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Development of an Educational Assessment Plan for Doctor of Pharmacy Programs

Eric G. Boyce

The assessment of academic and student services is becoming an essential component in higher education. Program assessment is a method to collect, disseminate and use data in order to improve the academic program and the students’ experiences while enrolled in that program. A program assessment plan for doctor of pharmacy programs is now part of the accreditation standards from the American Council on Pharmaceutical Education. The organization of an assessment plan includes leadership from college/school administration and faculty, plus participation from administrators, faculty, students, alumni, employers and possibly others. The development of an assessment plan includes designing prospective activities to determine what to assess, methods to perform the assessment, collection and dissemination of assessment data, data analysis, use of the data, and assessment of the assessment plan. Assessment activities should be implemented gradually, with a focus on assessing those factors that are most important, can be readily assessed, and can be useful.

KEY WORDS: pharmacy education, outcomes assessment, program assessment, higher education.

INTRODUCTION

Assessment is becoming increasingly important in higher education as a means of enhancing student learning and experiences. Although many universities and colleges had previously implemented assessment activities, institution-wide assessment gained national prominence and momentum in the mid 1980s. Accrediting agencies have recognized the worth of accreditation and now have standards that outline the need for the development and use of program assessment. The six regional accrediting agencies, which accredit entire universities and colleges, have each created standards that outline the need for the development of an institution-wide assessment program and the use of assessment data in making decisions. Specialized accrediting agencies for specific programs, such as the American Council on Pharmaceutical Education that accredits the Doctor of Pharmacy programs, have also created standards that outline the need for the collection and use of program assessment data. This article is intended to create a common language in assessment and then overview the components of program assessment with a focus on Doctor of Pharmacy programs. Colleges and schools of pharmacy are already collecting and using a variety of assessment data, and may only need to enhance the organization and scope of their efforts. A more detailed overview of program assessment for doctor of pharmacy programs can be found in recently created documents.

DEFINITION OF TERMS

It is important to create a common level of understanding of terms, since many of the
terms used in assessment are new or have multiple meanings. These terms include: assessment and evaluation, program assessment and student assessment, formative data and summative data, direct measures and indirect measures, and demographic data. There are numerous other terms, but these serve as a fundamental starting ground.

For the purposes of this article, assessment will be used as the collection and use of data for the purpose of improvement. Evaluation will be used as the collection and use of data for the purpose of determining a grade or making a decision. However, these terms have been used interchangeably in the assessment literature, particularly on the international scene. Outcomes assessment is essentially the same as assessment, but may put more emphasis on assessing the outcome of a program rather than on how that outcome is developed.

**Program assessment data include statistical descriptions of student performance or opinions such as the data mean, median, mode, etc.**

Student assessment is the collection and use of data for individual student development and improvement. Data for each student is collected and provided back to the student, with suggestions for improvement. However, program assessment includes the collection and aggregation of student and other assessment data. Individual students should not be easily identified in program assessment data. Program assessment data include statistical descriptions of student performance or opinions such as the data mean, median, mode, standard deviation, range, etc.

Formative assessment data are those data collected during an academic process that are meant to describe how a student develops an ability (skill, knowledge, attitude). For example, samples of students’ writing skills from the first through the fourth professional year would be formative data. Summative assessment data are those data collected at the end of the program or of a curricular component that are meant to describe the entire process. Types of summative data include graduation rates (percent of a class that graduates on time), pharmacy licensing exam passing rate, results of a competency exam given prior to beginning the Advanced Pharmacy Practice Experiences.

Direct measures of abilities evaluate or assess the actual performance of those abilities. Examples of direct measures would be evaluating a student who is counseling a patient on how to administer insulin or a student’s written response to a drug information question. Indirect measures of abilities are the perception of the performance of the task, and are generally collected by surveys or interviews. Examples of indirect measures would include a self-assessment by students of their knowledge of therapeutics of heart failure and a survey of employers of the oral communication skills of recent graduates.

Demographic data are those data that describe a group. These data include age, gender, ethnicity, first language for communication, class year, SAT, etc. These types of data are important in describing sub-populations and determining predictive factors for success or difficulty in a program.

