

# Institutionalizing Assessment-As-Learning Within an Ability-Based Program

Michael S. Maddux

**SUMMARY.** Institutionalizing assessment-as-learning (AAL) within an ability-based program provides a framework not only to assess curricular efficacy but to enhance learning as well. In ability-based education, AAL serves as the driving force for determination of educational outcomes, curricular content and structure, teaching processes, and assessment strategies. Properly institutionalized, AAL provides a method by which students become increasingly proficient in performing clearly defined abilities. An institution-wide AAL plan can also provide the basis for design of an assessment program capable of evaluating institutional effectiveness, as mandated by accreditation agencies. Care must be taken that the assessment program be constructed to focus on student performance of ability outcomes across the curriculum. A comprehensive approach to establishing such a program should involve collaboration among faculty, an assessment council/committee, and the curriculum committee. [Article copies available for a fee from The Haworth Document Delivery Service: 1-800-342-9678. E-mail address: [getinfo@haworthpressinc.com](mailto:getinfo@haworthpressinc.com) <Website: <http://www.haworthpressinc.com>>]

**KEYWORDS.** Assessment, outcomes, ability-based education, pharmacy education

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Michael S. Maddux, Pharm.D., is Assistant Dean for Clinical Development and Professor and Director of the Division of Pharmacy Practice at the St. Louis College of Pharmacy, 4588 Parkview Place, St. Louis, MO 63110.

The author thanks Tom Zlatic, Ph.D., Dimitra Vrahnos, Pharm.D., Sheldon Holstad, Pharm.D., Wafa Dahdal, Pharm.D., Mary Roth, Pharm.D., and Carla Wallace, Pharm.D., for their many contributions to enhancing faculty understanding and implementation of ability outcome assessment at the St. Louis College of Pharmacy.

[Haworth co-indexing entry note]: "Institutionalizing Assessment-As-Learning Within an Ability-Based Program." Maddux, Michael S. Co-published simultaneously in *Journal of Pharmacy Teaching* (Pharmaceutical Products Press, an imprint of The Haworth Press, Inc.) Vol. 7, No. 3/4, 2000, pp. 141-160; and: *Handbook for Pharmacy Educators: Contemporary Teaching Principles and Strategies* (ed: Noel E. Wilkin) Pharmaceutical Products Press, an imprint of The Haworth Press, Inc., 2000, pp. 141-160. Single or multiple copies of this article are available for a fee from The Haworth Document Delivery Service [1-800-342-9678, 9:00 a.m. - 5:00 p.m. (EST). E-mail address: [getinfo@haworthpressinc.com](mailto:getinfo@haworthpressinc.com)].

## **INTRODUCTION**

Assessment of educational outcomes is a topic of current interest to most institutions of higher education. Driven by postsecondary accrediting agencies' mandate that institutions and programs document the educational achievements of their students, assessment processes have assumed a position of high priority in the minds of many academic administrators. The American Council on Pharmaceutical Education's Accreditation standards and guidelines state:

A system of outcomes assessment should be developed which fosters data-driven continuous improvement in curricular structure, content, process, and outcomes. Evaluation of the curriculum should occur systematically in order to monitor overall effectiveness, to enable the achievement of the professional competencies in accord with outcomes expectations, and to provide a studies basis for improvement. (1)

However, an equally compelling, and perhaps more urgent, reason for pharmacy educators to pursue the implementation of meaningful, comprehensive assessment strategies is the need to accomplish curricular reform in anticipation of the evolving changes in professional practice. Assessment of student abilities can form the basis for data-validated discussions of needed changes in curricular outcomes, content, or educational processes. Rather than focusing only on content areas within the curriculum, institutions should analyze and interpret their students' achievement of outcomes in order to strategically implement curricular change; that is, faculty should assess the "ends" of the curriculum and use this appraisal to determine necessary changes in curricular "means." This is consistent with the view proposed by the AACP Commission to Implement Change in Pharmaceutical Education:

The process involves defining the appropriate educational and programmatic outcomes of curriculums . . . , gathering data related to these outcomes, and assessing the extent to which the program is achieving those outcomes. Corrections (if needed) in courses, sequences, teaching strategies, and related activities are necessary follow-ups to these assessments. (2)

There are many forms of assessment, including board examinations, job placement exams, standardized tests, assessment by objectives, competency-based assessment, and classroom assessment. However, focusing assessment on defined educational outcomes that are directly linked to professional abilities can offer distinct advantages to pharmacy programs. Ability-based education, a method that uses ability outcomes to define what students can “do” rather than only what they “know,” provides such a framework. As discussed by Zlatic elsewhere in this issue, the role of assessment in ability-based education extends beyond that of demonstrating curricular efficacy alone. In ability-based education, assessment is intrinsic to the learning process and actually facilitates students’ understanding and achievement of ability outcomes. This may be the most convincing reason for pharmacy faculty to embrace assessment as a core activity within their classrooms and clinics. Because ability-based education provides an excellent opportunity to enhance learning while also measuring institutional effectiveness, this article describes assessment-as-learning and a strategy and structure for institutionalization of ability-based assessment.

