of hospital pharmacists in the state of Michigan. There was no apparent explanation for the high percentage of hospital pharmacists in the Michigan sample.

The pharmacists practiced an average of 42.4 hours per week. A total of 53.0 percent of the participants practiced pharmacy from 40 to 49 hours per week. Approximately 29 percent of the participants practiced 50 or more hours per week. A total of 11.2 percent of the sample practiced less than 40 hours per week and 6.7 percent of the pharmacists were not currently practicing pharmacy. The respective percentages for both states were comparable.

The mean pretest average for the participants was 54.7 out of a possible 100 points. The range of scores was from 28 to 88. Approximately 35 percent of the participants achieved a "passing" score of 60 or more. There was no significant difference between scores of Florida and Michigan pharmacists. There appeared to be gaps in the pharmacology knowledge of the participants with respect to the information presented in this course.

Pharmacists who had practiced ten years or less scored significantly higher on the pretest than participants who had practiced more than ten years. Apparently the recent graduates knew more about the course topics than the older pharmacists. Perhaps the difference was from more extensive education as well as more recent instruction in pharmacological principles.

Hospital pharmacists scored significantly higher on the pretest than community pharmacists. This might have reflected more use of pharmacological information in the hospital than in the community pharmacy professional setting. It also might have reflected that the hospital pharmacists were younger and had been instructed in pharmacological principles more recently.

No other significant differences were found when pretest comparisons were made with the following demographic variables: 1) employment status; 2) current practice status; 3) hours of practice per week; 4) number of full-time pharmacists; and 5) total number of pharmacists.

The posttest mean for participants was 79.5. The range of scores was from 44 to 100. The average gain in posttest score over the pretest was 24.2 points which indicated significant increases in cognitive knowledge. A total of 97.0 percent of the participants achieved a passing score. There was no significant difference between posttest mean scores for Michigan and Florida

pharmacists. Mandatory continuing education requirements for Florida pharmacists apparently did not cause higher test performance than was achieved by Michigan pharmacists.

Similar to the pretest results, significant differences were found when posttest performance was compared with the length of pharmacy curriculum and years of practice. The graduates of two or three year curricula scored lower than graduates of longer curricula. Pharmacists who had practiced ten years or less scored higher on the posttest than pharmacists who had practiced more than ten years.

The difference between hospital and community pharmacists noted on the pretest was not found on the posttest although the mean score for hospital pharmacists was higher.

No differences were found when posttest performance was compared with: 1) employment status; 2) current practice status; 3) hours of practice per week; 4) number of full-time pharmacists per pharmacy; and 5) total number of pharmacists per pharmacy.

The differences found in the posttest performance reinforced the supposition from the pretest results that years of practice and length of curriculum, both apparently related to age and possibly to formal background in pharmacology, could account for the differences in performance.

The evaluation questionnaire consisted of statements about facets of the course and project which the pharmacists rated using a five-point scale from "Strongly Agree" to "Strongly Disagree." Other questions requested pharmacists' opinions about aspects of the course and suggestions for the future.

The course materials were generally well received by the pharmacists. The pharmacists, as a group, strongly agreed that the notebook was convenient. They also agreed that the lecture outlines were helpful. The pharmacists did not agree that the references were helpful for answering questions about the course. This probably was because the references were not readily available or too much time was involved in searching out and using them. The pharmacists strongly agreed the audio quality of the tapes was good.

Pharmacists rated the information of the course and its presentation high. The pharmacists agreed the information in the handout materials was presented clearly, in sufficient quantity, and it helped them understand the lecture. The Michigan pharmacists rated the helpfulness of the handout material higher than Florida pharmacists. Perhaps they have had fewer opportunities to compare materials of this type since they do not have mandatory continuing education and a large number of programs each year.

All groups of pharmacists agreed the information in the lectures would be useful in their pharmacy practice. However, all pharmacists did not agree that the majority of information was new. The mean rating of pharmacists from both states indicated the majority of information was, in fact, not new. Neither community nor hospital pharmacists agreed that the majority of information was new. Pharmacists who graduated more than ten years ago did agree that the majority of information was new, but pharmacists who had graduated in the last ten years disagreed with the statement.

The pharmacists agreed the lecture topics were covered in sufficient detail. Of those who disagreed with this statement, nearly 90 percent scored 80 or higher on the posttest. Apparently their dissatisfaction did not impair their ability to score well on the post-test. Perhaps these were people who thought they had covered this material before and were seeking more detailed information.

All groups of pharmacists agreed the lecturer spoke at a comfortable pace and presented a well-organized lecture. All groups of pharmacists also agreed the lecturer used familiar terminology throughout his lectures. Hospital pharmacists agreed more strongly than community pharmacists about the terminology. This suggested that the hospital pharmacists might use this terminology more frequently in their professional setting.

There was general agreement that the course was presented at the knowledge level of most pharmacists. Employees rated the knowledge level higher than employers. Perhaps younger employee pharmacists had more confidence in the knowledge level of all pharmacists than employer pharmacists. The employers as a group may not have had the same responsibilities and interests in this material that the employees did.

All groups of pharmacists indicated the checktests were helpful in review of the lecture materials. This might indicate to program planners of future cassette tape lecture courses that checktests have been adjudged helpful in at least one course.

There was general agreement that: 1) the posttest questions were stated clearly; 2) the posttest was representative of the course material; and 3) the posttest was long enough to indicate if the pharmacists had learned anything. Apparently the examinations designed for the course were well received.

The pharmacists did not agree that it was easy to find time to study. Florida pharmacists mildly agreed it was easy to find time to study, but Michigan pharmacists definitely disagreed with the statement. This suggests that Florida pharmacists may have become accustomed to committing time to continuing education, but the Michigan pharmacists were not accustomed to allocating this time.

The pharmacists expressed mild overall agreement that the two months project time was sufficient to study the materials. The Florida pharmacists rated the project time higher than the Michigan pharmacists. This might seem unusual because the Florida pharmacists had the responsibility to successfully pass the course to satisfy their continuing education requirements. However, this seems to be in accord with the Florida pharmacists finding it easier to take time to study the material.

