Assessment of Pharmacy Graduates' Educational Outcomes[1]

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The purpose of this project was to develop a model for a self-reported assessment of achievement of educational outcomes identified in AACP's Background Paper II. The following areas were addressed: (*i*) preparation for demonstrating 10 occupational skills; (ii) preparation/encouragement to acquire 30 educational outcomes; and (iii) identification of differences in occupational skills or educational outcomes when analyzed by year of graduation and entry-level degree. A seven-page questionnaire was mailed to 770 potential respondents from five entire graduating classes for one school of pharmacy (Purdue University). A response rate of 66.3 percent was obtained. Preparation for most occupational skills and educational outcomes was rated above the 1-4 scale midpoint. In general, more recent graduates and those with a BS degree (vs. PharmD) provided higher item ratings. This assessment of students' outcomes has provided baseline information for the future refinement of the School's educational programs. This approach can serve as a model for other schools' assessment programs.

INTRODUCTION

The assessment of students' educational outcomes is an essential part of any school of pharmacy's evaluation program. Relating assessment to well-defined curricular outcomes is one of the issues currently being addressed by the American Association of Colleges of Pharmacy (AACP). The American Association of Colleges of Pharmacy Commission to Implement Change in Pharmaceutical Education developed a series of papers which provide definitive recommendations "to assist pharmaceutical education strategic planning activities (1)." One component of the Commission's efforts, Background Paper II, specifies examples of general and professional curricular outcomes necessary for pharmacy graduates to be effective in providing pharmaceutical care. These outcomes are based, in part, on the principles of liberal or humanist education. It is suggested that basic liberal education principles be included in professional curricula to help assure that pharmacy graduates are prepared to become "educated citizens and contributors to the community in broad ways (1)."

Information is lacking on the degree to which pharmaceutical education enables students to develop the knowledge, skills, perspectives, and habits which are necessary for students to become effective professionals. Pharmacists' self-evaluation of learned concepts and skills as they relate to their daily practice is fundamental for the development of curricula that are responsive to practitioners' needs. This paper is based on the premise that graduates of an educational program are reasonably good judges of the extent to which their program prepared them with particular occupational skills and encouraged or developed within them broad educational outcomes. As Rupp noted, "only in retrospect, as practitioners who are daily faced with the demands of their chosen practice, are they able to identify the strengths and weaknesses of their professional preparation(2). "This study was designed to develop a model for a baseline assessment of achievement of educational outcomes identified in Background Paper II by surveying graduates of a single program. It is believed this model approach would provide useful data and be applicable for any school of pharmacy implementing the recommendations of Background Paper II.

Educational Outcome Focus Development

The Argus Commission was established in 1978 to analyze, evaluate, and bring to attention issues of relevance to the American Association of Colleges of Pharmacy (AACP). The 1988 Argus Commission Report centers on "the problem of assessment and its relationship to the current status of pharmacy education(3)." It recommended the study of outcome measures that evaluate factors pertinent to graduates' proficiency as professionals and citizens, and the creation of a recommended assessment approach for use by the schools of pharmacy.

In its report for 1988-1989, AACP's Academic Affairs Committee urged its membership to "a long-term commitment for the renewal of pharmacy education (4)." Again, outcome abilities indicative of a well-educated professional, and the assessment of students' progress and curriculum effectiveness were key concerns.

The Argus Commission and AACP's Academic Affairs Committee laid the groundwork for AACP's recommendations issued by the Commission to Implement Change in Pharmaceutical Education. This Commission was appointed in July, 1989 with the task of developing recommendations to guide the future of pharmaceutical education. These recommendations are contained in a series of background papers which have been endorsed for implementation by AACP member schools. The Commission expects these papers will be used by schools and colleges of pharmacy as an aid "in evaluating and refining existing educational efforts and in designing and implementing new educational endeavors (5)."

Background Paper I described the missions for the profession of pharmacy, pharmacy practice and pharmaceutical education (5). Pharmacy practice's stated mission is that of delivering pharmaceutical care. This involves promoting the rational use of drugs by practitioners engaging in several functions and responsibilities aimed at improving the patient's therapeutic outcome. The mission of pharmaceutical education is "preparing students to enter into the practice of pharmacy and to function as professionals and informed citizens in a changing health care system (5)."