### ***ASSESSMENT-AS-LEARNING***

Many faculty view *assessment* only as a means to measure student learning. However, the origins of the term belie this common pedagogical impression. The word “assess” is derived from the Latin term *assidere*, “to sit beside.” This etymological origin provides a useful model for recasting faculty impressions of the purpose and nature of assessment; that is, “sitting beside” implies that the act of assessment involves coaching or guidance. Within the schema of ability-based education, assessment serves primarily as a tool to facilitate student learning and achievement of ability outcomes. This approach, termed assessment-as-learning by Alverno College, employs assessment as a continuous, formative process that is intrinsic to understanding and achieving ability outcomes (3).

The six essential components of assessment-as-learning described by Alverno provide a framework for understanding the process of ability-based education (Table 1). First, it is critical that *expected learning outcomes* be defined and understood by both students and faculty. In the ability-based model, these outcomes are “abilities” and represent an integrated combination of knowledge, skills, attitudes,

TABLE 1. Six Essential Components of Assessment-As-Learning.

<b>Essentials for Assessment-As-Learning</b>
<ul style="list-style-type: none"> <li>• Expected learning outcomes (abilities)</li> <li>• Assessment as a process involving multiple performances</li> <li>• Explicit criteria</li> <li>• Expert judgment</li> <li>• Productive feedback</li> <li>• Self-assessment</li> </ul>

habits, and values. At the department or course level, abilities are further defined in concrete, discipline-specific terms and assume more precise meaning (e.g., “select/recommend antimicrobial therapy”).

Second, *assessment* must then be established as *a process involving multiple performances*. Students should be engaged in repetitive opportunities to practice the desired outcomes. For example, in an antimicrobial pharmacotherapy course, repeated scenarios are assigned throughout the semester that require students to recommend empiric or definitive antibiotic treatment. Obviously, this approach makes sense as one realizes (and observes) that students provide more effective recommendations as they gain more experience (“practice makes perfect”).

In practicing an ability, *explicit criteria* should serve to guide the student in further defining, and learning, the specific dimensions of the ability. Without explicit, public criteria, students don’t know what is expected and often make false assumptions regarding performance expectations.

*Expert judgment* provides a mechanism for validated interpretation of performance criteria. As experts in their field, faculty have an implicit understanding of what they expect in student performance. However, until this judgment is articulated, clarified to colleagues, and made explicit and public, it remains poorly understood. Assessment requires faculty to articulate their judgment explicitly and publicly by developing performance criteria; it also requires dialogue among faculty as they compare ability assessments and reach agreement on their collective understanding of ability-specific criteria. Once this judgment is refined and clarified, students are able to understand the basis on which their performance will be assessed.

Despite clear and well-understood criteria, students will have diffi-

culty improving upon their weaknesses without *productive feedback*. Clearly, for assessment to be learning, students must receive feedback. “Productive” feedback is not necessarily positive feedback. Productive feedback creates a unique opportunity for students to recognize performance areas that require improvement and to make the changes necessary to enhance performance. This feedback interprets student performance as judged by performance criteria and hence provides specific data regarding their ability development. Also, it recognizes strengths in the learner’s performance that motivate further development and instill a desire to pursue self-directed learning.

Finally, *self-assessment* obligates students to take responsibility for their own development. Using criteria, learners are better able to conceptualize the ability as a whole and also to create a profile of their performances. Thus, students are able to envision the expected level of performance, identify specific areas of strength and weakness, and plan the steps necessary to effect improvement. Hence, students learn not only by receiving feedback from instructors (so-called “expert assessment”) but by providing feedback to others (peer assessment) and by assessing their own work (self-assessment). Indeed, the act of *providing* feedback through meaningful peer assessment is often as instructive as receiving feedback, particularly when students are first trying to conceptualize a given ability outcome. Then, based on this feedback, students continue to practice the ability to effect improvement.

Applying these principles to pharmacy education, students taking a course on antimicrobial pharmacotherapy are asked to read a case study and recommend an empiric antibacterial regimen for a patient with community-acquired pneumonia. In performing this ability (select/recommend antimicrobial therapy), students use specific performance criteria as a guide. These criteria identify for the students the “rules” for constructing their recommendation by describing explicitly what should be included in their answer. For example, the criteria state that the student’s answer should:

- Identify correct drug, dose, and route and frequency of administration
- State the planned duration of therapy
- Justify antibiotic choice over alternative antibiotics

- Justify drug, dose, and route and frequency of administration based on patient-specific and drug-specific data
- When recommending IV antibiotics, establish an endpoint for IV therapy and provide guidelines for switching from IV to oral administration.