All groups of pharmacists strongly agreed that the cassette tape lecture technique was a valuable learning experience. This should serve as a strong endorsement for the technique. In addition, the pharmacists strongly agreed that the course was a satisfactory learning experience. This should serve as substantiation that the concept of the cassette tape course has merit. More than 90 percent of the participants indicated they would recommend the course to a colleague, another indication of satisfaction with the course. About 95 percent of the participants were interested in future participation in cassette tape lecture courses. This represented better than 90 percent of those people who had had previous experience with cassette tape continuing education and also those individuals who had had no previous experience.

The pharmacists were asked to indicate the one most-liked and least-liked tape. The pharmacists

indicated the most-liked tapes were those five tapes which were the most clinically oriented. One tape on the cardiovascular system was selected by 35 percent of the participants who selected a most-liked tape. The least-liked tapes were two tapes which dealt with more philosophical and less directly applicable information. Apparently the pharmacists were more interested in directly applicable materials.

The most frequently mentioned least-liked factors were: 1) the inability to ask questions; and 2) difficulty in finding a specific place on the tape. On the other hand, the most-liked factors were mostly related to some convenience offered by the course. The most frequently mentioned most-liked factors were: 1) convenience of the technique; 2) ability to repeat the lecture; and 3) the opportunity to use the course in their free time.

The examination performance showed a significant increase in cognitive knowledge. The significant differences found among the scores were reasonable. The strong overall evaluation ratings given to the course and technique give ample support to the concept of the cassette tape lecture course. Improvements in a limited number of facets would make this course a model for the development of more examples of this convenient continuing education technique.

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Meyer, Thomas, et al., "Report of an Experiment in the Use of Telephone Dial Access Tape Recording Library in the Continuing Education of Physicians," unpublished paper, 1969.

Niles, Anne, "Definitive Dialing, Nursing Dial Access: A Report of the Planning Year and the First Eighteen Months in Operation," University Extension, Department of Nursing, University of Wisconsin, 1970.

"Pharmacy in Review," Albany College of Pharmacy, Union University, Albany, New York, 1971 (September-December), Kenneth S. Griswold, Director.

Shapiro, E. Donald, (letter to member of bar) advertisement for Practicing Law Institute, 1972 (no specific date).

APPENDICES

APPENDIX A

ENDORSEMENTS

1. Letter from two Deans of Pharmacy in Michigan
2. Letter from Executive Secretary of the Michigan Pharmaceutical Association
3. Letter from Director of Continuing Professional Education, University of Florida, College of Pharmacy

February, 1973

Dear Pharmacist,

New innovations in pharmacy continuing education programs should be developed to permit pharmacists to participate in continuing education programs more conveniently. Extension Services in Pharmacy-University of Wisconsin has developed cassette tape lecture courses. This innovation may offer some interesting new opportunities in continuing education for pharmacists in our state.

Each new proposal should be evaluated by the pharmacists to determine if a useful satisfying program has been developed. A special offer of a seven cassette lecture course, "Selected Topics in Pharmacology", is being made to a random sample of pharmacists in our state to evaluate this new continuing education technique. The results of this evaluation may provide program planners in our state important information for consideration in planning new continuing education opportunities for our pharmacists. We hope you may be able to take advantage of this special offer and evaluate this new continuing education technique.

Sincerely

Richard A. Ohvall

Richard A. Ohvall, Dean
School of Pharmacy
Ferris State College

Thomas D. Rowe

Thomas D. Rowe, Dean
College of Pharmacy
University of Michigan

MICHIGAN PHARMACEUTICAL ASSOCIATION
183
STATE PROFESSIONAL SOCIETY OF PHARMACISTS

LOUIS M. SESTI, R.Ph.
Executive Director

February, 1973

Dear Michigan Pharmacist:

A new innovation in pharmacy continuing education has been developed enabling pharmacists to participate in continuing education programs more conveniently. Extension Services in Pharmacy University of Wisconsin has developed cassette tape lecture courses. This innovation should offer interesting new possibilities for pharmacists.

This new proposal should be evaluated by pharmacists to determine if a useful, satisfying program and technique has been developed. A special offer of a seven-cassette lecture course, "Selected Topics in Pharmacology," is being made to a random sample of pharmacists in Michigan to evaluate this new technique.

MPA is cooperating in this special study project to ascertain your viewpoints to assist our planning of expanded continuing education opportunities for Michigan pharmacists.

You have been selected to receive this special offer (see other letters enclosed for additional details). We hope you will seriously consider taking advantage of this special offer and, thereafter, evaluate this new approach to continuing education.

Sincerely,

Louis M. Sesti, R.Ph.
Executive Director

P.S. Michigan pharmacists licensed in Florida will receive 14 continuing education hours of credit upon completion of the course and a project evaluation.

1812 MICHIGAN NATIONAL TOWER • LANSING, MICHIGAN 48933 • (517) 484-1466

UNIVERSITY OF FLORIDA • J. HILLIS MILLER HEALTH CENTER • GAINESVILLE
COLLEGE OF PHARMACY (Box 779)
Division of Professional Education

Dear Pharmacist:

A new innovation in pharmacy continuing education has been developed to permit pharmacists to participate in continuing education programs more conveniently. Extension Services in Pharmacy--University of Wisconsin has developed cassette tape lecture courses and through a cooperative relation with the College of Pharmacy, University of Florida, these courses are available to all Florida pharmacists. This innovation should offer interesting new possibilities in continuing education for pharmacists in our state.

This new proposal should be evaluated by our pharmacists to determine if a useful, satisfying program and technique has been developed. A special offer of a seven cassette lecture course, "Selected Topics in Pharmacology", is being made to a random sample of pharmacists in our state to evaluate this new technique. The results of this evaluation will provide program planners in our state important information for consideration in planning further continuing education opportunities for our pharmacists.

You have been selected to receive this special offer. Like those pharmacists who participate in the regular offering of this course, you will receive 14 continuing education hours of credit upon completion of the course and project evaluation. We hope you may be able to take advantage of this special offer and evaluate this new technique while continuing your education.