Background Paper II identified curricular outcomes and curricular content essential to pharmacy professional education. The curricular outcomes include practice functions and educational outcomes or competencies. Practice functions are entry-level skills "that comprise pharmaceutical care which practitioners must be able to perform regardless of their practice environment(1)." These practice functions represent the same functions and responsibilities mentioned in Background Paper I as components of the mission of pharmacy practice. The two types of outcomes are: (*i*) general outcomes that any professional person should have, and, (*ii*) professional outcomes inherent to pharmacy practice(1). These outcomes are expected to provide pharmacy students with "a relevant knowledge base, skills, attitudes, ethics and values" that will ensure the performance of all practice functions contained in the definition of pharmaceutical care(1).

AACP has adopted both Background Papers I and II, confirming the curricular outcomes, competencies, and educational processes necessary to educate pharmacy students(6). Another initiative from AACP designed to begin to operationalize recommendations of Background Paper II was the creation in 1990 of the Focus Group on the Liberalization of the Professional Curriculum. This Focus Group flowed from the previously mentioned recommendation of the AACP 1988-1989 Academic Affairs Committee. Its first report had the purpose of providing a "coordinated set of ideas and examples to illustrate the benefits which can be derived from an ability-based curricular plan (7)." This document used Background Papers I and II as its framework. It suggests the creation of revised curricular plans based on effective approaches in place in several institutions for providing the curriculum with an outcome-based character. Examples from a variety of curricular areas were provided in the report to serve as a resource of strategies relating "outcome goals with instructional strategies and methods of performance assessment (7)." The Focus Group recently developed a second report that deals with assessment of the student development of the outcome abilities (8).

Curricular Assessment Studies

Studies of pharmacists' opinions on their education are not new. Recent studies that exemplify curricula evaluation by practicing pharmacists are only applicable to certain areas of undergraduate education (2, 8-12). The concept of "outcome" as defined by AACP Background Paper II is not explicit in these studies, even though it is alluded to. These studies suggest a need for additional research focused explicitly on outcome assessment.

An attempt to define educational outcomes was performed by the Pew Health Professions Commission. This group was founded to conduct research on the "desired educational outcomes for all health professional schools" based on health care needs' projections for the year 2005(14).

A national telephone poll of practicing dentists, nurses, pharmacists, physicians, and veterinarians was conducted during the Spring of 1991. The skills and competencies derived were similar to those included in AACP's Background Paper II, suggesting the Commission's recommendations are in accord with those of the national educational outcome movement.

The value of past empirical studies on the assessment of educational outcomes as they are viewed today is somewhat limited. It is reasonable to suggest that a study should be developed to deal with outcomes using a measurement method consistent with existing recommendations. This study may be viewed as a model for additional efforts in the area of outcome assessment.

OBJECTIVES

This study addresses the following questions:

1. What level of preparation do graduates believe their entry-level pharmacy education provided with respect to the ability to demonstrate selected occupational skills?
2. What level of preparation or encouragement do graduates believe their entry-level education provided them with respect to the acquisition of selected educational outcomes?
3. Are there significant differences among pharmacy graduates in level of preparation/encouragement to acquire selected outcomes, or perform occupational skills provided by entry-level education among pharmacy graduates when analyzed by year of graduation and entry-level degree?

METHODS

A sample of graduating classes from Purdue University comprised the population for this study. This institution has both Baccalaureate and Doctor of Pharmacy Programs. All 1978, 1982, 1986, 1988, and 1990 graduates were surveyed (N=770). These classes were selected because they provide a cross section of relatively recent graduates who would have been exposed to the evolving educational philosophy embodied in Background Paper II. A seven-page questionnaire was developed as the basis for collecting project data. The practice functions and curricular outcomes suggested by AACP's Commission to Implement Change in Pharmacy Education constituted the conceptual framework for developing the survey instrument. The questionnaire collected information on individual personal background, professional education, current professional practice, their general preparation, occupational skills, and educational outcomes.

