Creating an Efficient Outcome Assessment Plan for an Entry-Level PharmD Program

Jane R. Mort1 and Kimberly A. Messerschmidt

College of Pharmacy, South Dakota State University, Brookings SD 57007-0099

Establishing an effective and efficient outcome assessment plan is an issue facing many colleges of pharmacy. This paper describes one college’s attempt to create an assessment plan that would achieve both of these goals through an integrated three tiered process primarily using currently available assessment information. The design of this plan was influenced significantly by quality improvement concepts used in the health care setting. In addition, assessment tools and processes currently employed were grouped together based on similarities and examined for their strengths and limitations. Using this information a system was created that would avoid duplication, utilize the optimal assessment tool to measure achievement of a given outcome, only probe more deeply into an issue if a problem appeared to exist, and bring about curricular revision if necessary. While limitations to the plan are identified it is hoped that this description may help facilitate assessment plan development at other colleges.

INTRODUCTION

Pharmaceutical education has undergone significant change in the past ten years with a shift to the entry-level PharmD degree, an emphasis on the development of an outcome based curriculum, and the requirement for an outcome assessment plan(1). Most colleges of pharmacy have dealt effectively with the first two issues. However, creation and implementation of an efficient outcome assessment plan remain hurdles for many colleges. Outcome assessment is basically the process of compiling information to determine if a standard is met or not thereby validating current practices or identifying opportunities for improvement(2). When necessary this process will guide curricular revision and if the action is appropriate, it will enhance student performance. As colleges of pharmacy attempt to navigate this new challenge many are overwhelmed by the complexity and immense nature of an outcome assessment plan. This paper describes our attempt at South Dakota State University (SDSU) to develop an effective and efficient assessment plan including the conceptual framework, general plan, and current status of implementation.

1Corresponding author address: College of Pharmacy - SDSU, 1011 11th Street, Rapid City SD 57701

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CONCEPTUAL MODEL

Assessment plans may lose effectiveness and efficiency by focusing on small pieces of assessment without looking at the larger process. In order for a plan to be efficient there must be coordination among all outcome measures to avoid unintended or excessive duplication.

In designing a more efficient process the College of Pharmacy’s Assessment Committee members relied on their experience with the quality improvement standards used in the health care setting(3). These standards formed the foundation for the assessment plan and included: issue identification (an outcome in this case), goal establishment or benchmarking (a minimum standard of performance), data collection design (a testing method or assignment), compilation and comparison of the results to the established goal, analysis of results, corrective action based on the results, and follow-up assessment to determine if the action produced the desired results. These concepts were utilized when looking at all of the individual assessment measures within the plan. In many ways this is very similar to the research process.

Our students and other stakeholders are continuously assessed by means of exams, exercises, evaluations, and questionnaires. It did not seem rational or efficient to create new assessment tools that would only burden our instructors. Based on these factors we identified the need to develop a plan that would enable us to efficiently use the already available data. After examining the many various assessment methods and tools that were being used within our program similarities emerged which allowed the tools to be grouped together into categories. The common characteristics of the tools in each category dictated their strengths and limitations. For example, surveys and Advisory Council input were grouped together because they both address a broad range of outcomes and serve as an indirect source of information on outcome achievement. A strength of this category is the ability to monitor achievement of course activities (e.g., a patient counseling assignment or a classroom presentation) and success in overall completion of the course. When selecting measures for this tier (courses or individual activities) the faculty must first “map” the curriculum to identify the courses in which each outcome is taught, determine if there is unnecessary duplication or omission of experiences needed to achieve the outcome, and decide if the learning experiences progressively build upon each other. The individual activities selected to measure a given outcome were termed “flagged activities.” This term designated these activities as a marker of some specific outcome that was currently being examined by the Assessment Committee. The instructors responsible for the flagged activity are asked to define a minimum level of competency that is expected. A student’s ability to achieve this minimum level of performance is recorded. The instructors also set a threshold or benchmark for group performance (e.g., 97 percent will meet the minimum level). If this benchmark is not met, the results are examined by the instructor to determine the cause (e.g., method of teaching is not optimal). The Assessment Committee is informed of the results and the instructor’s analysis. Further evaluation or curriculum revision may be pursued if corrective action at the course level was inadequate or not an appropriate means for addressing the deficiency.

Tier II was described as “Screening Assessments.” This tier was further divided into indirect and direct measures. The indirect measures included such things as Advisory Council input and alumni surveys. These were termed indirect because the information is based on perceptions and often qualitative in nature. Direct measures on the other hand involved quantitative assessment of student performance but the results are typically provided in a general format that does not allow for scrutinizing of individual outcomes. An example of a Tier II direct assessment tool is the NAPLEX. Results of either direct or indirect assessments that do not meet the preset standard will guide more in depth analysis or bring about curricular revision.