Sincerely,

Max A. Lemberger, Director
Division of Continuing Professional Education

ks

APPENDIX B

PROJECT PROPOSAL MAILING

1. Cover Letters
   a. Michigan
   b. Florida
2. Description of Course and Project with Directions for Participation
3. Registration Form
4. Self-addressed, Postage Paid Return Envelope
5. Registration Deadline Notice
6. Indicized, 9 x 12 inch Mailing Envelope

CENTER FOR HEALTH SCIENCES
THE UNIVERSITY OF WISCONSIN-MADISON
MADISON, WISCONSIN 53706

HOOL OF PHARMACY
macy Building
North Charter Street

February 1973

Dear Pharmacist:

Continuing education has been accorded increased importance by pharmacy in the last decade. With the increased importance a need has developed for an increased number of well designed educational opportunities for the pharmacist at times when he can participate - at his convenience.

Extension Services in Pharmacy - University of Wisconsin recently has developed cassette tape lecture courses. Each course offers the pharmacist the opportunity to participate in a carefully designed learning experience at his own learning rate and convenience. After the course is completed, the student has ready access to expert opinion on important new information.

Evaluation of each new innovation is essential to providing well-designed satisfying educational opportunities. Practicing pharmacists are the best individuals to evaluate the program designed for them.

Extension Services in Pharmacy-University of Wisconsin wishes to evaluate a seven lecture cassette course, "Selected Topics in Pharmacology". We ask your help in this evaluation. Your name was randomly selected from a list of Michigan pharmacists to receive this special offer. The regular price for this course is $40. Participants in this special offer will receive the seven cassette lectures, coordinated printed materials, notification of individual achievement and continuing education credit for the course. The cost of this special to you is only $20.

To participate in this evaluation project, read the enclosed course description and project description, complete the registration form and return the form with your remittance in the enclosed self-addressed envelope.

Our goal is to provide the pharmacist with useful satisfying continuing education opportunities. The deans of pharmacy at Ferris State College and the University of Michigan and Michigan Pharmaceutical Association are interested in our educational goal and endorse our special evaluation offer to you. Your participation in this project may help provide Michigan pharmacists with new continuing education opportunities. We would appreciate your participation greatly.

Sincerely,

Jerome W. Blank

Jerome W. Blank, R.Ph.
A.F.P.E. Fellow

Sincerely,

Melvin Weinswig

Melvin H. Weinswig, Chairman
Extension Services in Pharmacy

CENTER FOR HEALTH SCIENCES
THE UNIVERSITY OF WISCONSIN-MADISON
MADISON, WISCONSIN 53706

SCHOOL OF PHARMACY
Pharmacy Building
425 North Charter Street

Dear Pharmacist,

Continuing education has been accorded increased importance by pharmacy in the last decade. The advent of mandatory continuing education in Florida and other states created a need for more continuing education opportunities for the pharmacist at his convenience. Partly as a result of this need the visiting lecture technique and the telephone lecture technique were developed.

Extension Services in Pharmacy-University of Wisconsin recently has developed cassette tape lecture courses. Each course offers the pharmacist the opportunity to participate in a carefully designed learning experience at his own learning rate and convenience. After the course is completed, the student has ready access to expert opinion on important new information.

Evaluation of each new innovation is essential to providing well designed satisfying educational opportunities. Practicing pharmacists are the best individuals to evaluate the program designed for them.

Extension Services in Pharmacy-University of Wisconsin wishes to evaluate a seven lecture cassette course, "Selected Topics in Pharmacology". We ask your help in this evaluation. Your name was randomly selected from a list of Florida pharmacists to receive this special offer. The regular price for this course is $40. Participants in this special offer will receive the seven cassette lectures, coordinated printed materials, notification of individual achievement and credit for the course. As the enclosed letter from Max A. Lemberger, Director, Division of Continuing Professional Education, College of Pharmacy, University of Florida will attest, satisfactory completion of the course and project evaluation will provide you with 14 hours of continuing education credit. The cost of this special offer is only $20.

To participate in this project, read the enclosed course description and project description, complete the registration form and return the form with your remittance in the enclosed self-addressed envelope.

Our goal is to provide the pharmacist with useful satisfying continuing education opportunities. Your participation in this project may help provide Florida pharmacists with new continuing education opportunities. We would appreciate your participation greatly.

Sincerely,

Jerome W. Blank

Jerome W. Blank, R.Ph.
A.F.P.E. Fellow

Melvin H. Weinswig

Melvin H. Weinswig, Chairman
Extension Services in Pharmacy

COURSE DESCRIPTION

Selected Topics in Pharmacology is a continuing education course designed to provide you with an up-to-date approach to principles upon which rational therapeutics can be based. This course will best fit the needs of those individuals who have had some previous professional training in a health discipline and some formal background in pharmacology.

The seven cassette lectures are supplemented by clinical case reports and by lists of suggested readings for those individuals interested in exploring a particular topic in depth. A check test accompanies the supplementary material for each lecture to assist the student with his learning. A specially designed notebook is provided to permit convenient storage and easy access to the seven cassette tapes and the supplementary printed materials.

The titles for the lectures in this cassette tape course are:

1. The Need for a Rational Therapeutics: The Old Way Is Not Always the Best Way
2. Chemotherapy: The Use of Antibiotics and Other Agents
3. Psychotherapeutics: What Do We Know About the Nervous System?
4. The Cardiovascular System: New Drugs and New Knowledge About Old Drugs
5. Fertility: The Pros and Cons of a Complex Problem
6. Diuretics: Ways of Watering Down the Urine
7. The Philosophy of a Therapeutic Nihilist: "Omnia in omnes"

PROJECT DESCRIPTION AND HOW TO PARTICIPATE

This is an educational evaluation project. The purposes of the project are to determine: 1) by a precourse examination the participant's familiarity with the subject matter before the course, 2) the participant's increase in familiarity with the subject matter by an examination after the course, 3) the participant's evaluation of this continuing education course and the continuing education technique.