Occupational skills were defined as "entry-level practice functions that comprise pharmaceutical care which practitioners must be able to perform regardless of their practice environment(1)." The ten practice functions listed by Background Paper II were rewritten as 10 one-sentence items for inclusion in the survey. In the survey, respondents were asked to respond using a four-point scale (4 = excellent to 1 = poor) to the following question for each item: "Please indicate the level of preparation to perform this activity provided by your entry-level pharmacy education."

To identify educational outcomes the institution's goal statements were compared against a "standard outcomes taxonomy," to reveal which broad outcomes were consid-

ered the most important by the School(15). A chart was created with the school's educational goals listed on its left side, and a generic set of outcome variables selected from the available literature displayed across the top. Check marks were made to indicate points at which the school's goals matched the standard outcomes list. This exercise revealed the broader dimensions that were considered most important by the school. These six outcome dimensions were: Critical Thinking Abilities, Communications, Leadership, Continued Learning, Professional Ethics, and Professional Identity. Definitions used for the outcome dimensions (Appendix A) are adapted from the report of the Professional Preparation Network and Background Paper 11(1, 16). Items were created by the authors to reflect the essence of each of these dimensions. Four to six items were developed for each dimension. The outline for Curricular Outcomes in Background Paper II was followed for construction of item wording. All items were reviewed by members of the School's Problem Solving Task Force and Curriculum Committee for consistency with the School's outcome goals. The items comprising each of the six outcome dimensions were analyzed for internal consistency as part of the subsequent survey process.

Survey respondents were asked to rate each outcome on a four-point scale with anchors ranging from 4=excellent to 1=poor in response to the question "Please circle the response that best represents the level of preparation or encouragement related to these outcomes provided by your entry-level pharmacy education." A survey pretest using 100 graduates from the class of 1984 was conducted. Responses from 36 individuals resulted in minor modifications of the wording of the outcome items. Thirty items representing the six previously identified broad outcome dimensions were included in the final instrument.

Questionnaires with cover letters were mailed to the study population in March. 1992. The cover letter explained the purpose of the survey and assured the respondent of confidentiality. A response bias assessment was performed comparing respondents and nonrespondents on gender, year of graduation, state in which the graduate was currently practicing and entry-level degree. No significant differences (Chi-Square test) were found on any of these variables. This finding suggests that the ability to generalize the results of the study was not limited to those who participated in the survey.

The completed questionnaires were coded and analyzed using the Statistical Package for the Social Sciences (SPSS-X) program (17). A probability level of $P < 0.05$ was used for all statistical tests. Pearson's Chi Square was used to determine whether the distributions of graduates' ratings of general preparation for outcomes and occupational skills varied when analyzed by year of graduation and entry-level degree.

RESULTS

Seven hundred and seventy questionnaires were sent out. Nine were returned as non-deliverable. The total number of questionnaires received after two follow-up mailings was 514 (67.6 percent). Since the purpose of this study involved assessing the entry-level education received at the institution, those post-BS PharmD graduates who received their entry-level pharmacy degree from other schools were subtracted from the total sample. Therefore, the actual usable

Table I. Individual background characteristics

Variable	Frequency	Percent
Gender (N=505)		
Male	193	38.2
Female	312	61.8
Pharmacy Degree for Practice Entry (N=503)		
BS or BPharm	470	93.4
PharmD	33	6.6
State in which practice (N=450)		
Indiana	261	58.0
Other	189	42.0
Current Practice Site (N=456)		
Chain Pharmacy	170	37.3
Hospital	134	29.4
Industry	42	9.2
Independent	37	8.1
Nursing Home/Long Term Care	18	3.9
Nuclear Pharmacy	14	3.1
Clinic	13	2.9
Education	8	1.8
Government	3	0.7
Mail Service	3	0.7
Health Maintenance Organization	2	0.4
Other	12	2.6
Primary Functional Activity (N=461)		
General Staff	160	34.7
Manager/Director	98	21.3
Assistant/Assoc. Manager/Director	67	14.5
Clinical Staff	62	13.4
Industry	38	8.2
Pharmacy Owner/Partner	10	2.2
Educator	8	1.7
Consultant	5	1.1
Self-employed (not owner)	3	0.7
Government	3	0.7
Other	7	1.5