As students develop their recommendations, they use the performance criteria as a guide. This process clarifies for students what an empiric antibiotic recommendation should include and, with repeated practice, induces students to internalize the criteria. Once they have completed their recommendations, students learn to check their responses against the criteria (self-assessment) before submitting their work in duplicate to the instructor. Upon submission, one copy of the assignment is distributed to another student for peer assessment. Each student reviews and assesses a peer's answer as a part of the assignment. To ensure accurate and conscientious peer assessment, the peer evaluation constitutes a portion (usually 20-30%) of the *peer's* grade on the assignment. The process of peer assessment reinforces further the steps involved in performing the ability, and often the peer learns more from completing the peer assessment than from the initial development of his or her own answer. Upon completion of the peer reviews, the instructor assesses each student response and the corresponding peer assessment, giving feedback to both the student and the peer. This feedback is specific and directly drawn from the criteria (e.g., to the student: "You didn't justify your exclusion of a second-generation cephalosporin. Why wouldn't cefuroxime be appropriate in this setting?" to the peer: "You failed to critically evaluate the dose here. Is this correct in light of the patient's renal dysfunction?"). In situations involving complex or new material, the feedback may be formative in nature such that students can repeat the performance by revising their answer for a final grade. Regardless, in order to ensure appropriate student effort in situations where revision and resubmission are expected (or provided as an option), the first draft of the student's answer still accounts for a meaningful portion of the overall assignment grade (usually 30-40%).

Note that this approach does not consider assessment as an adjunctive or supplemental strategy. Instead, it serves as an integral, ongoing step in the teaching and learning process. Once incorporated consistently into an institutional or departmental curriculum, assessment

assumes an intrinsic role in the faculty's pedagogy. Also, it can become an expected teaching and learning strategy among students.

### ***INSTITUTIONALIZATION OF ASSESSMENT***

As discussed above, current accreditation standards serve as a primary driving force behind many institutions' efforts to implement an assessment program. The American Council on Pharmaceutical Education has set forth the following standard:

Evaluation measures focusing on the efficacy of the curricular structure, content, process, and outcomes should be systematically and sequentially applied throughout the curriculum in pharmacy. Evidence should exist that evaluation outcomes, including student achievement data, are applied to modify or revise the professional program in pharmacy. (1)

Ability-based education, because of its inherent emphasis on assessment, provides an effective means of meeting such accreditation standards. The next two sections of this article discuss suggested strategies for implementing ability-based assessment and the institutional structures necessary to support these strategies.

#### ***Strategies for Implementing Ability-Based Assessment***

Because every institution possesses unique strengths and weaknesses, no single prescription for establishing assessment-as-learning programs can be advocated for all academic environments. However, the following steps may serve as general guidelines for implementing ability-based assessment:

1. Articulate shared educational assumptions.
2. Establish and make explicit institutional ability outcomes.
3. Identify/create departmental and course ability outcomes that support institutional outcomes.
4. Create criteria for institutional, departmental, and course ability outcomes.
5. Sequence institutional ability outcomes across courses within the curriculum.

6. Create an assessment plan for each ability outcome across the curriculum.
7. Based on ability assessment data, modify or revise ability outcomes, curricular structure, course content, and/or instructional process.

Each of these steps is presented and explained below.

*Articulate Shared Educational Assumptions.* Initiating a comprehensive program to assess an institution's effectiveness in achieving learning outcomes must begin with discussion of shared educational assumptions (4). The faculty must formulate and express clearly their consensus assumptions regarding (1) student learning and assessment and (2) curricular coherence and development. There is logic to this approach in that a faculty's philosophy on these two topics will determine an institution's approach to teaching, learning, and assessment. If an institution desires to implement ability-based education, it should engage its faculty in meaningful discussion of the rationale, processes, barriers, and potential successes that surround this educational approach. Without this critical step, an institution's assessment program is likely to fail due to the lack of alignment between consensus faculty philosophy and the program's goals, processes, and outcomes.

A set of shared educational assumptions concerning ability-based education, published by the Consortium for the Improvement of Teaching, Learning, and Assessment, is shown in Table 2. These assumptions reflect the experience of 11 educational institutions involved in the implementation of ability-based education. Although not necessarily transferrable to other academic enterprises, these assumptions provide a ready example of the basis upon which an ability-based program might be developed.

*Establish and Make Explicit Institutional Ability Outcomes.* This is an important foundational step, because educational outcomes form the basis for institutional goals, curricular content and sequence, teaching methods, and assessment. Most schools and colleges of pharmacy have articulated a set of outcomes or competencies, but these outcomes may not be well understood-or agreed upon-by faculty. In addition, the outcomes may not be understood by students and/or connected to perceived professional roles. The act of making public an institution's outcomes so that they can be understood by faculty and students alike is essential to the success of an ability-based program.



