

The Map to Curriculum Alignment and Improvement

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If you don't know where you are going, any road will get you there.

- Lewis Carroll

Curriculum mapping is a versatile process tool that can help faculty discern whether different curriculum components align; and if not, what adjustments can be made. Through this process faculty create a graphic portrayal of the program outcomes, the courses that comprise the program, and their relationship to the program's purpose. This article describes both the curriculum mapping process and resulting map, highlighting the versatility of this approach by sharing examples of how it has been used by several academic units.

Improving Scholarly Teaching and Student Learning

Today, the improvement of scholarly teaching and student learning is a critical charge for institutions of higher education, particularly due to accreditation standards and accountability for educating future professionals. While there are many improvement strategies and methods available, typical initiatives involve a feedback loop based on student learning outcomes, which are previously agreed upon skills and broad learning goals adopted by faculty. Based on these outcomes, faculty members design courses and programs, and then collect pertinent assessment data which is reviewed by faculty for refinement and modification (Allen, 2004;

Maki, 2002; Hutchings, Marchese, & Wright, 1991). Thus, the improvement process involves continual monitoring and assessment in order to ensure scholarly teaching and learning found in quality education. The purpose of this essay is to show the versatility of one improvement method, curriculum mapping, as a process that facilitates curriculum alignment, and to share examples of how several of our academic units have used this process. Finally, we will highlight some of the costs and benefits of using the curriculum mapping process, although an extensive discussion of these important issues is beyond the scope of this paper.

The Four Curricula

What is a curriculum? Often a curriculum is described only as a collection of courses leading to a certificate or degree. Unfortunately, this is how too many students experience higher education – an aggregate of classes lacking clear intentionality of purpose, process, and content. The course catalogue is the only “map” needed to navigate such a curriculum. An effective curriculum is synergistic: “A curriculum is a programme of study where the whole is greater than the sum of the individual parts” (Harden, 2001). The Pennsylvania State Board of Education (1998) offers a useful definition of curriculum: “A series of planned instruction that is coordinated and articulated in a manner designed to result in the achievement by students of specific knowledge and skills and the application of this knowledge.” A curriculum entails four types of “curricula:” what institutions, programs, and faculty say about the curriculum’s nature and purpose (the written curriculum); how the curriculum is implemented (the taught curriculum); what students gain from their experiences (the learned curriculum); and how student performance is measured (the assessed curriculum). Similar concepts also have been noted by others (Robley, Whittle, & Murdoch-Eaton, 2005; Wachtler & Troein, 2003).

Studies on the efficacy of curriculum alignment in K-12 grades, such as those reviewed by Cohen (1987) and those in medical education (Harden, 2001; Wachtler & Troein, 2003), suggest what is intuitively obvious to many educators: students will learn and perform better when these four “curricula” align to form one curriculum. When they do not align, things rarely go well. Consider a Learn-To-Drive class. The brochure states that students will learn everything required to obtain a driver’s license (written curriculum), but classes consist mostly of instructor stories, films of accidents, reading the Driving Manual, and driving around the parking lot (taught curriculum). Students come to understand that driving can be dangerous and they learn numerous rules-of-the-roads, but not much more (received curriculum). Following the course, they take their licensing exam – and may fail. The driving examiner requires them to merge into freeway traffic, parallel

park, and other maneuvers that they had not experienced (the assessed curriculum).

Purpose of Curriculum Mapping

Curriculum mapping is a versatile process tool that can help faculty discern whether different curriculum components align, and, if not, what adjustments can be made. Like road maps that show the starting point, destination, and a variety of routes to get there, depending on the purpose (e.g., scenic or expeditious), a curriculum map is a graphic portrayal of the program goals or outcomes, the courses that comprise the program, and their relationship to the program’s purpose. The map enables faculty and administrators to see these relationships, including gaps and redundancies. By adding details to the map, especially instructor input, the stage is set for reflective and meaningful faculty discussions about the curriculum. As Harden (2001) states:

Curriculum mapping is about representing spatially the different components of the curriculum so that the whole picture and the relationships and connections between the parts of the map are easily seen. This complete picture is more meaningful to the teacher, the student or the manager than the picture presented by the random collection of pieces which is often what they have (p. 123).

Consequently, the purpose, content, and design of the curriculum become readily apparent to all stakeholders: faculty, administrators, future employers, students, parents as well as external entities requiring evidence of accountability. A curriculum map also helps guide program design and improvement, including consistency, fairness, quality, and effectiveness (Matveev, Okala, & Cuevas, 2006). The processes of designing curriculum maps range from complex audit systems (Matveev et al., 2006) to relatively simple, though faculty-intensive, procedures (Mahaffy, Messick Svare, & Kopera-Frye, 2007). As with research, obtaining quality data, while essential,

is only the first part. The real value comes from engaging faculty to analyze the map, then discuss and act on the implications.

