Curriculum Mapping—An Essential Tool for Curriculum Development
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INTRODUCTION
Curriculum development has become increasingly more difficult to manage due to the increasing fund of medical knowledge, the clinical skills expected of a well-educated physician assistant (PA), and the proliferation of educational strategies. Student-centered learning, evidence-based medicine, problem-based learning, integrated teaching, and standardized patients have all enjoyed vogue recently, while educators are still expected to maintain enabling and terminal instructional objectives. New approaches to assessment and new learning technologies have also attracted tremendous interest as well. An aspect of curricular development that has been relatively neglected is how curriculum developers communicate about the content of curriculum and track that content. How do faculty know what has been covered in the curriculum and when it has been addressed? How does assessment relate to the curriculum?

Curriculum mapping provides answers to these questions. Specifically, it tracks what is taught, how it is taught, and when it is taught. It may include which assessment instruments measure the competencies gained in the teaching, as well. Because autonomy and academic freedom to build curriculum are closely guarded values of higher education, curricula have a tendency to shift when changes in faculty occur (eg, hiring new faculty, changing assignments of existing faculty). As a result, students can lose an important part of the curriculum. Curriculum mapping provides a context for planning and discussing the curriculum so that decisions are not made in a vacuum. This comes from faculty understanding the workings and the value of the process. Veteran and novice faculty alike must become familiar with the process of the mapping paradigm so that they will see the inherent value in knowing that what they plan to teach actually translates into a working curricular model that makes better use of faculty time and resources. Adopting a systematic yet flexible process is vital to stripping away the nonprogressive sentiments and the false sense of autonomy that may exist in adjusting curricula. Curriculum mapping is a spatial representation of the different components of the curriculum so that the whole picture and the relationships and connections between their parts are easily seen.

Identify Stakeholders
The first step in preparing a curriculum map is to investigate the needs and abilities of those who will be using the map. Several different groups may find it useful, and it must meet the needs of all stakeholders. These will depend on the needs of the program. Faculty will want the map to be easy to use and a clear picture of what they teach and how it fits into the curriculum. Faculty will also want to know what the students learned before they entered their classes and the level to which the stu-
Electronic Mapping
The key to facilitating the entering of the mapping data is to do it electronically. Electronic entry allows the data to be shared with colleagues so that they can confirm which parts of the curriculum are being delivered in another class. Computer-based tools must be easy to navigate and effectively support a wide level of user capabilities to be successful and widely accepted. The technology must not impose an unnecessary burden on faculty. Available commercial programs include Rubicon Atlas, Curriculum Compass, Curricular Mapper, and SemNet (a Macintosh-based system). Filemaker Pro and Microsoft Access databases and Microsoft Excel spreadsheets may be modified for use in curriculum mapping when resources are limited. When choosing a mapping program, one must consider the time it takes to develop and maintain a database. What must remain consistent, whether outsourcing the database or developing it in-house, is that the program be flexible enough and that all faculty have access to it.

Map Content
To ensure success for all, each program should be committed to the systematic planning for reflection on and realignment of what is taught. The extent to which faculty identify specific content to be learned is an important element in the development and implementation of the mapping program, as is the extent to which the content is organized and how skills and attitudes are integrated with disciplinary knowledge. These are required of all PA programs and are outlined through expected competencies.

Inherent in the success of the curriculum mapping process is the capability to identify the content and the extent to which the students have reached the objectives. Mapping of the instructional objectives can identify needed corrections and improvements in the program. Gaps, omissions, and unneeded repetitions found in mapping should be addressed. Analysis of assessments or review of the benchmarks that have been met may be hyperlinked to various parts of the map. This process provides validation for faculty and gives them the assurance of knowing that what they teach is actually being learned and used. Collaboration among users of the mapping process by means of critical feedback based on data is vital to the success of the mapping curriculum.

One Program’s Experience
Through the activity of its PA curriculum committee, the Butler University/Clarian Health Physician Assistant PA Program establishes and maintains the instructional objectives used throughout the program in a Global Objective Tracking System (GOTS) document, which assists our program in curriculum mapping. Because of financial limitations and the diversity of technological savvy within our program, we chose to map our curriculum using an Excel spreadsheet. The GOTS document is subdivided into 14 spreadsheets: 12 body system-specific spreadsheets, a research-specific spreadsheet, and one general spreadsheet that includes those instructional objectives that do not easily fit into a body system-based design. Each body system spreadsheet is set up identically with the specific system labeled in the upper, far left column. The courses within our program are listed along the X axis at the top of each column. A partial pulmonary spreadsheet is included to serve as an example of curriculum mapping. (Figure 1).

After much deliberation, the curriculum committee determined the basis for curricular content within our program to be an amalgamation of sources. These sources include the National Commission on Certification of Physician Assistants’ disease list, the Indiana University School of Medicine list of core competencies, PA program faculty, and the practice experience of local physicians and PAs about the common diseases and pathologies that they regularly encounter. This content is labeled along the Y axis of the spreadsheet. Within the appropriately located cell, instructional objectives are listed that correspond to the class in which student achievement is expected and correlated to the previously described modified disease list along the Y axis. The next step in the development of our program’s map is to incorporate the outcome of programmatic assessment data into the curriculum map for immediate accessing.

Dynamic Process
It should be understood that the first map is only the beginning. Often, many more questions are raised than answered. While it may be a static snapshot of competencies at the time it is instituted, the curriculum map should reflect a dynamic process. This is especially important as the program’s curriculum increases in complexity so that the curricular content can be accurately audited. The curriculum map should evolve as the curriculum evolves. Developing and implementing a curriculum map is not an easy task. A long-term com-
mitment to mapping can only come by infusing the process into the culture of the program. However, time and effort spent developing and maintaining the curriculum map will prove to be rewarding.

REFERENCES