TABLE 2. Shared Educational Assumptions Concerning Ability-Based Education.

<b>SHARED EDUCATIONAL ASSUMPTIONS</b>
<b>Student Learning and Assessment</b>
<ul style="list-style-type: none"> <li>• Student learning is a primary purpose of an educational institution.</li> <li>• Education goes beyond knowing to being able to do what one knows.</li> <li>• Learning must be active and collaborative.</li> <li>• Assessment is integral to learning.</li> <li>• Abilities must be developed and assessed in multiple modes and contexts</li> <li>• Performance assessment—with explicit criteria, feedback and self-assessment—is an effective strategy for ability-based, student-centered education.</li> </ul>
<b>Curricular Coherence and Development</b>
<ul style="list-style-type: none"> <li>• A coherent curriculum calls for faculty investment in a community of learning and judgment.</li> <li>• The process of implementation and institutionalization of a curriculum is as important as the curriculum: the process is dynamic, iterative, and continuous.</li> <li>• Educators are responsible for making learning more available by articulating outcomes and making them public.</li> <li>• Responsibility for education involves assessing student outcomes, documenting inputs, and relating student performance over time to the curriculum.</li> </ul>

As pointed out by Zlatic elsewhere in this issue, schools of pharmacy and professional organizations have developed educational outcomes that are readily retrievable from publications or institutional documents. As one would expect, most of these educational outcomes are very similar and differ primarily in wording and organization. Obtaining a set of outcomes appropriate for most pharmacy programs does not appear to pose a problem—they can be easily adapted from others' published outcomes and then "pasted" into an institution's curricular framework. However, it is not really the outcomes themselves that are important but rather the *process* of describing, prioritizing, and determining how best to achieve them. This process requires significant faculty deliberation and a commitment to make the outcomes public and well understood by both faculty and students.

While time-consuming, the most efficacious strategy for accomplishing this step should involve a combination of focused, outcome-driven faculty retreats, departmental deliberations, and curriculum committee discussions. The goal must be to establish well-understood

institutional ability outcomes that reflect meaningful faculty dialogue and consensus. Although often too broad for easy interpretation by an observer from outside the institution, these global outcomes assume more precise definition and relevance as they are translated by departments and refined at the course level.

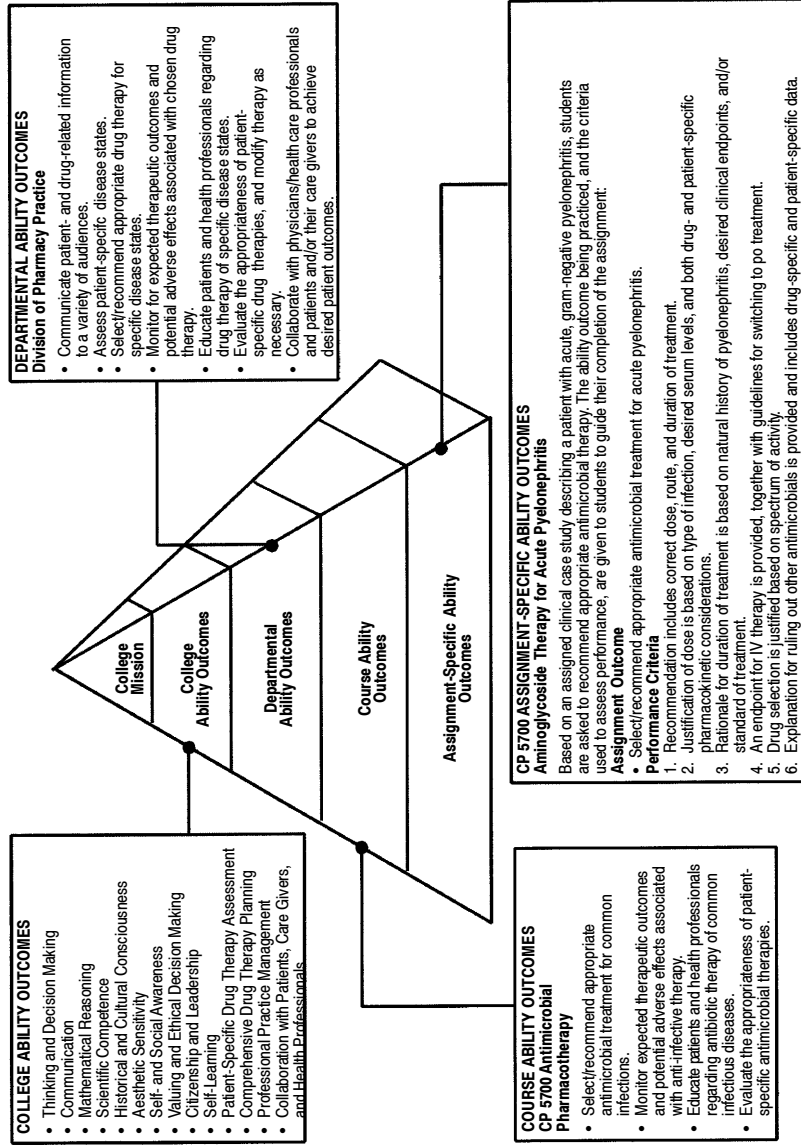
*Identify/Create Departmental and Course Ability Outcomes That Support Institutional Outcomes.* As institutional outcomes are being formulated and clarified, the faculty must also decide how the outcomes will be achieved. Most often this is accomplished at the department and course levels. If ability outcomes are to be achieved, they must be defined by various disciplines (departments, programs) and then practiced/learned in specific courses.