**GOALS OF AN ASSESSMENT PLAN**

The major goal of an assessment plan is to enhance the abilities of students by enhancing the academic and nonacademic components of the program of study. This goal incorporates program assessment into a continuous improvement loop. One example of a continuous improvement loop involves the following sequential steps: 1) program design/redesign, 2) program implementation, 3) teaching, 4) learning, 5) evaluation and assessment, back to 1) program design/redesign, and so on. Assessment data may also be used to improve implementation, teaching and learning methods. An assessment plan must be ongoing, prospective, meaningful and utilized.
Additional goals of an assessment plan are numerous, and include enhancing satisfaction (of students, their parents, faculty, staff, alumni, employers), improving health care and the pharmacy profession, and meeting the needs for program accreditation. Accreditation is a strong incentive for developing an assessment plan. However, if accreditation is the only reason for the development of an assessment plan, both the assessment plan and possibly accreditation are likely to be unsuccessful.

DEVELOPMENT OF AN ASSESSMENT PLAN

The development of an assessment plan can be broken into four phases: environmental scan, plan development, initial plan implementation, plan refinement and maintenance. Some of these phases may overlap. It is best accomplished in a slow, but effective manner, and then built to a reasonably comprehensive assessment plan. Such development will take a minimum of two years. Administrators and faculty may need to be reminded to be patient during the developmental phases and reminded of the successes and what has been learned.

An environmental scan is important from a number of viewpoints. It is important to determine what is expected and available from the institution-wide assessment plan. There may be program assessment guidelines and resources available for faculty development, instrument development, and data collection, storage, analysis, and dissemination. The environmental scan also helps determine the assessment activities already in place, including who is collecting, analyzing and utilizing data. It is important to gather this information from deans, department chairs, program directors, coordinators of major courses, alumni office, admissions officer, registrar, advising coordinator, and other student service and academic directors. A number of student assessment and evaluation activities may be rich with untapped program assessment data. Finally, it is important to determine what types of expertise exist and what is needed with respect to faculty, administrator and staff development in assessment. The environmental scan phase may take up to two years.

The second phase involves the development of a plan to assess the program. This plan should include the goals of the plan, responsible individuals, administrative and committee structure, communication pathways, and methods of utilizing the data. A small group may be involved in the development of an assessment plan, but all faculty and administrators should be given the opportunity to review the plan and provide input prior to implementation of the plan. The development of an assessment plan can be expected to take one to two years.

Once developed, the assessment plan can be initiated. This should be done in a slow manner. Data already available should be collected, analyzed, disseminated and utilized. New initiatives should only involve the assessment of one or two major program outcomes or goals. This initial implementation phase may take one to three (or more) years. It is important to close the loop during this phase—important data must be shared with others and utilized in decision making. Additionally, it is important to begin to assess the assessment plan.

The maintenance phase of development is a transition from the initial implementation phase. However, it is not a static phase. Instead, it is a phase of continually questioning what is being done and what should be done. Modifications to the plan and to assessment activities are expected. Routines and expectations should begin to emerge. Assessment activities should be expanded to include all important program outcomes and goals, student services, and the assessment plan itself.
ADMINISTRATION AND PARTICIPATION IN AN ASSESSMENT PLAN

The administrative structure of an assessment plan must meet the goals of the plan and the culture of the institution. Participation should include members from all major stakeholder groups. The major administrative components and participant levels within an assessment plan include leadership, committee(s), and other major stakeholders. Essentially, all administrators, faculty, staff, students, and alumni will have some role in program assessment activities. These individuals and groups will be involved in at least one component of the continuous improvement aspect of program assessment at their institution.

Leadership of an assessment plan must be dedicated, strong and direct, with both administrative and faculty involvement. The dean of the college or school of pharmacy and the director of the academic program (or associate or assistant dean) must deliver a clear message on the importance of program assessment. Leadership from faculty is also key to initiating and maintaining an effective assessment plan. Effective leadership from faculty should involve one or two faculty members with a strong interest in education, understanding of the curriculum, and an ability to work with others. The administrators and faculty who are selected to functionally lead the assessment activities may need to further develop their knowledge and skills in assessment. Conferences, workshops, books, consultants and other resources can provide the needed abilities.