Year of Pharmacy School Graduation (1st Degree) (N=505)

78	Percent	82	Percent	86	Percent	88	Percent	90	Percent
13	20.4	9	19.6	4	18.6	17	21.2	12	20.2

response rate was 66.3 percent (n=505). Table I presents a summary of the frequencies and percentages for various individual background characteristics. The findings for the research questions were as follows:

The first research question dealt with the perceived level of preparation that graduates believed their entry-level pharmacy education provided with respect to the ability to demonstrate certain occupational skills. Table II provides a response frequency distribution for these skills.

The second research question asked subjects to report the level of preparation or encouragement provided by their entry-level education with respect to the acquisition of selected educational outcomes. Table III indicates that all the educational outcomes assessed appeared to be encouraged by the School but to different degrees.

The last research question dealt with differences in the level of preparation or encouragement provided by entry-level pharmacy education to acquire selected outcomes or perform occupational skills. The objective was to assess

Table II. Perceived preparation on occupational skills[a,b]

Occupational skill	Scale			
	Excellent	Good	Fair	Poor
Dispensing/providing drug products to patients	46.9[c]	47.9	4.4	0.8
Counseling patients on prescription medications	39.8	47.5	11.9	0.8
Preparing medication for patient use	36.6	49.0	12.2	2.4
Determining patient's dose and dosage schedule	29.9	57.0	11.6	1.4
Monitoring patients to prevent adverse reactions	19.8	54.5	22.8	2.8
Monitoring patients to maximize compliance	16.7	55.2	26.2	1.8
Selecting the appropriate dosage form, formulation, administration forspecific drugs	16.3	56.0	25.3	2.4
Monitoring patients' progress	10.6	54.3	31.1	4.0
Participating with MDs in prescribing decisions	12.6	48.9	32.5	6.0
Selecting source of supply for drug	6.0	29.4	42.3	22.2

[a] Question asked was: "Please indicate the level of preparation to perform this activity provided by your entry-level pharmacy education."

[b] Due to missing cases n ranges from 495 to 501.

[c] Percent.

significant differences by year of graduation and entry-level degree.

The analysis by year of graduation showed that preparation for three occupational skills is not independent of year of graduation ($P<0.05$). The proportions of "preparing medication for patient use" showed fewer "excellent" and more "fair" ratings as the year of graduation progressed ($X^2 = 22.36$). In contrast, the skills: "monitoring patients' progress" ($X^2 = 22.06$) and "monitoring patients to prevent adverse reactions" ($X^2 - 22.76$) showed an increasing proportion of "good" and "excellent" preparation ratings moving from 1978 to 1990.

When occupational skills preparation was analyzed by entry-level degree, those with a Bachelor degree tended to rate their preparation higher than those with an entry-level Doctor of Pharmacy degree. Significant differences were observed for three of the ten skills: "preparing medication for patient use" ($X^2 = 20.19$, $P<0.001$)), "dispensing drug products to patients" ($X^2 = 11.87$, $P <0.01$), and "counseling patients on prescription medications" ($X^2 = 10.43$, $P< 0.05$).

When compared by year of graduation significant results generally revealed an increase in the proportion of "good" and "excellent" ratings for the various educational outcomes over time. An improvement in preparation or encouragement related to the Leadership Skills dimension

was indicated by significant differences in the items: "giving pharmacy related presentations" ($X^2 = 21.20$, $P<0.05$.), "contributing to pharmacy" ($X^2 = 24.10$, $P<0.05$), and "assuming a leadership role in society" ($X^2 = 31.79$, $P<0.01$). Finally, the four statements designed to measure Communication Skills were significantly different. They were: "use of listening and speaking skills to convey information" ($X^2 = 23.17$, $P<0.05$), "use of writing skills to convey information" ($X^2 = 27.29$, $P<0.01$), "communicate with patients" ($X^2 = 21.81$, $P<0.05$), and "communicate with physicians and other health care professionals" ($X^2 = 27.23$, $P<0.01$). As with the previous repeated items, the proportion of "good" and "excellent" responses was higher for more recent graduates.