Departmental ability outcomes provide discipline-specific definition and application of a designated institutional outcome. The outcome is then defined more specifically and practiced within the courses offered by the department. Varied disciplines can provide complementary practice of the ability outcome in different contexts, thereby reinforcing general skills of the ability while also revealing unique, ability-specific aspects associated with each discipline. For example, a communication institutional ability outcome might be practiced differently in a course in microbiology (writing laboratory reports, orally presenting a review of microbial resistance mechanisms) than in a clinical clerkship (writing SOAP notes, orally presenting a patient case). The two courses provide complementary and additive practice of the outcomes that help students apply the ability to a variety of settings.

Within courses, assignments usually provide the major opportunities to practice and assess abilities (such as selecting/recommending antimicrobial therapy for a patient with pneumonia, as described earlier). Assignments also provide increasingly greater detail in defining the specifics of an ability outcome. Hence, at the assignment level, an ability outcome becomes more “real” to both students and faculty. Repetitive practice of an ability outcome through the completion of multiple assignments in a variety of courses eventually allows the student to perform the outcome and apply his/her ability in different contexts. Figure 1 illustrates the links among institutional, departmental, course, and assignment-specific ability outcomes.

Creating departmental and course ability outcomes requires close collaboration among faculty. Faculty must work together to identify

FIGURE 1. Example of Linked Ability Outcomes at the St. Louis College of Pharmacy.



those institutional outcomes addressed within their respective courses and departments. Then, by consensus, these ability outcomes should be defined clearly at the departmental and course levels to assure understanding among faculty and students. An effective approach to developing departmental outcome definitions is the organization of faculty into ability-specific committees within the department (5). Each committee is then charged with creating a proposed definition for a designated ability outcome. The committees then present their respective proposed definitions to the entire department faculty for discussion. Once appropriately revised, understood, and agreed upon, the outcomes are adopted by the department. Individual faculty then determine which departmental ability outcomes can be achieved in their courses and redefine these outcomes in course-specific terms. The next step, creation of performance criteria, assists in lending additional definition to departmental and course outcomes.

*Create Performance Criteria for Institutional, Departmental, and Course Ability Outcomes.* Again, performance criteria describe what students must do to accomplish an ability outcome and also provide the basis for judging their performance. Criteria clarify for the student what is expected during performance of a given ability outcome and allow faculty to collect evidence of student achievement. In addition, when articulated clearly and understood by students, performance criteria provide the learner with an explicit definition of the ability. This explicitness is key to helping students successfully achieve the outcome.

Because faculty implicitly understand the outcomes associated with their discipline, it is common for instructors to provide “course objectives” that are not well understood by students, to pose questions or provide assignments without adequate guidelines for formulation of an answer, and to cite their common experience of receiving student answers that seem to have little association with the question asked. In contrast, it often seems to students as if they are playing in a game where only the instructor knows the rules. This is unintentional on the part of faculty. They know their discipline’s criteria implicitly, usually through vast experience and practice, but fail to realize that students usually don’t share this insight naturally. Until these criteria are made explicit and understood by the learner, it is difficult for students to perform at the expected ability level. Once criteria are clarified and understood, students not only know what is expected but also have the

opportunity to assess their own performances, independent of the faculty.

Creating performance criteria is easiest for courses or assignments (see Figure 1) and most difficult for institutions or departments. In fact, faculty generally learn how to develop and utilize criteria when they are able to apply them to discrete assignments. At this stage, an ability is usually being practiced in part, or in a very precise context, allowing one to describe specific criteria for the performance. Still, it is often difficult for faculty to formulate criteria because previously they have not been required to articulate them. Although they intuitively recognize a subpar or excellent performance, faculty may not be able to describe completely the specific behaviors that differentiate one from the other.