One or more committees can be used to perform and facilitate the performance of assessment activities. Many institutions have elected to use committees that were already in place (such as the curriculum committee, academic planning committee, program committee, executive committee, etc.) or subcommittees of those committees to assume the responsibility for the assessment activities. Other institutions have created an assessment committee. The functional unit responsible for assessment activities should be designed with the notion that program assessment is a continuous improvement set of activities and required interactions with a number of constituents. Therefore, assessment activities involve interactions with faculty, administrators, the dean’s office, registrar, course coordinators, alumni office, curriculum and planning committees, and others.

Committee membership should include representation from all major stakeholders, including the dean’s office, department chairs, program directors, faculty from the major disciplines, advising, student services, students, and alumni. The addition of employers and consumers or patients would also strengthen the committee. If the number of committee members becomes too large, it may be best to consider a main or steering assessment committee that directs a number of sub-committees. Committee membership should also be based on stability (continuing membership), new insights (planned turnover of members), and expertise.

Scheduled activities of an assessment plan will probably occur at a variety of intervals. Almost continuously, student assessment data are being collected. Every academic semester or quarter involves the collection of course evaluations, student progression, and other data. Yearly assessment activities generally include course review, curricular review, planning, student satisfaction surveys, graduating senior surveys, performance on licensing examination, and alumni surveys. However, an effective assessment plan will also include annual data analysis, data dissemination, data utilization and informal assessment of the assessment plan. Each year also provides the opportunity to select certain targets of assessment activities based on current concerns of faculty, administrators, students, alumni, employers, etc.

Leadership from faculty is also key to initiating and maintaining an effective assessment plan.
Assessment activities performed approximately every four to six years should include comprehensive reviews of the curriculum or program, major courses and student services, and the assessment plan.

**FUNDAMENTAL COMPONENTS OF AN ASSESSMENT PLAN**

The fundamental components of an assessment plan include defining major program goals and outcomes, determining what to assess, methods of data collection, data collection, data storage, data analysis, dissemination of data and analyses, communication and discussion of data, utilization of the data collected, and assessment of the assessment plan. Each of these are described below.

**DEFINING MAJOR PROGRAM GOALS AND OUTCOMES AND DETERMINING WHAT TO ASSESS**

An early step in both initiating and maintaining an assessment plan is to determine what to assess. This process begins with the goals and expected outcomes of the academic and student services programs plus the mission and goals of the departments, school, college and university. These goals and outcomes must be well defined, hopefully in measurable terms. Additionally, the teaching and learning methods in place will also affect the determination of what to assess. For example, if problem solving is an outcome of a program but students experience only lectures, have no opportunity to practice problem solving skills, and are given multiple choice questions, then it may not be appropriate to attempt to assess problem solving skills. Therefore, it is best to clarify and define the goals and expected outcomes of the program and its components (courses, etc.) and be sure that those goals and outcomes are consistent with the teaching and learning methods in place. The need for revisions in goals, outcomes, curricular components and/or teaching and learning methods may become apparent during this process. These revisions should be made if needed, but assessment activities can be initiated even during those revisions.

Both general and pharmacy specific abilities are important to assess. The general abilities described in the AACP CAPE (Center for the Advancement of Pharmaceutical Education) Educational Outcomes document should be expected from all pharmacy graduates. These include thinking skills, communications skills, ethics and morality, social interaction, social context and responsibility, and self-learning skills. This is an excellent list to use in selecting where to begin formative and summative assessment activities. Pharmacy specific abilities are well defined in the ACPE Accreditation Standards, AACP CAPE Educational Outcomes document, National Association of Boards of Pharmacy (NABP) Competencies, and numerous statements from professional pharmacy organizations. All of these resources must be used in conjunction with the goals and outcomes from the program and from the mission and goals of the institution and its units.

How can a college or school of pharmacy select the best factors to assess from all of these choices? It is important to focus on those goals, abilities, outcomes, and/or competencies that are most important to that particular program based on input from faculty and administrators, plus input from students, alumni, employers, and the public when possible. Select one or two targets for assessment activities that are of highest concern or question.