Tier III was called “Focused Assessment.” This form of assessment is similar in design to a study. A question is identified (e.g., can students perform physical assessment), a tool is designed (e.g., students will accurately measure a patient’s blood pressure), and data are evaluated in order to answer the question. This category is labor intensive and involves careful analysis of students’ performance of a specific outcome. This measure is created solely for the purpose of curricular assessment and it may or may not be part of a class. This tier requires a great deal of faculty resources and students’ time. Therefore, Tier III should only be utilized to address perceived problem areas or to probe more deeply into issues raised by Tier I or II results.

Data obtained from any one of the three tiers may influence the type of information sought in the other tiers. For example, poor performance on a flagged activity (Tier I) addressing written communication skills might influence questions asked on an alumni survey (Tier II) or bring about a Tier III assessment focused on written skills. Another example would be graduates not reaching the goal on the “Manage Drug Therapy to Optimize Patient Outcomes” section of the NAPLEX (Tier II). Subsequently, Tier I flagged activities addressing the corresponding outcomes (e.g., an activity on pharmaceutical care) may be examined or a Tier III focused assessment on this outcome may be employed. By obtaining more information on the issue the curricular revision will be more effective. However, information from one tier alone may provide sufficient information to produce a change in the curriculum.

STRENGTHS AND LIMITATIONS

One of the strengths of the tiered system compared to use of individual assessment tools is that this system orchestrates the use of other assessment methods to confirm or refute suspected deficiencies. The system also efficiently uses resources by only invoking further examination if additional data are needed to better understand the issue or for follow-up on a matter. This outcome based assessment plan is limited in several ways. First, while this plan has been designed to improve efficiency it is still labor intensive. A college must still be willing to commit significant resources to implement an effective plan. Second, outcomes are subjectively prioritized and chosen for review. This means of identification relies on faculty’s perceptions to recognize areas of concern. Even though the plan has been designed to be more efficient a deficient area may still be overlooked. Third, minimum performance standards for individual students (e.g., a score > 80 percent on a rubric designed
to assess the outcome) and thresholds or benchmarks for group performance (e.g., 97 percent of students will achieve the minimum standard) are initially arbitrarily set by those most involved in teaching the outcome. However, other faculty may not agree with the minimum standard or the benchmark expected by the instructor. Fourth, flagged activities and Tier III focused assessments have the potential to be biased by the instructor. This may result in an assessment tool which reflects what he/she teaches while other areas are ignored. Discussion has occurred regarding the use of consultants outside the college to avoid this bias. Finally, formative student assessment is not addressed in this plan. We recognize that this is an important component of assessment but we are limited in our resources at this time. We plan to address this concern in the near future.

OUTCOME ASSESSMENT AT SDSU

SDSU is a land-grant institution offering its first certificate in Pharmacy in 1890. Since that time there have been many different degrees granted from the Pharmacy Graduate, Pharmaceutical Chemist, BS in Pharmacy, to the current entry-level PharmD. Time required for completion of the degree has also increased over the years from a two year program to the current six year curriculum. The first class was accepted into the entry-level PharmD in 1994 and the assessment process began even prior to implementation of the program.

Initial assessment work began with curricular assessment based on instructional outcome data. This data was obtained by asking the instructor for each course to indicate the extent to which his/her course addressed each individual outcome. This was done before the curriculum was implemented(4) and after two years of the program had been taught(5). Students were also surveyed in this same manner and the results were compared to the instructors’ survey data. This mapping of the curriculum allowed us to determine whether each outcome was adequately addressed within the curriculum and led to improvement in instructional design at both times(4,5). Further discussion regarding instructional assessment is beyond the scope of this paper and the reader is referred to the references cited above for more detail.

The next step in the curricular assessment process was to determine if the students were able to actually perform or demonstrate their competency in achieving the outcomes. One of the major limitations to our original plan was that it was basically a list of assessment measures such as NAPLEX results, accreditation findings, and alumni survey data. The tools were not closely tied to specific curricular outcomes which made evaluation of outcome achievement impossible. The process also produced fragmented outcome data that was not integrated in design. This meant some outcomes could be excessively evaluated while others were overlooked. Therefore, the Assessment Committee decided to implement a tiered assessment plan that would maximize efficiency by providing a systematic method of utilizing data to identify weaknesses, focusing further evaluation efforts, and bringing about curricular revision when necessary.