One approach to solving this dilemma is to share similar types of ability-specific assignments among faculty and then discuss their respective criteria for successful performance of the assignments. This dialogue often results in clarification, expansion, revision, and rearticulation of faculty expectations of student performance. Once refined, these expectations can be translated into performance criteria. After faculty have developed criteria for assignments, they are able to create more general criteria for performance of course outcomes as a whole (Figure 1).

This inductive process can be applied as follows:

1. Create and use assignment-specific performance criteria as a basis for developing performance criteria for course ability outcomes.
2. Employ course-specific criteria to create criteria for corresponding departmental outcomes. (Charging responsibility for this articulation to the departmental ability-specific committees, as discussed above, is a logical method for completing this task.)
3. Use departmental/program outcome criteria to develop global performance criteria for each institutional ability outcome.

Of course, it is important to assure that desired institutional outcomes maintain their intended definition as this process is followed to avoid any misguided modifications that might result from this “bottom-up” approach.

*Sequence Institutional Ability Outcomes Across Courses Within the Curriculum.* Once an institution’s ability outcomes have been created

and defined, they should be appropriately sequenced across the curriculum to ensure that students obtain the necessary practice and development of desired outcomes. Because students develop progressively higher levels of performance of an ability outcome as they progress through the curriculum, it is desirable to create definitions of the levels of expected performance for each ability across the curriculum. This is best accomplished by developing specific performance criteria for each ability level and then constructing a curricular map to determine where, when, and at what level each ability outcome is addressed in the curriculum (see Zlatic's article in this issue) (6). Based on the results obtained from this mapping process, the course-specific practice of outcomes can be changed or the expected performance levels modified. This step should be carried out by an institutional curriculum committee, assessment council, or other appropriately charged committee of the faculty.

*Create an Assessment Plan for Each Ability Outcome Across the Curriculum.* A plan should be developed to assess each ability outcome level regularly across the curriculum. Because assessment-as-learning relies on assessment primarily as a learning tool, effort should be made to establish frequent points of assessment for formative purposes. The goals of formal assessments should be to identify student weaknesses and to provide feedback to effect improvement in ability performance. As students repeat these assessments across the curriculum and receive specific feedback, they learn how to better accomplish the abilities and improve their understanding and performance of ability outcomes. In designing such an assessment plan, therefore, it is critical to ensure that students have *multiple opportunities* to develop and demonstrate, through repeated assessments in different courses/contexts, that they have acquired the desired level of performance for each ability. This multidimensional assessment process can engage students in the practice of an ability in multiple modes—as speakers, as writers, and as practitioners.

If a four-year institution has established three levels of performance for each ability outcome, it might decide to assess Levels 1 and 2 of each ability during every semester, requiring that students achieve Level 2 performance before entering the third year of the curriculum. Level 3 of the abilities could then be assessed during the third and fourth years, with achievement of Level 3 of each ability being required for graduation. Most assessments would likely occur within

designated courses in the curriculum. For example, Level 1 of communication ability might be assessed in several first-year courses (Professional Communication, Introduction to Pharmaceutical Care, Non-prescription Drugs) while Level 2 Communication is assessed in second-year courses (Jurisprudence, Drug Information, Pharmacy Management). Other assessments, particularly those that are integrated to assess multiple abilities, should be administered externally. Purdue University School of Pharmacy has described a model for this external assessment process using an Integrated Abilities Seminar (7, 8).

At certain stages in the curriculum, students can be asked to complete *validations* of their ability-summative assessments of one or more abilities designed to determine whether a student will be allowed to progress to the next year or phase of a program. These assessments may occur either during required courses in the curriculum or as external assessments conducted outside of courses at predetermined points in the curriculum. Ideally, institutions will choose to incorporate a mixture of in-course and external validation assessments throughout the curriculum, building in flexibility that allows students to demonstrate ability competence at self-selected stages of the curriculum. Such an approach has the advantage of requiring students to demonstrate that they have achieved certain levels of ability performance before they can progress through the curriculum while also providing opportunities for remediation and improvement in performance. Students who excel in oral communication may choose to validate their level of performance in this ability as early as possible while delaying validation of an ability that they find more difficult (e.g., drug therapy assessment) until after completing several formative assessments. Again, the goals of the assessment plan are twofold: (1) to allow students to successfully learn and achieve the desired levels of performance for each ability outcome and (2) to provide evidence that students can indeed perform each ability outcome.

The assessment plan should be created by the faculty, usually with the cooperation of a curriculum committee and institutional assessment body (i.e., a committee, council, or center). Ideally, the faculty determine how and at what level an ability outcome should be assessed; the curriculum committee determines where in the curriculum assessments should be offered and required; and the assessment body assists faculty in developing assessment skills and tools, including development of integrated, external assessments.