**TYPES AND METHODS OF COLLECTING ASSESSMENT DATA**

It is important to collect data from a variety of sources utilizing a number of methods, but to do so in a meaningful, efficient manner. There are numerous types of assessment data methods of collecting assessment data. Many of those methods are already in place within colleges and schools of pharmacy, even before a
formal assessment plan is developed. The key to creating and maintaining an effective assessment effort is to begin with data that the college or school already collects, with a focus on important data. Importance, utility and efficiency must be a continual focus of data collection. As program assessment develops, this collection of data needs to be refined, with the eventual goal of collecting data on a comprehensive set of goals and/or outcomes using a variety of techniques, but continuing to focus on importance, utility and efficiency.

The types of assessment data and methods of collecting data can be categorized using a variety of schemes. The major types of assessment data are demographic, direct (or performance), and indirect (or perceptual) data. Those data are collected at entry into the program, during the program, and after completion of the program. Major methods for the collection of data are student records (registrar, Dean’s office), course evaluations, embedded curricular assessment, and surveys. These methods include collection of data from student and alumni performance in addition to student, alumni, administrator, faculty, staff, employer and possibly client/patient perception.

The basic types of assessment data that should be collected for every program include pertinent demographic data, student progression, course evaluation, graduating senior survey, performance on licensing examination, and alumni survey data. Essential data should also include formative data on the most important goals or outcomes of the academic program, as determined by the faculty and administrators. Other essential assessment data include those data on student life and student services.

Demographic Data

Demographic data of importance include age (date of birth), gender, ethnicity, primary language, performance in high school (grade point averages, class ranking), SAT scores (mathematics, written, combined), Test of English as a Foreign Language (TOEFL) (if appropriate), performance in prior college or university courses or programs (grade point averages, class ranking), and previous college or university degrees. These data should be collected upon admission and are usually available from the Office of the Dean, Admissions, and/or the Registrar. These data should be collected on all students and used routinely and data are used to assess recruitment efforts, to determine which factors are associated with success or failure in the program, or specific components of the program.

Direct Performance Data

Direct performance data can be collected at entry, during, at the end, and following completion of the program. These are direct measures of students’ abilities and may be done on all or only a portion of the students or alumni. For students, these measures may be done as a required or a voluntary component of the program.

Initial performance data include those data that students possess as they enter the program of study. TOEFL, both written and oral, is an example of initial performance of an ability. Assessment or placement evaluations may be used to determine other abilities, including communication skills (not using TOEFL), computer skills, mathematics skills, interpersonal interaction skills, and others. The use of these data provide insights into program design and delivery as they relate to student strengths and weaknesses and may also be used to determine factors associated with success or failure in the program or specific components of the program.

Student progression and performance in the program should be measured in every student
using grade point averages, academic problems (probation, dropped from the program, etc.), academic success (Dean’s list, awards, etc.), timely progression to graduation, persistence (or continued enrollment in the program). Participation in student organizations, community activities, service learning, and other extra-curricular activities may provide additional performance data.

Curricular- or course-embedded assessment techniques involve the collection of select student performance data that may also be used for the purpose of determining a grade. Performance evaluations are directly measured in essentially every course or major component of the program and are generally used to determine grades. Grades themselves are not considered to be good assessment data. However, select data may be extracted and used as assessment data. For example, if writing skills have been determined to be an important outcome that needs assessment, then samples of writing skills from various points in the curriculum can be collected, aggregated and used to determine how students are progressing in their development of their writing skills. Writing samples could be collected from homework, in course work, quizzes, and/or examinations during the didactic portion of the curriculum and from assignments during specific Advanced Pharmacy Practice Experiences during the final year of the curriculum. These samples would need to be assessed using the same criteria, followed by data aggregation and analysis.

Performance of alumni can be determined by measuring success at the workplace (promotions), additional degrees or training (residencies, fellowships, certificates, etc.), presentations (lectures, posters, etc.), and publications (manuscripts, editorials, abstracts, etc.). These data are generally self-reported and collected using alumni surveys, but could be verified by contacting employers, etc. Alumni surveys are more completely described next.

**Indirect or Perceptual Data**

The perceptions of alumni are also basic assessment that should be collected from as many alumni as possible. Alumni surveys generally collect data about careers (position, promotions, degrees, training programs, certificates, etc.), happiness and satisfaction with their college/school of pharmacy experience and their career, etc. However, only 20 to 30% of alumni respond to alumni surveys. Colleges and schools should consider additional methods to enhance this response rate—possibly by using e-mail or web-based surveys, providing incentives, and having students and alumni accept the importance and their responsibility to provide this type of data even after they graduate.