Participation in this carefully designed course and evaluation project involves the following steps:

1) Complete and return the registration form with your check or money order for $20 in the enclosed self-addressed envelope.
2) Upon receipt, complete and return the precourse examination.
3) Study the course materials at your convenience for eight weeks. (The materials will be mailed to you upon receipt of the precourse exam.)
4) Complete and return the final examination and evaluation forms which will be mailed to you after you have had the course materials for two months.

Completion and return of the final examination and evaluation forms will terminate your responsibility to the project. As with the regular course offering, successful completion of the course and the basis for certification of continuing education credit will be judged by satisfactory completion of the final examination.

You will be notified of your achievement in the course and your successful completion of the course will be certified to the agency or institution of your choice. ALL OF YOUR INDIVIDUAL RESPONSES ON THE REGISTRATION FORM AND THE EXAMINATIONS WILL REMAIN CONFIDENTIAL.

HELP US MAKE CONTINUING EDUCATION OFFERINGS IN PHARMACY MEANINGFUL AND

REGISTRATION FORM

SELECTED TOPICS IN PHARMACOLOGY

NAME _____
Last First Initial

ADDRESS _____
Number and Street

_____
City State Zip Code

_____
Telephone (business)

PLEASE ASSIST US WITH THE FOLLOWING INFORMATION

In what year did you receive your pharmacy degree? 19___

What was the length of the pharmacy curriculum that you completed?

____ 2 years ____ 3 years ____ 4 years ____5 years ____ 6 years

For how many years have you practiced pharmacy? ____ years

Are you an employer or employee pharmacist? _____

Are you presently practicing pharmacy? ____ Yes ____ No

How many hours per week do you practice pharmacy? _____ hours

In what professional setting do you practice pharmacy?

____ Community pharmacy

____ Hospital pharmacy

____ Other (please describe) _____

_____

(If you practice in more than one setting, indicate both settings and circle the setting in which you do the majority of your work.)

How many full-time pharmacists service the pharmacy in which you practice? (circle the appropriate response)

1 2 3 4 5 6 or more

What is the total number of pharmacists (full-time and part-time) which service the pharmacy in which you practice?

1 2 3 4 5 6 or more

ALL INDIVIDUAL INFORMATION SUPPLIED ABOVE WILL REMAIN CONFIDENTIAL

NOTE: Have you enclosed a check for $20 made out to:

University of Wisconsin Extension

Postage Will be Paid by Addressee

No Postage Stamp Necessary If Mailed in the United States

BUSINESS REPLY MAIL

FIRST CLASS PERMIT NO. 33 MADISON, WISCONSIN

UNIVERSITY OF WISCONSIN–EXTENSION
432 North Lake Street
MADISON, WISCONSIN 53706

Attention:

Pharmacy

190

NOTICE ! DEADLINE ! NOTICE ! DEADLINE! NOTICE! DEADLINE!

This special price offer of the cassette lecture course, " SELECTED TOPICS IN PHARMACOLOGY, is available to you until FEBRUARY 23, 1973. If the completed registration form is not returned by that date, the special price offer is no longer valid.

Be sure to include your check or money order payable to University of Wisconsin Extension with your registration form.

DEADLINE .....DEADLINE.....DEADLINE.....DEADLINE.....

NOTICE! DEADLINE! NOTICE! DEADLINE! NOTICE! DEADLINE!

This speical price offer of the cassette lecture course SELECTED TOPICS IN PHARMACOLOGY, is available to you until FEBRUARY 23, 1973. If the completed registration form is not returned by that date, the special price offer is no longer valid.

Be sure to include your check or money order payable to University of Wisconsin Extension with your registration form.

DEADLINE ..... DEADLINE ..... DEADLINE ..... DEADLINE..

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This special price offer of the cassette lecture course SELECTED TOPICS IN PHARMACOLOGY, is available to you until FEBRUARY 23, 1973. If the completed registration form is not returnedby that date, the special price offer is no longer valid.

Be sure to include your check or money order payable to University of Wisconsin Extension with your registration form.

DEADLINE .....DEADLINE ..... DEADLINE..... DEADLINE .....

ES UNIT
ENSION
OF WISCONSIN
RTER STREET
ONSIN 53706

ADDRESS CORRECTION REQUESTED
RETURN POSTAGE GUARANTEED

APPENDIX C

FLORIDA FOLLOWUP MAILING

1. Cover Letter
2. Course Description Form
3. Note

To: Florida Pharmacists
From: Jerome W. Blank, R.Ph.
Subject: "Selected Topics in Pharmacology"
Date: February 26, 1973

Recently you received a special half-price offering for the pharmacy continuing education cassette tape lecture course, "Selected Topics in Pharmacology". Unfortunately a delay in the mail may have prevented you from receiving this offer in time to return the registration form before the February 23 deadline. Because of the unforeseen delay in the mail, the deadline for registration has been extended to March 15 to permit you to take advantage of this offer.

If you wish to participate, please complete the enclosed registration form and return it with your $20 remittance to:

Jerome W. Blank, R.Ph.
School of Pharmacy
University of Wisconsin
425 No. Charter St.
Madison, Wisconsin 53706

If you have already returned your registration, you will be receiving your materials soon.

This course is approved for continuing education credit in Florida. As the original offer proposed, you will receive 14 hours of continuing education credit for participation in the course and the evaluation project.

We hope you may be able to take advantage of this special offer and continue your education. If you have any questions, do not hesitate to write to me.

JBlank

COURSE DESCRIPTION

Selected Topics in Pharmacology is a continuing education course designed to provide you with an up-to-date approach to principles upon which rational therapeutics can be based. This course will best fit the needs of those individuals who have had some previous professional training in a health discipline and some formal background in pharmacology.

The seven cassette lectures are supplemented by clinical case reports and by lists of suggested readings for those individuals interested in exploring a particular topic in depth. A check test accompanies the supplementary material for each lecture to assist the student with his learning. A specially designed notebook is provided to permit convenient storage and easy access to the seven cassette tapes and the supplementary printed materials.