*Based on Ability Assessment Data, Modify or Revise Ability Outcomes, Curricular Structure, Course Content, and/or Instructional Process.* Inherent in the ability-based approach is an iterative, assessment-driven process that results in continuous improvement in curricular content, pedagogical strategies, and student performance. Once a plan for assessment is established, the data gathered from assessments can be used to refine, clarify, or redefine ability outcomes; that is, the information derived from repeated and appropriately sequenced assessments of student abilities invariably reveals ambiguities in the articulation of outcomes, confusion about the meaning of performance criteria, inadequate opportunities to practice abilities, and/or dysfunctional mechanisms for providing meaningful feedback. Such data then prompt an institution to reassess its outcomes, make content or process changes in specific courses, create or rewrite performance criteria, and launch new faculty development programs. For example, assessments that reveal an inadequate level of student writing abilities might prompt an institution to:

1. More explicitly define written communication ability outcomes
2. Revise performance criteria for writing assignments across courses
3. Require more writing assignments in selected courses
4. Develop external writing assessments
5. Offer faculty workshops on developing writing assignments and assessment tools.

This institutional process is probably best monitored and administered by an assessment body in collaboration with the curriculum committee and interested faculty.

At the course or assignment level, faculty teaching ability-based courses collect data from their course/assignment assessments that yield the same insights. This often results in assessment-driven revision of course/assignment outcomes, performance criteria, classroom/discussion-section teaching strategies, context or content of assignments, and frequency or content of in-course assessments (9). For example, in a course on nonprescription drug therapy an instructor finds that when evaluating patient-specific nonprescription drug regimens in case studies (a key course ability outcome), students routinely fail to identify potential nonprescription drug-disease interactions. Upon analyzing the performance criteria for this ability outcome, the faculty member discovers that the criteria do not clearly indicate that



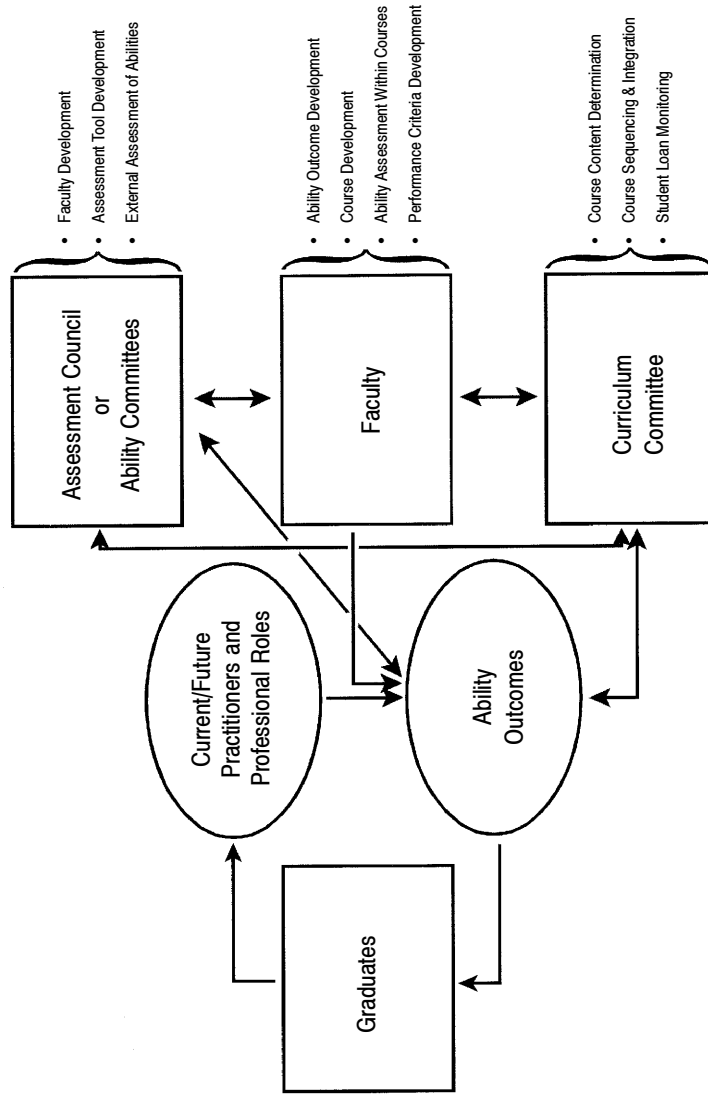
students should include drug-disease interactions in their evaluation and that students are asked to evaluate nonprescription regimens only rarely in their homework cases. After modifying the criteria (explaining the changes to students) and increasing the number of homework cases that ask students to evaluate such regimens, performance of the outcome improves markedly. Hence, it is at this level that the ability-based method has its greatest potential impact. Once faculty realize the utility of this assessment-driven process as a means of determining course outcomes, content, and teaching strategies, it becomes an integral part of course development and management.