The Assessment Committee designed the tiered outcome assessment plan in the spring of 1999. Appendix A contains the final version of the Outcome Based Assessment Plan Overview approved by the faculty including examples of assessments used in each tier. Appendix B provides an example of how an outcome is examined at all levels although each outcome is not typically evaluated on all three levels. The system is designed to use routinely acquired information (Tier I and II) to trigger more in depth evaluation (Tier III) when needed. Tier IA refers to completion of a course that focuses significantly on the outcome/s in question (e.g., Professional Resource Management course addresses the management outcome). Tier IB designates the flagged activity within a course that addresses the outcome/s being examined. Thresholds or benchmarks of group performance will be established for these monitors to indicate when further evaluation is necessary. Appendix C illustrates how the results from a Tier IB flagged activity are used to evaluate the achievement of a curricular outcome and modify teaching. Figure 1 provides a sample of the pathway for curricular modification based on assessment findings. The time frame from problem identification to curricular revision will vary depending on the issue. If more information is needed or the solution is extremely complex, the process will be more prolonged.

IMPLEMENTATION OF THE PLAN

A timetable for implementation of the assessment plan was developed. An outside consultant, Dr. Diane Beck, provided a seminar on assessment and reviewed the plan in the spring of 1999. The plan was revised and clarified based on this input. The plan requires faculty support and participation and therefore the plan was presented to the faculty for their input in the summer. Faculty approved the plan in September of 1999. The University Assessment Coordinator has also provided the Assessment Committee with input on the plan and instruction on assessment.

Tier I work has included choosing a manageable number of target outcomes, using instructional assessment results to correlate courses with the outcomes, selecting only one course from each year that addresses each outcome category to avoid redundancy, and requesting flagged activities from the instructors of these courses. The Assessment Committee examines the submitted activities to determine if the outcome is being developed in a stepwise manner in the curriculum. The instructor is also asked to submit a description of the assignment, the minimum level of competency that is acceptable, a benchmark for group performance, and a report of the results. This report includes a description of the deficiency, the number of students who are not meeting the minimum standard, an analysis of the
data, and a description of any changes made to address areas of concern. (See Appendix C for an example of our reporting method.) Results are shared with the faculty and administration at an annual curriculum workshop. The initial plan was to look at several activities from each year that addressed the majority of outcomes. This was subsequently revised to target specific outcomes of concern. Courses and flagged activities addressing specific outcomes will be examined to determine if a problem exists. If there are no problems, then a new set of outcomes will be examined.

Tier II activities currently undertaken include disseminating an alumni survey focused on select outcome categories, determining the benchmark for quantitative results, establishing reporting mechanisms for the qualitative information which comes from the advisory or student council, and evaluating licensure examination data. The following is an example of data analysis for a Tier II assessment. NAPLEX results are examined for passing rates and average score results. The benchmark for passing the exam is set at 100 percent of SDSU students achieving a passing score. SDSU students’ average overall scores and subsection scores in each of the three areas (e.g., Area 1 - “Manage Drug Therapy to Optimize Patient Outcomes”) are evaluated by comparing these averages to the national averages. Our benchmark is for the SDSU students’ average scores to be greater than the national averages (i.e., total scores and subsection scores). We have met these benchmarks since graduating our first class of PharmD students in 1998. Failure to reach any of these benchmarks would result in a more careful analysis of the data and potentially a Tier I or Tier III assessment.

Initiating Tier III assessment was anticipated in the fall of 2000 but clerkship requirements were altered in May of 2000. In order to obtain data before and after the curricular change, a clinical knowledge assessment tool was designed and is being administered. The assessment tool examines knowledge in each clerkship area from Internal Medicine to Pediatrics. Data will be collected for four consecutive graduating classes. Tier II NAPLEX results (i.e., Area 1 - “Manage Drug Therapy To Optimize Patient Outcomes”) will also be compared for these four classes to identify trends in students’ knowledge base. NAPLEX results will not provide data on deficiencies in knowledge about specific rotations which our assessment tool data can provide. However, NAPLEX results will help to identify differences in knowledge base between classes and thereby enhance analysis of Tier III assessment results. This illustrates how the tiers are designed to work together to clarify analysis of assessment information.

Currently the Assessment Committee is responsible for these activities. Membership has been expanded to include three faculty members from each of the two departments. One of the faculty members also serves on the Curriculum Committee to enhance coordination of efforts between the two committees. No faculty member has a specific part of their work assignment set aside for these activities. The committee has requested that a faculty member be designated Assessment Coordinator and assigned 20-25 percent of their time for assessment activities. This person would be responsible for such things as keeping faculty on task and sharing assessment results with the faculty.

CONCLUSIONS
Outcome based assessment has become the standard for curricular development and revision(1,4,6,7,8). This represents one college’s attempt to create and implement a plan that will help to optimize the curriculum and improve students’ achievement of outcomes. It is anticipated that the plan will also be revised as shortfalls are identified and more efficient methods are developed.