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3. Psychotherapeutics: What Do We Know About the Nervous System?
4. The Cardiovascular System: New Drugs and New Knowledge About Old Drugs
5. Fertility: The Pros and Cons of a Complex Problem
6. Diuretics: Ways of Watering Down the Urine
7. The Philosophy of a Therapeutic Nihilist: "Omnia in omnes"

PROJECT DESCRIPTION AND HOW TO PARTICIPATE

This is an educational evaluation project. The purposes of the project are to determine: 1) by a precourse examination the participant's familiarity with the subject matter before the course, 2) the participant's increase in familiarity with the subject matter by an examination after the course, 3) the participant's evaluation of this continuing education course and the continuing education technique.

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You will be notified of your achievement in the course and your successful completion of the course will be certified to the agency or institution of your choice. ALL OF YOUR INDIVIDUAL RESPONSES ON THE REGISTRATION FORM AND THE EXAMINATIONS WILL REMAIN CONFIDENTIAL.

HELP US MAKE CONTINUING EDUCATION OFFERINGS IN PHARMACY MEANINGFUL AND

NOTE:

In addition to the cover letter and the course description, a self-addressed stamped return envelope and a course registration form were included in the follow-up mailing.

APPENDIX D

STATISTICAL TESTS

1. F-Test
2. Computer Printout
3. Scheffe Post Hoc Procedure

F-TEST

The F-Test, an analysis of variance among means, is used to determine if the independent groups in the experiment have equal expected values. This analysis of variance will tell us only whether there is variation among the means in the groups analyzed. It does not tell us about individual comparisons of means when there are three or more groups in the experimental design. The formula for determining the F-Ratio is:

$$F = \frac{\text{Variance of Means Between Groups}}{\text{Variance About Means Within Groups}}$$

The "Variance of Means Between Groups" is a calculation of the variances of the means of the groups about the grand mean of all groups. These variances can occur for two reasons: 1) they occur by chance; and 2) they occur because of the treatments to the groups.

The "Variance About the Means Within Groups" is an estimation of the variance among the individual scores within each group.

The major point in the analysis of variance is that the more the value of the "Between Groups Variance" exceeds the "Within Groups Variance," the greater is the probability that the groups represent different populations.

The observed and calculated F-ratio is compared to an estimated normal F-ratio considering the sample size and the number of treatments. If the observed ratio exceeds the estimated normal ratio, called the "critical value," then at that level of probability, it appears that the differences in means of the groups are said to be probably caused by the treatments of the groups.

In this project, all F-ratios were calculated using the NWAY1 and ONEWAY1 computer programs at the Madison Academic Computer Center. The calculated values were compared to a table of critical values to determine if the variances observed were significant at the five percent level of significance. A copy of a computer printout is enclosed showing the calculated F-ratio and the normal critical value typed in below the other information. The printout material refers to the comparison in Table 12. For further information about the F-test, see Marascuilo.*

---

*Leonard A. Marascuilo, Statistical Methods for Behavioral Science Research, McGraw-Hill, New York, 1971.

G CENTER PROGRAM NWAY1 73/07/03 RUN 1 PAGE 4

1 (INPUT VARIABLE 42)

BLE USING SCHEFFE'S APPROXIMATION
S, MEAN SQUARES, AND F-RATIOS ARE APPROXIMATE

RE	F-RATIO	SOURCE
		TOTAL SUM OF SQUARES
		CORRECTION DUE TO A GRAND MEAN OF •5460741+02
		CORRECTED TOTAL SUM OF SQUARES
.4	.22	ETATS
.4	3.23	CIRRUC
.4	1.05	ETATS • CIRRUC
.4		WITHIN CELLS

5 SECONDS

CRITICAL VALUE (c.v.) = 3.06

SCHEFFE'S POST HOC PROCEDURE[1,2]

The Scheffe post hoc procedure was selected to determine the course of the significant differences found during the analysis of variance procedure and noted by a significant F-ratio. The Scheffe procedure was used because:

1) The Type I error rate remains constant with the error rate used in the one-way analysis of variance.

2) The procedure guarantees to find the significant differences noted in the analysis of variance procedure. However, the significant difference found may not be expressible in logical terms.

3) This procedure allows not only for pair-wise, but also complex comparisons.

The Scheffe value is used in the following formula to create a confidence interval:

$$\psi_i = \hat{\psi}_i \pm \sqrt{S^2 \text{ Var } (\hat{\psi}_i)}$$

where:

$$\hat{\psi}_i = \bar{X}_1 - \tfrac{1}{3}(\bar{X}_2 + \bar{X}_3 + \bar{X}_4) \quad \text{etc.}$$

$$\text{Var.}(\hat{\psi}_i) = MS_w \sum \frac{a_k^2}{N_k}$$

---

[1]Roger E. Kirk, Experimental Design: Procedures for the Behavioral Sciences (Belmont, California, 1968), pp. 90-1.

[2]Leonard A. Marascuilo, Statistical Methods for Behavioral Science Research, McGraw-Hill, New York, 1971, pp. 356-60, 371.

If zero does not fall within the confidence interval produced above, it is assumed that there is a significant difference in the comparison being made. Conversely, if zero falls in the interval there is no significant difference.

Sample Calculations with Scheffe Procedure:

Source of Data: Pretest performances for groups of pharmacists practicing different numbers of years. Data from Table 13. Comparison to be made between the group of pharmacists practicing ten years or less (a) and all other groups (b + c).

$$\hat{\psi}_1 = \bar{X}_a - \tfrac{1}{2}(\bar{X}_b + \bar{X}_c)$$

$$= 59.3 - \tfrac{1}{2}(53.7 + 50.8) = 7.05$$

$$\text{Var}\,\hat{\psi}_1 = \text{MSE} \times \sum \frac{a_k^2}{N_k}$$

(Note: MSE supplied on analysis of variance computer printout.)

$$= 113.15\ (1/47 + 1/47 + 1/41) = 7.81$$

$$F_{c.v.} = F_{(3-1)(135-3)} = F_{(2)(132)} = 3.06$$

$$(\text{Scheffe value})^2 = J_1 F_{j_1 j_2} = 2(3.06) = 6.12$$

$$\text{Critical value} = \sqrt{S^2 \text{var}(\hat{\psi}_1)}$$

$$= \sqrt{(7.81)(6.12)} = 6.91$$

The observed value (7.05) exceeds the calculated value (6.91). Therefore, a significant difference in pretest performance had been found to occur between the group of pharmacists practicing ten years or less and the other groups sampled.