The analysis of preparation or encouragement for the studied educational outcomes by entry-level degree revealed that those with a Doctor of Pharmacy degree rated two Leadership-related items significantly different than BS degree holders. They were: "desire to improve the profession" ($X^2 = 9.36$, $P<0.05$), and "writing articles for newspapers/journals" ($X^2=9.84$, $P<0.05$). PharmD graduates tended to give lower ratings to the former and higher ratings to the latter. Three items on the Motivation for Continued Learning dimension displayed significant differences with higher ratings provided by respondents with a Bachelor of Science in pharmacy: "having a spirit of intellectual inquiry" ($X^2 = 9.92$, $P<0.05$), "positive attitude to change" ($X^2 = 10.97$, $P<0.05$), and "reading health journals" ($X^2 = 12.01$, $P<0.01$). The respondents with a Bachelor of Science in pharmacy also gave a higher proportion of "good" and "excellent" items ratings to all the Professional Ethics indicators, including: "sense of obligation towards patient" ($X^2 = 31.40$, $P<0.00001$), "developing ethical practice standards" ($X^2 = 29.54$, $P< 0001$), "making decisions when values may conflict" ($X^2 = 17.47$, $P<0.001$), "having high everyday practice standards" ($X^2 = 16.44$, $P<0.001$), and "analyze ethics related to practice situations" ($X^2 = 17.44$, $P<0.001$) plus one item for Professional Identity: "understand contemporary issues affecting pharmacy" ($X^2 = 10.23$, $P<0.05$).

DISCUSSION AND CONCLUSION

It appears that all the educational outcomes included in the survey are encouraged by the School, but to various degrees. None of the mean ratings for the educational outcomes was "poor."

There was a tendency for respondents with an entry-level Bachelor's degree to give higher preparation scores than PharmD graduates for those items in which significant differences were found. It is possible that PharmD graduates as did not foresee themselves engaging extensively in these activities and, thus did not focus on them during their education. Or, it may be that PharmDs had higher expectations for their education because they tended to be more academically gifted, and thus gave lower ratings overall. Alternatively, Bachelor's degree students may have perceived greater direct relevance of their education to their entry-level positions and accordingly gave higher preparation scores.

Regarding the perceived preparation or encouragement for the studied educational outcomes, the significant differences between the classes of 1978 and 1990 for all the Communications dimension items confirms an increased stress on communications skills in recent years by pharmacy, in general, and the School, in particular. The fact that the graduates with a PharmD rated their preparation for writing

Table III. Perceived preparation/encouragement on educational outcomes[a,b]

Educational outcome	Scale				Educational outcome	Scale			
	Excellent	Good	Fair	Poor		Excellent	Good	Fair	Poor
Leadership					**Professional Identity**				
Desire to improve the profession	31.0[c]	48.4	16.7	4.0	Consider yourself a health care professional	62.7	32.7	3.4	1.2
Contributing to pharmacy	17.9	50.3	26.0	5.8	Having pride in the profession	56.9	36.6	5.4	1.2
Assuming leadership role in society	16.7	49.0	26.8	7.5	Understand contemporary issues affect pharmacy	24.8	50.2	21.2	3.8.
Giving pharmacy related presentations	12.5	39.0	33.8	14.7	Belong to professional organizations	18.3	40.9	32.3	8.5
Holding office in professional organizations	5.4	33.3	43.0	18.3	Attend local, state, national professional meetings	8.4	43.0	37.8	10.8
					Communications				
Writing articles for newspapers/journals	5.0	25.7	44.4	24.9	Communicate with patients	28.9	50.2	18.3	2.6
Motivation for Continued Learning									
Learn independently	39.3	50.6	7.9	2.2	Communicate with MDs/ other HC professionals	20.5	47.7	24.7	7.2
Having a spirit of intellectual inquiry	33.0	50.7	14.3	2.0	Listening and speaking skills to convey information	20.4	42.5	26.0	11.1
Positive attitude to change	32.9	48.8	14.7	3.6	Writing skills to convey information	12.1	38.2	34.2	15.5
Read health journals	29.0	49.0	17.7	4.4	**Thinking Abilities**				
Abilities encouraging postgraduate learning	27.2	50.5	18.9	3.4	Examining issues rationally & logically	21.7	55.2	20.7	2.4
Professional Ethics					Find, evaluate &. interpret literature	25.6	49.2	18.7	6.5
Developing ethical practice standards	60.9	32.1	5.0	2.0					
Sense of obligation towards patient	52.6	40.1	6.0	1.4	Have an analytical attitude	19.6	52.0	25.4	3.0
Having high everyday practice standards	50.8	41.3	6.7	1.2	Make decisions in both familiar and unfamiliar circumstances	17.5	52.2	27.2	3.2
Analyze ethics related to practice situations	31.2	47.6	17.5	3.8	Understand and ability to apply statistics	8.7	31.5	34.1	25.6
Make decisions when values may conflict	22.6	44.4	24.6	8.3					