### ***Structure to Support Ability-Based Assessment***

A variety of structures have been described to support institutional assessment programs (10-12). The framework detailed in Figure 2 is one suggested method of supporting the institutionalization of ability-based assessment. This framework relies on the work of several major groups of individuals: the faculty, a collection of committees including the curriculum committee and an appropriately charged assessment body, and graduates. Unlike administratively dominated assessment programs, this framework relies on faculty. As individual course instructors, faculty determine specific course ability outcomes (as an appropriate extension of agreed-upon institutional outcomes), develop courses and teaching strategies to achieve these outcomes, create ability-specific performance criteria, and assess ability outcomes within courses.

An assessment body composed of faculty with expertise and interest in assessment (e.g., an assessment council, or a group of ability committees responsible for the ongoing development of one or more specific ability outcomes) serves to support the above faculty activities by providing faculty development opportunities (e.g., workshops, instructional resources), by developing assessment tools (e.g., self- and peer assessments), and by coordinating integrated external ability assessments that occur outside discrete courses. The latter responsibility may require the assessment body to provide training in assessment to both faculty and nonfaculty external assessors (e.g., pharmacy professionals). The assessment body also collects ability-specific assessment data from summative ability assessments (see discussion of ability validations above), sharing these data with appropriate faculty and the curriculum committee. Often, a separate office of assessment, or an

FIGURE 2. Organizational Structure of an Institutional Assessment Program.



assessment center, is created to serve as a repository that records and tracks each student's completion of required ability assessments (3).

The curriculum committee, working closely with the assessment body, reviews data from formative and summative assessments and determines needed changes in course content, sequencing, or integration. The committee should also have the responsibility for recommending modifications in the positioning and sequencing of in-course and external validation assessments across the curriculum. The committee, with input from the faculty and the assessment body, should have final responsibility for recommendations concerning needed curricular and ability outcome changes. Again, these recommendations are based on data generated from ability assessments conducted across the curriculum.

### **CONCLUSION**

Assessment of institutional outcomes is clearly important. It can serve to document a school's or college's curricular efficacy while also providing needed data for accreditation. However, assessment itself should not be viewed as a primary institutional goal that is separate from the process of teaching and learning. Rather, student learning and achievement of those abilities necessary to enter the profession are the primary goals of schools and colleges of pharmacy. The most important step in developing an assessment program is coming to the realization that ability outcome assessment is a powerful tool that can effectively promote, measure, and improve student learning. In the context of ability-based education, institutional application of this assessment-as-learning concept is essential to the design and implementation of an effective assessment program.

### **REFERENCES**

1. American Council on Pharmaceutical Education. Accreditation standards and guidelines for the professional program in pharmacy leading to the doctor of pharmacy degree. Chicago: ACPE, Inc., 1997.
2. Commission to Implement Change in Pharmaceutical Education. Maintaining our commitment to change. *Am J Pharm Educ* 1996;60:378-84.
3. Alverno College. Student assessment-as-learning at Alverno College. Milwaukee, WI: Alverno College Institute, 1994.

4. Consortium for the Improvement of Teaching, Learning and Assessment. Shared educational assumptions. Milwaukee, WI: Alverno College Institute, 1992.
5. Vrahnos DV, Dahdal WY, Wallace CS, et al. Developing ability outcomes across the clinical curriculum [abstract]. *Am J Pharm Educ* 1998;62(Winter Suppl): 109S.
6. Chalmers RK, Grotmeter JJ, Hollenebeck RG, et al. Changing to an outcome-based, assessment guided curriculum: a report of the Focus Group on Liberalization of the Curriculum. *Am J Pharm Educ* 1994;58:108-15.
7. Purkerson DL, Mason HL, Chalmers RK, Popovich NG, Scott SA. Evaluating pharmacy students' ability-based educational outcomes using an assessment center approach. *Am J Pharm Educ* 1996;60:239-48.
8. Purkerson DL, Mason HL, Chalmers RK, Popovich NG, Scott SA. Expansion of ability-based education using an assessment center approach with pharmacists as assessors. *Am J Pharm Educ* 1997;61:241-8.
9. Vrahnos D, Dahdal WY, Zlatic TD, Maddux MS. The peripheral brain: a tool to foster higher-order thinking in abilities-based courses. *Am J Pharm Educ* 1998;62:44-9.
10. Banta T, Lund JP, Black K, Oblander FW. *Assessment in practice: putting principles to work on college campuses*. San Francisco: Jossey-Bass, 1996.
11. Diamond RM. *Designing and assessing courses and curricula: a practical guide*. San Francisco: Jossey-Bass, 1998.
12. AAHE Assessment Forum. *Learning through assessment: a resource guide for higher education*. Washington, DC: American Association of Higher Education, 1997.