Constructing a Curriculum Map

Developing a curriculum map for program improvement is a process beyond the scope of this paper; however, a brief description may be useful. Prior to constructing a curriculum map, two conditions must be met. First, each course must have stated learning objectives. Second, the program must have student learning outcomes that commensurate with the departmental mission. The framework of the map is a matrix with required courses listed on the left vertical axis and the program's student learning outcomes listed as column headings on the horizontal axis, as shown in Table 1.

Each cell formed by the matrix will contain information showing how a specific course relates to a specific student learning outcome. The kind of information portrayed in the cells should be determined by the faculty. The example below represents only a small portion of a typical map, and displays information about:

- level – the “depth” at which the content is explored (introduced, reinforced, advanced/

applied, not addressed);

- emphasis – the time and effort devoted to the content (little/none, moderate, extensive); and
- assessment – how the content is assessed (exam, paper, project, other, not assessed).

Some faculty choose to populate these cells with information about the area of Bloom's taxonomy of educational objectives (Bloom, 1956) being addressed (e.g., synthesis, comprehension). Many variations exist; the relevant point is that faculty agree on the information the curriculum map will display and that it is designed accordingly.

Each instructor is responsible for mapping their own courses – information that is then compiled and displayed on one comprehensive matrix, the curriculum map. At our university, the program's assessment coordinator creates the final map, but having someone in charge of the overall mapping effort is critical to success. Finally, one of the true strengths of curriculum mapping is its malleability; programs can and should modify it to serve their needs.

Using Curriculum Mapping

Curriculum mapping can be used for two different purposes: 1) to examine a curriculum at its design

TABLE 1
Alternative Arts and Sciences – B.S.

	Students can predict the future.	Students can read others' minds.
Palm Reading 102	Level: Introduce concepts Emphasis: Light Assessment: Not assessed	Level: Introduce skills and concepts Emphasis: Moderate Assessment: <i>What's My Sign? Test</i>
Crystal Ball Analysis 380	Level: Advanced Emphasis: Strong Assessment: <i>The Madam Celeste Simulation</i>	Level: Reinforce skills and concepts Emphasis: Strong Assessment: <i>Student Clairvoyant Assessment Method (SCAM)</i>

stage or creation; and 2) to refine/evaluate an existing curriculum. The first case, or “front-end” analysis, involves reviewing a curriculum map to examine if the curriculum has face validity by posing questions about the appropriateness of the stated student learning outcomes, the nature and range of courses, the course sequence and prerequisites, course content (goals, instructional objectives, and assessments), along with gaps, and redundancies among courses. The purpose is to see if there is agreement on what students are to learn by completing the curriculum, how faculty will know what students know, and if the curriculum is designed and aligned to enable students to achieve those outcomes. Such a map also is useful in the design of a new course or curriculum as it often stimulates constructive dialogue among faculty.

Conversely, a “back-end” analysis uses assessment data with a curriculum map to facilitate faculty discussion and understanding about why outcomes are or are not achieved. If the curriculum is aligned properly, assessment data will show concordance between student performance and preset student learning outcomes. The map highlights classes where student performance falls below expectations on one or more pre-defined outcomes. First, if the outcome itself is found to be appropriate, faculty look to the scope and sequence of the courses supporting the outcome (or the instructional objectives if a single course is under review). For example, course content supporting outcomes may be redundant across several courses or the content level of instruction is covered out of sequence (e.g., advanced level of instruction in a 200-level course, and introductory level in a 400-level course). While the structure of the curriculum may align with the outcome, student learning or retention may be problematic. Such situations may require delving into course syllabi and engaging faculty in more detailed discussions about what they teach and how they assess learning. Because the discussions become more sensitive as they become personal, leadership is required. In fact, someone in the program must guide and coordinate the entire curriculum mapping process and review. Finally, not all student performance problems directly result from curriculum and instruction; student behaviour, departmental resources, and institutional

culture should not be overlooked.

Research Component in a Social Work Program

A front-end analysis example

The following example, currently in process, illustrates the use of curriculum mapping for the purpose of redesigning one component of an existing program – in this case a four-course research sequence, which spans the bachelors and masters social work programs at the University of Nevada, Reno. This example also illustrates how a problem with the “hidden curriculum” can be addressed through a curriculum mapping process. The hidden curriculum (Wachtler & Troein, 2003) consists of student learning outcomes which are not stated and perhaps contested among faculty members, and therefore may not be aligned or assessed.

Our need to redesign the research sequence resulted from student feedback in the form of program evaluation surveys, student teaching evaluations, and faculty observations that students were not transferring skills learned in research classes to higher-level research classes or practice courses. Social work students’ dislike of and anxiety about research is legendary. However, the value of research to inform practice is widely recognized. Our goal was to assess the research curriculum. Did the research sequence reinforce key research principles? Did assignments fit the skill level of students to minimize anxiety and maximize learning? Broad research requirements are established by our accreditation body, but each school adapts these guidelines to fit their program philosophy and mission.