[a] Question was: "Please circle the response that best represents the level of preparation/encouragement related to these outcomes provided by your entry-level pharmacy education."

[b] Due to missing cases n ranges from 502 to 504.

[c] Percent.

articles for journals higher may be explained in that this activity is likely a part of most PharmDs' duties along with the increased likelihood that this competency was stressed in their educational preparation.

The results are in accord with a greater recent emphasis in the outcome dimensions of Professional Ethics, Leadership, and Continued Learning in the BS pharmacy curriculum. It is possible that PharmD graduates sense an increased complexity in these areas for their practices, and thus conclude they should have had additional preparation resulting in lower item ratings.

Any survey project suffers from a standard set of limitations. Because of the problems associated with retrospective recall of educational experiences, it is necessary to interpret these data with caution. Similarly, the small number of PharmD graduates in the sample results in potentially fragile comparisons. The potential for subjects to provide "socially desirable" evaluations of their degree-granting

institution also have to be considered. However, it is believed the findings as presented do provide valuable information for current use and future comparisons. The results of this study provide a snapshot of graduates" perceptions of the extent to which they achieved as students adequate preparation or encouragement related to practice skills and certain educational outcomes. Even though these surveyed graduates did not experience the focus on broader educational outcomes as is becoming evident today, it is believed that the competencies addressed by the Commission to Implement Change in Pharmaceutical Education have been an important implied component of pharmaceutical education in recent years.

The results of this study suggest there has been an evolution within pharmacy practice, and within graduates of Purdue University. Other schools might benefit from assessing their graduates' educational outcomes. The approach to such an assessment must be evaluated in the context of the school's overall educational goals. Then, assessment initiatives can be implemented that are compatible with the school's goals. The overall focus of these activities should be to interrelate educational strategies with student and program assessment systems.

There is no doubt that further research is needed in the area of educational outcomes. This study has provided a model approach for assessing the extent to which program graduates perceive that the educational outcomes identified in Background Paper II are being addressed. Various activities that will improve this approach to the assessment of educational outcomes are:

1. Develop standardized scales for each general outcome dimension to be appraised. Create an adequate number of items to capture the several different dimension of each outcome. Use the scales repeatedly to corroborate their reliability.
2. Conduct studies to collect baseline and continuing data on students' perceptions of their educational program as they move through the professional curriculum.
3. Continue periodic surveys of graduate classes to monitor changes in their assessment of their educational outcomes.