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References

APPENDIX A. OVERVIEW OF THE OUTCOME BASED ASSESSMENT PLAN

GOAL
The goal of the assessment plan is to systematically assess the curriculum’s effectiveness in preparing students to achieve competency in the curricular outcomes and to use the information gathered to continuously improve the curriculum in the areas of content, instruction, and assessment.

FORMAT
The plan focuses on the relationship of the 85 individual outcomes and the 13 Outcome Categories to assessment methods. The ground work for this relationship within the curriculum has been determined through the surveys which examined the instructors’ perceived level of outcome coverage in his or her assigned course. A frame work has been designed for evaluation of future assessment results. This framework utilizes a Tier Level structure and is expected to optimize the evaluation of assessment information. There are three tiers in the structure with Tier I involving classroom achievement, Tier II focusing on screening results, and Tier III including focused assessment activities. (These are described in more detail below.) A pathway for curricular modification is included. A timetable for assessment activities will be created. An annual report will be provided to the faculty and the Curriculum Committee by the Assessment Committee.

TIERED SYSTEM - OVERVIEW
Tier I - Course Specific Assessment
Classes are tied to outcomes and therefore successful completion of courses reflects achievement of outcomes. Tier I consists of the following:

Tier II - Screening Assessment
Tier II consists of indirect and direct general information on students’ achievement of a broad group of outcomes outside of course work. Direct assessments (e.g., NAPLEX, State Law Exam) in this category are considered general information because of the limited results reported to the College.

Indirect
- Advisory Council
- Student Advisory Council
- Alumni Survey

Employer Survey
California Critical Thinking Skills Test California Critical Thinking Disposition Inventory

Direct
- NAPLEX State Law Exam

Tier III - Focused Assessment
Tier III consists of assessments which focus on a specific set of outcomes. A group of experts in the College creates the assessment tool and evaluates the results. For example:
- Pharmaceutical Care Practice Simulations
- Drug Distribution and Control Practice Simulations

APPENDIX B. TIERED ASSESSMENT FOR A SELECT OUTCOME

<table>
<thead>
<tr>
<th>Outcomes</th>
<th>Tier I - Course specific assessment</th>
<th>Tier IB - Flagged activities</th>
<th>Tier II - Screening assessment</th>
<th>Tier III - Focused assessment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pharmaceutical Care -</td>
<td>3rd Year – PHA 310 – Introduction to</td>
<td>Paper on the Pharmaceutical Care Process (Proposed)</td>
<td>NAPLEX – Area 1 “Manage Drug Therapy to Optimize Patient Outcomes”</td>
<td>Written clinical skills exam at time of graduation (Only used if there was a problem identified in one of the other tiers)</td>
</tr>
<tr>
<td>Outcome # 61</td>
<td>Pharmaceutical Care</td>
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<tr>
<td>Design and implement drug therapy for the purpose of achieving definite outcomes that improve the patient’s quality of life by: (1) curing a disease, (2) eliminating or reducing a patient’s symptomatology, (3) arresting or slowing a disease process, or, (4) preventing a disease or symptomatology.</td>
<td>4th Year – PHA 460 - Pharmaceutical Care Experience Lab</td>
<td>Patient Counseling Simulation (Proposed)</td>
<td></td>
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<td></td>
<td>5th Year – PHA 733 - Therapeutics Gastrointestinal and Nutrition</td>
<td>Group Case Study</td>
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<td>6th Year – Clerkship Oral Exam Requirement</td>
<td>Oral Exam</td>
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APPENDIX C. EXAMPLE OF TIER IB FLAGGED ACTIVITY

Outcome statement: The student will understand the ethical, legal and sociopolitical aspects of information and its technologies.

Description of flagged activity: The instructor and a guest speaker from the library presented lecture material regarding plagiarism and copyright issues.

Benchmark: 80 percent of students will achieve a SATISFACTORY (9 of 11 points) or EXCELLENT (10 of 11 points) score on written examination questions pertaining to plagiarism and copyright issues.

Data Collected: 76 percent of students received a SATISFACTORY or EXCELLENT score.

Comparison to Benchmark: Benchmark not met.

Analysis:
- The topic appeared to be adequately covered based on the following:
  - Review indicated that the material was appropriate and an expert in the field was involved in the presentation.
  - Students mastering the activity did quite well.
  - Test design (i.e., points assigned) may have contributed to poor performance.
  - Poor performance was limited to a subset of students who did not study for this portion of the exam. These students may have determined that their final grade was not likely to be affected by a low score in this area because of the limited number of points assigned to this topic.

Corrective measures: Assessment will be administered in a separate quiz that the student is required to pass rather than as part of a larger examination.

Follow-up: Flagged activity will be repeated next year with the above modifications.