The first step in successful curriculum mapping depends on identifying a group that is responsible for its completion – in this case the Research Curriculum Committee. The hidden research curriculum quickly became evident when the committee members could not agree on key issues: the emphasis on specific research methodologies, the definition and value of evidence-based practice, and the integration of research with the rest of the curriculum. This

lengthy process, as well as inviting the director of the University Assessment Office to a meeting to discuss curriculum mapping, was important in establishing buy-in for the curriculum mapping process.

Before proceeding to graph the research sequence curriculum, it became clear that we needed to establish specific student learning outcomes for research that faculty could endorse. To accomplish this, we developed a list of core research competencies that currently are taught (adapted from Adam, Zosky, & Unrau, 2004) and which we will use to survey faculty and field practicum supervisors about the importance of each competency for professional practice. This process has provided a structure for faculty to discuss issues that can become contentious. Once the committee agrees on a list of core competencies, these will be mapped onto the four research courses. Ultimately, we plan to examine how the agreed-upon core competencies can be reinforced throughout the social work curriculum.

Programmatic Curriculum Alignment

A back-end analysis example

The starting point of a curriculum improvement program should involve deciding on the student learning outcomes and how they are embedded in the curriculum. These outcomes should be commensurate with the departmental mission and consistent with faculty concerns and interests.

In our Human Development and Family Studies undergraduate program, we constructed a curriculum mapping of our core courses. Each instructor was responsible for mapping their own courses, information our assessment coordinators compiled and displayed on one comprehensive grid. For each course, the instructor noted our departmental mission-based student learning outcomes across the top horizontal axis of the matrix, and the course objectives were listed on the vertical axis of the matrix. Three elements were contained in each cell: 1) level of instruction (e.g., how much instructional time/effort was devoted to this outcome such

as introductory, advanced, etc.); 2) level of student learning/performance using Bloom's (1956) taxonomy (e.g., synthesis, comprehension); and 3) artifacts or products used to document student performance (e.g., exam, paper). The comprehensive, program-level map was color coded for level of instruction to help gauge sequencing of outcomes across appropriate course numbers (e.g., introductory human development should occur in our 201 course, not our 431 class), and also to look for instances of redundancy or overlap of course objectives, artifacts, and course content (i.e., students complained they had the same material in two prior courses, suggesting redundancy of instruction). Refined course content led to greater curriculum alignment, dropping redundant courses and material, and an enhanced sequence of learning for our students.

Utilizing Curriculum Mapping in an Accreditation Application

An accountability example

One of the authors was involved in preparing an accreditation application for Program of Merit designation through the Association for Gerontology in Higher Education (AGHE) for our 24-credit interdisciplinary gerontology undergraduate certificate program. In this case, the certificate classes represented up to nine different academic departments across our campus, with at least eight different instructors. Curriculum mapping was undertaken to compare each of our certificate courses against AGHE's standards for accredited programs nationally. A map was constructed, as described above; however, instead of departmental mission-derived student learning outcomes, AGHE's standards were represented across the horizontal top axis and the certificate classes displayed down the leftmost vertical axis. The same three elements in the program example described immediately above were included in each cell. Our Gerontology Certificate program was only the seventh program nationally to receive the Program of Merit designation and the site reviewers remarked that they had not experienced prior applications containing

curriculum maps, but were going to require this process in all future applications to show accountability and curriculum alignment with AGHE standards.

Challenges and Benefits of the Curriculum Mapping Process

In workshops at the University of Nevada, Reno and elsewhere, we informally surveyed attendees (primarily faculty and fewer administrators) about the benefits and challenges of using curriculum mapping. These, along with our recommendations for implementing curriculum mapping, are listed below.

Benefits

- Curriculum alignment.
- Clarification of student learning outcomes.
- Use in accreditation applications.

Challenges

- Faculty buy-in for using curriculum mapping due to the time and effort involved and because of concern over how the map might be used (e.g., faculty evaluation).
- Difficulty in reaching decisions about what to do with overlapping courses.
- Course ownership issues.
- Difficulty in mapping departmental missions and/or student learning outcomes that are vague or incongruent.

Recommendations

- Get faculty buy-in up front in order to promote ownership of the curriculum mapping process (instead of a top-down mandate).
- Revisit the map to check for periodic drifts in courses.
- Have regular faculty dialogues about purpose and value of curriculum mapping, and to discuss faculty views on the process.
- Share your results with administration to

recognize academic units leading this process.

- Encourage stipends, trainings, presentations at teaching conferences (e.g., STLHE) and publications as a means to reinforce this process among faculty.

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