References

(1) Commission to Implement Change in Pharmaceutical Education, "Background Paper II: Entry-level, curricular outcomes, curricular content and educational processes," *Am. J. Pharm. Educ.,* **57**, 377-385(1993).
(2) Rupp, M.T. and Szkuldlarek, B.A., "Perceived needs of recent graduates for marketing-related knowledge and skills: Implications for pharmacy education," *ibid.,* **55**, 6-12(1991).
(3) Chalmers, R.K., Gagnon. J.P., Gibson, R.D., Schumacher, G.E. and Zografi, "Assessing the outcomes of pharmacy education. The 1988 Argus Commission Report," *ibid.,* **52**, 405-408(1988).
(4) Bloedow, D.C., Chalmers. R.K., Cohen, J.L., Crimson, M.L., Perrier, D.G., Reuning, R.H. and Trinca. C.E., "An agenda for pharmacy education renewal," Report of the 1988-1989 Academic Affairs Com mittee, *ibid.,* **53**, 407-413(1989).
(5) Commission to Implement Change in Pharmaceutical Education, "Background Paper I: What is the mission of pharmaceutical education?." *ibid.,* **57**, 374-376(1993).
(6) Commission, to Implement Change in Pharmaceutical Education, "Entry-level education in pharmacy: A commitment to change." *ibid.,* **57**, 366-373(1993).
(7) Chalmers. R.K., Grotpeter. J.J., Hollenbeck, R.G., Nickman, N.A., Wincor. M.Z., Loacker, G. and Meyer. S.M., "Ability-based outcome goals for the professional curriculum: A report of the Focus Group on the Liberalization of the Professional Curriculum," *ibid.,* **56,** 304-309 (1992).
(8) Chalmers. R.K., Grotpeter, J.J., Hollenbeck, R.G., Nickman. N.A., Sommi. R.W., Zlatic,T.D., Loacker. G., and Meyer, S.M., "Changing to an outcome-based, assessment guided curriculum: A report of the Focus Group on the Liberalization of the Professional Curriculum." *ibid.,* **58,** 108-115(1994).
(9) Carroll, N.V., Gary, W. and Beaman. M.A., "Practice patterns of Doctor of Pharmacy graduates: Educational implications." *ibid.,***48***,* 125-130(1984).
(10) Coons. S.J., Smith, H.A. and McQuinn, L., "Hospital pharmacists' perceptions of pharmacy practice and education." *Hospital Pharmacy Times,* 4-8 (December 1991).
(11) Vinas. S.M., "Survey of Purdue University Doctor of Pharmacy Graduates and Students." Masters thesis. Purdue University. West Lafayette IN (1990).
(12) Cureton, G.L. and Jay. E.D., *Final Report-An Assessment of Future Educational Needs for Community Pharmacists,* SRI International. Menlo Park CA (1990).
(13) Muzzin. L.J. and Hornosty. R.W., "Assessments of the value of eighty years of formal and practical pharmacy education in Ontario, Canada." *Am. J. Pharm. Educ.,* **57**, 319-325(1993).
(14) Shugars. D.A., O'Neil, E.H. and Bader. J.D., *Survey of Practitioners Perceptions on their Education.* The Pew Health Professions Commission. Durham NC (1991) p. 3.
(15) Ewell, P.T. and Lisensky, R.P., *Assessing Institutional Effectiveness, Redirecting the Self Study Process.* Consortium for the Advancement of Higher Education. Washington DC (1988).
(16) Stark. J.S. and Lowther, M.A., *Strengthening the Ties that Bind-Integrating Undergraduate Liberal and Professional Study.* Report of the Professional Preparation Network. The University of Michigan, Ann Arbor MI (1988) pp. 23-25.
(17) *Statistical Package for the Social Sciences,* SPSS Inc., Chicago IL (1990).

APPENDIX A. DEFINITIONS

Thinking abilities include logical thinking, analytical thinking, problem solving and decision-making. These are abilities that enable the individual to acquire, evaluate, and synthesize information and knowledge to make decisions in any type of circumstances.

Communications competence is the ability to read, write, speak and listen; and use these processes effectively to acquire, develop, and convey ideas and information.

Leadership is the capacity to contribute as a productive member of the profession and to assume direction roles as appropriate in the profession and society.

Motivation for continued learning is the process of continuously exploring and expanding personal, civic and professional knowledge and skills throughout a lifetime.

Professional ethics involves the understanding and acceptance of professional mores as standards that guide professional behavior.

Professional identity is defined as the acknowledgment and concern for improving the knowledge, skills and values of the profession.