APPENDIX E

EXAMINATION PERFORMANCE

1. Pretest/Posttest Performance on Each Examination Question
2. Comparison of Performance on all Examination Items

1. Which <u>one</u> of the following statements does not conform to the definition of a placebo?

   A. an indifferent substance, in the form of medicine given for the morale or suggestive effect
   B. an innocuous medicine used to please or gratify a patient
   C. an inert compound which is identical in appearance with material being tested in experimental research
   D. the replacement drug for a person on medication which is used to alleviate the allergic reaction caused by the initial drug
   E. a "dummy" dosage form

		POSTTEST					
		A	B	C	(D)	E	Total
	A	0	1	1	2	0	4
	B	0	0	1	1	0	2
PRETEST	C	0	1	1	4	1	7
	(D)	2	1	1	112	1	117
	E	0	0	0	3	1	4
	Total	2	3	4	122	3	134

2. A control is needed for a study to be conducted on the effectiveness of a narcotic analgesic drug. Which <u>one</u> of the following substances should be used to serve as the control substance?

A. aspirin
B. 1/100 of the usual dose of Morphine
C. a narcotic antagonist such as Nalorphine
D. lactose
E. lactose with a trace amount of Quinine added

		POSTTEST					
		A	B	C	(D)	E	Total
	A	10	1	0	15	3	29
	B	0	8	1	7	0	16
PRETEST	C	0	1	0	4	0	5
	(D)	4	1	1	61	4	71
	E	0	1	0	5	7	13
	Total	14	12	2	92	14	134

3. An individual was asked, "How do you feel today?" The response was, "I have a skin rash, a slight fever, no appetite and I am sick to my stomach." From the information given it is most likely that the individual is:

A. exhibiting a reaction to a drug
B. exhibiting a physiological action to a placebo
C. ill
D. allergic to something
E. masquerading an illness

		POSTTEST					
		A	B	(C)	D	E	Total
	A	15	3	5	4	1	28
	B	0	2	1	0	0	3
PRETEST	(C)	7	3	56	6	2	74
	D	5	1	7	12	0	25
	E	1	0	1	0	2	4
	Total	28	9	70	22	5	134

4. In the planning of a clinical drug trial, which one of the following deserves the least consideration?

A. the need for controls
B. crossover design
C. the use of a placebo
D. review of the previous animal work
E. triple blind protocol

		POSTTEST					
		A	B	C	D	(E)	Total
	A	0	0	1	1	1	3
	B	0	5	0	12	29	46
PRETEST	C	0	2	1	5	9	17
	D	0	1	0	14	16	31
	(E)	0	1	0	6	30	37
	Total	0	9	2	38	85	134

5. Of those listed, the most dangerous type of adverse reaction to the administration of penicillin is:

A. a skin rash
B. nausea and vomiting
C. fever
D. edema of the larynx
E. hives

		POSTTEST					
		A	B	C	(D)	E	Total
	A	0	0	0	4	0	4
	B	0	1	0	3	0	4
PRETEST	C	0	0	0	2	0	2
	(D)	0	0	0	122	0	122
	E	0	0	0	2	0	2
Total		0	1	0	133	0	134

6. Among the various types of antibiotics available today, the most important shortcoming, of those listed, is the relative

A. lack of agents for the cure of gonorrhea
B. lack of agents for topical use
C. lack of agents for resistant staphylococcal infections
D. lack of agents for serious gram positive infections
E. lack of agents for serious gram negative infections

		POSTTEST					
		A	B	C	D	(E)	Total
	A	2	0	2	1	0	5
	B	0	6	3	0	4	13
PRETEST	C	6	3	47	3	24	83
	D	0	0	2	1	1	4
	(E)	1	0	6	0	22	29
Total		9	9	60	5	51	134

7. Diagnosis is important before prescribing psychotherapeutic drugs. For example, it is true that:

A. specific drugs for tension headaches are available
B. anorexia (loss of appetite) is easily treated with a specific class of drugs
C. minor tranquilizers are <u>not</u> employed for anxiety states
D. antipsychotic drugs are <u>not</u> used for simple depression
E. neurotic symptoms related to breathing require respiratory-stimulating drugs

		POSTTEST					
		A	B	C	(D)	E	Total
	A	5	2	3	12	7	29
	B	1	2	0	8	2	13
PRETEST	C	0	0	2	2	1	5
	(D)	10	2	2	53	6	73
	E	1	2	0	9	2	14
	Total	17	8	7	84	18	134

8. All <u>except</u> which <u>one</u> of the following seem to be "allergic type" reactions to the phenothiazines?

A. the occurrence of unexpected seizures
B. decrease in the white blood count (leukopenia)
C. hyperpigmentation of the skin
D. sensitivity to sunlight
E. liver disease with jaundice

		POSTTEST				
	(A)	B	C	D	E	Total
(A)	41	5	2	0	4	51
B	16	2	1	0	3	21
PRETEST C	11	4	4	0	1	20
D	6	1	0	1	3	11
E	16	6	1	3	3	29
Total	88	18	8	4	14	134

9. The mono-amineoxidase inhibitors are less useful as anti-depressants than the tricyclics because:

A. they are less potent (larger doses needed)
B. their action is too specific
C. they appear to enhance norepinephrine activity at certain synapses in the brain
D. their use prevents any blood pressure-increasing action of drugs such as norepinephrine
E. they are generally less safe

		POSTTEST					
		A	B	C	D	(E)	Total
	A	0	0	1	1	4	6
	B	0	0	0	1	4	5
PRETEST	C	0	1	3	0	11	15
	D	0	0	3	2	10	15
	(E)	1	1	1	1	89	93
	Total	1	2	8	5	118	134

10. The post-ganglionic sympathetic nerve is a site of action of all except which one of the following anti-hypertensive drugs?