**DATA COLLECTION, STORAGE, AND ANALYSIS**

After determining what to assess and how it is to be assessed, it is important to develop plans to collect, store and analyze the data. The quality of the assessment data is dependent on the instruments used to collect the data, but also on the way the data are collected. Additionally, data need to be readily retrievable and analyzed in order to be effectively utilized.

Data can be collected in a number of ways, depending on the goals and instruments used. Student involvement can be mandatory or voluntary, in class or outside of class, and all-inclusive or only contain a sample of the class assessed. It is important to be sure that the data are as reliable and valid as reasonably possible. Students should be instructed to do their best and be honest, particularly if the methods are done outside of class work. Data collected from alumni, employers, faculty, and others are gen-
erally collected on a voluntary basis from a sample of the group. Although most data are collected in written and oral formats, consideration should be given to collecting data using electronic means, which will enhance the storage and analysis of the data.

Data should be stored electronically due to the need to recall, analyze, and make additional associations in the future. It is desirable to store assessment data using some sort of student identification in order to determine which student factors are associated either with success or with difficulty. However, confidentiality must be maintained.

Data analysis is needed to provide an overview of the data. Summary statistics that are useful include frequencies, percentages, maximum and minimum values, means, medians, modes, standard deviations or variances, and distribution characteristics. Additionally, it is useful to perform comparative or associative statistics when possible, including correlation, regression, t-tests, nonparametric tests, chi-square, etc. Qualitative data can also be described using consensus and other statements, some of which may be categorized. In analyzing data, it is important to look at trends over time. For example, one year’s worth of data may be of some interest, but the impact is dramatically increased if the same trend is seen over five years. Also, response to changes in the curriculum or student service program can be seen using longitudinal analyses.

DISSEMINATION, COMMUNICATION AND DISCUSSION OF DATA AND ANALYSES

It is imperative to disseminate, communicate and discuss the data and data analyses with all appropriate stakeholders. A series of steps in the dissemination of assessment data and analyses that may be useful includes discussion of preliminary findings and then creation of yearly reports. Open discussions of the data and its analyses are effective ways to enhance the communication and interpretation of the data and to help identify the implications and potential uses of the data. All pertinent program administrators and faculty should be involved in those discussions. The results of the discussions should then be incorporated into additional analyses, reports, and future data collection. Appropriate stakeholders for the dissemination of almost all of the final data summaries include all faculty and administrators in the program, the institution-wide assessment officer(s) and committee(s), provost or vice president of academic affairs, and probably accrediting agencies (institution-wide and program specific). Select data should be disseminated and possibly discussed with students and their families, prospective students and their families, alumni, employers, and others. Dissemination of data can be targeted to a specific audience or widely available through posting on a website or printing in a publication.

UTILIZATION OF THE DATA COLLECTED

If data are not used, they should not be collected. The use of data should be to determine the need for change and the types of changes needed. Assessment data should be utilized by the academic administrators (deans, department chairs, program directors), curriculum and academic planning committees, course coordinators, and student service program directors. Additionally, it is important to have the pertinent assessment data disseminated to and utilized in the assessment and design of prerequisite courses (professional and pre-professional) if possible and subsequent courses.

ASSESSMENT OF THE ASSESSMENT PLAN

A periodic assessment of the assessment plan will keep the process running smoothly and completes the loop. Each year a simple survey or other method should be employed. However, a comprehensive assessment of the assessment plan should be undertaken every four to six years. The components to assess include
all of the important elements of the assessment plan from goals to structure to function to value. Data should be collected from students, alumni, faculty, and administrators using surveys, interviews, focus groups, and other appropriate methods.

SUMMARY

The assessment of academic programs is necessary to continue to improve the academic and student service programs and to meet accreditation standards, particularly in colleges and schools of pharmacy. Assessment activities should be ongoing, prospectively planned, efficient, and an integral component of the academic and student services components at universities and colleges. This paper provides an overview of how to organize assessment activities and provides guidelines on what to assess, how to assess, and what to do with the assessment data. Many sources of assessment data are already in place at colleges and schools of pharmacy. The bottom line is to collect data only on the most important program outcomes or goals and then to communicate and utilize those data in decision making in a continuous and planned manner.

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