A. Rauwolfia alkaloids
B. Reserpine (Serpasil)
C. Guanethidine (Ismelin)
D. Methyldopa (Aldomet)
E. Veratrum alkaloids

		POSTTEST					
		A	B	C	D	(E)	Total
	A	1	0	0	0	4	5
	B	0	0	0	0	1	1
PRETEST	C	1	0	3	1	21	26
	D	2	0	0	1	47	50
	(E)	1	0	1	3	47	52
	Total	5	0	4	5	120	134

11. The <u>major</u> integrative site in the nervous system where the nerve impulses controlling the blood pressure originates is:

A. the vasomotor center of the medulla
B. the cerebral cortex
C. carotid sinus nerves
D. spinal cord
E. the sympathetic ganglia

		POSTTEST					
		(A)	B	C	D	E	Total
	(A)	29	3	3	0	8	43
	B	17	2	0	0	1	20
PRETEST	C	10	2	2	0	7	21
	D	0	1	0	0	0	1
	E	26	6	1	1	15	49
	Total	82	14	6	1	31	134

12. The first drug usually employed in the beginning treatment of mild hypertension is:

A. Guanethidine
B. Hydralazine
C. a thiazide diuretic
D. Diazoxide
E. Methyldopa

		POSTTEST					
		A	B	(C)	D	E	Total
	A	0	0	0	0	0	0
	B	0	0	1	0	0	1
PRETEST	(C)	1	0	126	0	0	127
	D	0	0	2	0	0	2
	E	0	0	4	0	0	4
Total		1	0	133	0	0	134

13. In the use of the "saliva test" for digitalis toxicity, the measurement of both potassium and calcium is superior to the measurement of potassium alone for the reason that:

A. digitalis in the saliva interferes with potassium estimation
B. there is no need for potassium supplementation in the diet
C. the presence of calcium during the measurement of potassium, stabilizes the potassium
D. the range of variation when both are measured and their product calculated is less than when potassium alone is measured
E. the measurement of calcium in addition to potassium cancels out the effect of any diuretic which the patient may be taking in addition to digitalis

		POSTTEST					
		A	B	C	(D)	E	Total
	A	0	0	1	3	5	9
	B	0	0	0	5	1	6
PRETEST	C	0	0	2	11	2	15
	(D)	1	0	0	39	12	52
	E	3	1	2	25	21	52
Total		4	1	5	83	41	134

14. When research on the pituitary gland leads to the isolation of highly purified gonadotropins, which of the following approaches would be most logical in developing a contraceptive technique for males?

A. develop a method for inhibiting LH production
B. develop a method for enhancing FSH production
C. develop a method for selectively inhibiting FSH production
D. develop a method for selectively enhancing LH production
E. develop a method for enhancing both FSH and LH production

		POSTTEST					
		A	B	(C)	D	E	Total
	A	4	1	24	0	2	31
	B	2	1	5	0	0	8
PRETEST	(C)	5	0	54	1	0	60
	D	1	0	16	0	0	17
	E	2	1	14	0	1	18
	Total	14	3	113	1	3	134

15. When a physician elects to start a patient on oral contraceptive drugs, the <u>least</u> important part of his work-up would be:

A. a pelvic examination
B. a history of past illnesses
C. routine blood and urine examination
D. a breast examination
E. a PAP smear

		POSTTEST					
		A	B	(C)	D	E	Total
	A	3	2	21	2	0	28
	B	0	3	15	0	0	18
PRETEST	(C)	2	5	71	1	0	79
	D	0	1	4	0	0	5
	E	0	1	3	0	0	4
	Total	5	12	114	3	0	134

16. Of the following reported side effects of oral contraceptives, the <u>least</u> important one from the point of view of morbidity and mortality is:

A. vaginal spotting
B. severe leg pain
C. severe chest pain
D. hemoptysis (coughing of blood)
E. blurred vision

		POSTTEST					
		(A)	B	C	D	E	Total
PRETEST	(A)	99	0	0	0	4	103
	B	3	1	0	0	1	5
	C	1	0	0	1	0	2
	D	2	0	0	0	0	2
	E	20	0	0	0	2	22
	Total	125	1	0	1	7	134

17. Of the following reported side effects of oral contraceptives, the one which is well below the 5% level in incidence is:

A. change in the volume of menstrual flow
B. acne
C. weight gain
D. headache
E. dysmenorrhea (painful menses)

		POSTTEST					
		A	B	C	D	E	Total
PRETEST	A	0	(7)	0	0	1	8
	(B)	0	56	1	2	1	60
	C	0	6	0	0	0	6
	D	0	6	0	0	0	6
	E	0	52	1	0	1	54
	Total	0	127	2	2	3	134

18. The term kaliuresis refers to:

A. the presence of hydrogen ions in the tubular urine
B. a decrease in the amount of sodium excreted in urine
C. an increase in the potassium excreted in the urine
D. any change from normal in the composition of the urine
E. the presence of uric acid in the urine

		POSTTEST					
		A	B	(C)	D	E	Total
	A	0	0	0	0	0	0
	B	0	0	0	0	0	0
PRETEST	(C)	0	0	127	0	0	127
	D	0	1	4	0	0	5
	E	0	0	2	0	0	2
	Total	0	1	133	0	0	134

19. To calculate a urinary clearance for a substance excreted into the urine one needs to know all except which <u>one</u> of the following:

A. the volume of the urine sample being measured
B. the specific gravity of the urine sample being measured
C. the amount of the substance found in the urine sample
D. the rate at which the urine sample was formed
E. the concentration of the substance in the blood

		POSTTEST					
		A	(B)	C	D	E	Total
	A	1	11	0	1	0	13
	(B)	1	55	0	0	0	56
PRETEST	C	0	2	0	0	0	2
	D	2	36	1	0	0	39
	E	0	22	0	1	1	24
	Total	4	126	1	2	1	134

20. Of the volume of urine which is filtered by the kidney, the usual volume which eventually finds its way into the bladder represents:

A. 10%
B. almost 100%
C. close to 70%
D. 30%
E. about 1%

		POSTTEST					
		A	B	C	D	(E)	Total
	A	3	0	0	0	11	14
	B	2	5	1	4	33	45
PRETEST	C	2	1	3	4	31	41
	D	0	0	0	0	13	13
	(E)	0	1	0	0	20	21
	Total	7	7	4	8	108	134

21. Carbonic anhydrase inhibitors which act as diuretics will be expected to:

A. affect the volume of blood filtered by the kidney
B. increase hydrogen ion secretion by the tubules
C. not change hydrogen ion secretion by the tubule
D. increase sodium reabsorption by the tubule
E. increase the excretion of bicarbonate ions in the urine

		POSTTEST					
		A	B	C	D	(E)	Total
	A	1	3	1	3	6	14
	B	2	3	4	6	11	26
PRETEST	C	1	0	5	4	4	14
	D	3	2	6	4	5	20
	(E)	2	7	12	4	35	60
Total		9	15	28	21	61	134

22. Iatrogenic disease refers to:

A. a specific disease produced by certain genera of bacteria
B. a disease produced by a toxin in food
C. a disease which is in the patient's mind and not organic
D. a lethal disease for which there is no known cure
E. a disease related to the prescribing of medicines by the physician

		POSTTEST					
		A	B	C	D	(E)	Total
	A	0	0	0	0	26	26
	B	1	0	0	0	8	9
PRETEST	C	0	0	3	0	26	29
	D	1	0	0	0	5	6
	(E)	0	0	0	0	64	64
Total		2	0	3	0	129	134

23. The great virtue of Homeopathy as a system of therapeutics was that few individuals were poisoned. This was due to:

A. the small number of different drugs employed
B. the minor use of drug combinations
C. the exceedingly low concentrations of drugs used
D. the use of specific drugs only
E. the short term use of drugs

		POSTTEST					
		A	B	(C)	D	E	Total
	A	3	0	8	0	0	11
	B	0	0	3	0	0	3
PRETEST	(C)	1	0	107	0	0	108
	D	1	0	7	1	0	9
	E	0	0	3	0	0	3
	Total	5	0	128	1	0	134

24. Krebiozen and Thalidomide are:

A. examples of drug problems handled by the FDA
B. examples of anticancer drugs
C. drugs for which the FDA is reviewing new drug applications
D. creatine derivatives
E. drugs which will be shortly available on prescription

		POSTTEST					
		(A)	B	C	D	E	Total
	(A)	113	1	1	2	0	117
	B	5	1	0	0	0	6
PRETEST	C	6	0	1	0	0	7
	D	3	0	0	1	0	4
	E	0	0	0	0	0	0
	Total	127	2	2	3	0	134

25. A quasi-therapeutic nihilist is <u>best</u> described as:

A. an "omnia in omnes" personality
B. a drug misuser
C. a Russian propaganda purveyor
D. a person who is quite exacting about the indications for the use of drugs in therapeutic situations
E. a person who never uses drugs as therapeutic devices

		POSTTEST					
		A	B	C	(D)	E	Total
	A	2	0	0	10	2	14
	B	2	1	0	20	1	24
PRETEST	C	0	0	0	2	1	3
	(D)	1	1	0	25	4	31
	E	5	4	0	46	7	62
	Total	10	6	0	103	15	134

RANKING OF EXAMINATION QUESTIONS BY PERCENT CORRECT ANSWERS AND PERCENT GAIN IN CORRECT ANSWERS

PRETEST		POSTTEST		GAIN	
Number	% Correct	Number	% Correct	Number	% Gain
12	94.8	12	99.3	20	64.9
18	94.8	18	99.3	25	53.8
5	91.0	5	99.3	19	52.2
1	87.3	22	96.3	10	50.8
24	87.3	23	95.5	17	50.0
23	80.6	24	94.8	22	48.5
16	76.9	17	94.8	14	39.5
9	69.4	19	94.0	4	35.8
15	59.0	16	93.3	11	29.1
3	55.2	1	91.0	8	28.1
7	54.5	10	89.6	15	26.1
2	53.0	9	88.1	13	23.1
22	47.8	15	85.1	9	18.7
21	44.8	14	84.3	6	16.5
17	44.8	20	80.6	16	16.4
14	44.8	25	76.9	2	15.7
19	41.8	2	68.7	23	14.9
10	38.8	8	66.7	5	8.3
13	38.8	4	63.4	7	8.2
8	38.6	7	62.7	24	7.5
11	32.1	13	61.9	12	4.5
4	27.6	11	61.2	18	4.5
25	23.1	3	52.2	1	2.7
6	21.6	21	45.5	21	0.7
20	15.7	6	38.1	3	-3.0

APPENDIX F

FINAL EXAMINATION RETURN REQUEST POSTCARD

School of Pharmacy, University of Wisconsin, Madison, WI.

June ___, 1973

Dear Pharmacist ____(Last Name)____,

I have not yet received your completed final exam and evaluation form for the cassette lecture course, Selected Topics in Pharmacology. I appreciate your busy schedule but ask that you try to return the completed forms before June ___ if at all possible. I wish to complete the evaluation of this project. Your evaluation is important to me. I hope you can assist me in this matter.

Thank you for your cooperation and participation. I look forward to receiving your evaluation and comments.

Sincerely,

Jerome W. Blank, R.Ph.
Project Director

APPENDIX G

LETTER OF NOTIFICATION OF PERFORMANCE

UWEX UNIVERSITY OF WISCONSIN–EXTENSION

PHARMACY BUILDING 425 N. CHARTER STREET MADISON, WISCONSIN 53706 PHONE 262-3130 (AREA CODE 608)

EXTENSION SERVICES IN PHARMACY

July 16, 1973

Congratulations on your satisfactory completion of the seven-hour cassette lecture course SELECTED TOPICS IN PHARMACOLOGY.

Your grade on the final examination was XX percent which entitles you to 14 continuing education hours (C.E.H.'s).

If you need certification of your participation in this continuing education course at any time in the future, please fill out the enclosed form and return to us.

Sincerely,

Jerome W. Blank

Jerome W. Blank
Project Director

JWB:bh
Enc: