

Curriculum Evaluation for the Improvement of STEM Programs of Study



The Office of Community College Research and Leadership (OCCRL) was established in 1989 at the University of Illinois at Urbana–Champaign. OCCRL is affiliated with the Department of Education Policy, Organization and Leadership in the College of Education. Our mission is to use research and evaluation methods to improve policies, programs, and practices to enhance community college education and transition to college for diverse learners at the state, national, and international levels. Projects of this office are supported by the Illinois Community College Board (ICCB) and the Illinois State Board of Education (ISBE), along with other state, federal, and private and not-for-profit organizations. The contents of publications do not necessarily represent the positions or policies of our sponsors or the University of Illinois. Comments or inquiries about our publications are welcome and should be directed to OCCRL@illinois.edu.

Attribution to ISBE

This publication was prepared pursuant to a grant from the Illinois State Board of Education and was funded 100% through the federal Race to the Top Funding provided through the American Recovery and Reinvestment Act of 2009. Printed by the Authority of the State of Illinois in September 2014 (500 copies, ISBE Contract Number 2012–06779). The total amount of federal funding involved is \$3,580.00, which represents 100% of the cost of producing the publication.

An Equal Opportunity/Affirmative Action Employer

Illinois State Board of Education
100 North First Street
Springfield, IL 62777-0001
<http://www.isbe.net>



Chair, Gery J. Chico
Superintendent, Christopher A. Koch, Ed.D.

Acknowledgment

This module was printed by the Pathways Resource Center and the Office of Community College Research and Leadership (OCCRL), Department of Education Policy, Organization and Leadership, University of Illinois at Urbana–Champaign. Special thanks to the Illinois State Board of Education, particularly Dora Welker and Harley Hepner, for their persistent and gracious support. We also express our thanks to the PTR team leaders and team members throughout the state who have piloted and implemented PTR since its inception. Finally, we thank Heather Fox for her creative contributions to the design and production work on this publication.

Suggested Citation:

Malin, J. R. (2014). *Curriculum evaluation for the improvement of STEM programs of study*. Champaign, IL: Office of Community College Research and Leadership, University of Illinois at Urbana–Champaign.

Copyright 2014 Board of Trustees, University of Illinois



Background

This Curriculum Evaluation module has been developed by the Pathways Resource Center as a companion to the Curriculum Alignment module, and is complementary to the Pathways to Results (PTR) process (Bragg & Bennett, 2012) established by its affiliate organization, the Office of Community College Research and Leadership (OCCRL) at the University of Illinois at Urbana-Champaign. These modules are designed to be supportive of the Illinois Pathway Initiative (IPI) and the implementation of P-20 STEM programs of study. The IPI is aimed to assure that Illinois high school students are fully prepared for college and careers and also complete postsecondary education in greater numbers. Represented by a partnership among the State of Illinois' education and economic development agencies, IPI supports programs of study that empower students to explore and prepare for their academic and career pursuits while also supporting public-private partnerships known as STEM Learning Exchanges that coordinate investments, resources, and planning for these programs. The IPI website is available at <http://www.ilpathways.com/Pages/Home.aspx>.

IPI is complemented by Pathways to Results (PTR), which is an outcomes-focused, equity-guided process to improve programs of study and related policies that support student transitions to and through postsecondary education and employment. P-20 programs and pathways emphasize college and career readiness are at the heart of both the Illinois Pathways and PTR efforts.

Pathways to Results (PTR) is an outcomes-focused, equity-guided process to improve pathways and programs that support student transition to and through postsecondary education and employment. PTR focuses on addressing equity gaps between diverse learner groups and continuously improving processes critical to student success, including retention, completion of postsecondary credentials, and transition to employment.

Curriculum assessment and evaluation should be ongoing endeavors, which are particularly focused and systematic under certain circumstances. For instance, the onset of a program typically begs for attention as to how its elements (including curriculum and instruction) are working. Also, at regular intervals, it is imperative to review existing programs, as a means of continually improving them, or determining whether they justify continued investment. Step one of the seven-step process outlined herein concerns helping educators to determine whether the time is right to systematically evaluate curriculum (or some aspect of it), and—if so—to broadly identify topics and questions of greatest current interest. Next, in step two, educators are guided through a number of fundamental planning decisions, including who will be responsible for overseeing and conducting the evaluation. For instance, will the evaluation be conducted in-house or by external evaluators (further discussed on p. 18)? Will the evaluation be primarily formative or summative in nature (see Appendix A; also further discussed on p. 14)? Evaluation is a planning—and decision-heavy endeavor; the first five steps, all of which concern preparation, will position educators nicely to carry out and complete the evaluation (steps six and seven).

Although evaluation purposes and central questions vary, ideally an evaluation will be used to inform decisions, improve curriculum or program quality, and improve student learning. To do so, evaluators must assess the merit or worth of the object(s) of evaluation (Guba & Lincoln, 1981; also see inset). With respect to programs of study, curriculum evaluation will be instrumental as educators develop and refine these programs to best meet students' learning and developmental needs. This module is aimed to assist those who intend to pursue program of study curriculum evaluation. Educators desire the best possible learning experiences for students, and curriculum evaluation is an indispensable means of improving programming.

Merit and Worth in relationship to evaluation.

Merit refers to the intrinsic value of an entity or object of study. It is independent of context.

Worth refers to the value of an entity in relationship to a particular context or application.

For example, a beautifully written passage from Jane Austen's *Great Expectations* might seem to a principal to have significant merit. However, in the eyes of many middle school students in an urban school environment, its worth may be limited.

Source: Guba, E., & Lincoln, Y. (1981). *Effective evaluation*. San Francisco, CA: Jossey-Bass.

Overview

This module borrows from Wolf, Hill, and Evers (2006), who define curriculum evaluation as “a process of gathering and analyzing information from multiple sources in order to improve student learning in sustainable ways” (p. 3). This module emphasizes evaluation as a means of learning more about the curriculum within a program of study (or its courses or other elements of special interest), and the ways in which it is impacting participating students; most generally, this module aims to identify curricular areas of strength and need. To do so, a model and approach for reviewing information from various sources is shared. This model incorporates aspects common to all curriculum assessment, as well as aspects that are of particular importance to programs of study. The Pathways Resource Center is particularly concerned with facilitating Illinois educators’ development and improvement of Science, Technology, Engineering, and Mathematics (STEM) programs of study; as such, this module provides targeted, STEM-specific information and advice. However, the foundational information and processes described herein are applicable to the evaluation of all manner of educational programming.

Curriculum has been defined in a multitude of ways; this module employs a broad definition: “The curriculum consists of the ongoing experiences of children under the guidance of the school” (Ragan & Shepherd, 1971, pp. 3–4). Eisner (2002, p. 26), as well, views curriculum as a “program” that the school organization “offers to its students.” It includes a plan for achieving goals for student learning (Ornstein & Hunkins, 2009). These broad conceptualizations accommodate the many types of student learning experiences, some of which occur apart from the confines of a traditional classroom setting, which are offered within mature or highly implemented programs of study. For instance, mature programs of study invariably feature work-based experiences, internships, and career and technical student organizations, each of which fits within this definition of curriculum (see inset on page 4). Yet, in any given curriculum evaluation, the team will wisely limit its focus to areas of particular interest or concern. Teams using this module, in fact, will be guided through a set of approaches enabling them to systematically assess stakeholders’ needs and select the best suited evaluation options (Chen, 2005).

What is STEM Education?

“...an interdisciplinary approach to learning where rigorous academic concepts are coupled with real-world lessons as students apply science, technology, engineering, and mathematics in contexts that make connections between school, community, work, and the global enterprise enabling the development of STEM literacy and with the ability to compete in the new economy” (Tsupros, Kohler, & Hallinen, 2009).

Is This Curriculum?

Which of the following is part of this module's working definition of curriculum?

- A. A syllabus for a course
- B. A Career and Technical Student Organization
- C. A school-sponsored internship program
- D. All of the Above

The correct answer is D. All of the above.

Still, in any evaluation of curriculum, the task will be to define the evaluation's scope and limits. Steps 1-4 in this module will help teams to do so!

Curriculum Evaluation: Potential Focus Areas

Depending upon the primary questions and phase of program development/implementation (Appendix B; also see Chen, 2005, for more detail), the team may choose to focus especially on outcomes, processes/materials, or both. In nearly all cases, teams first will wish to consider questions that span across each of these areas before narrowing the scope. Here are a few examples of the types of questions to pose and answer about the program(s) of study, by focus area:

Process/Materials-Focused Questions

Examples; adapted from Glatthorn, Boschee, Whitehead, & Boschee, 2012

- What aspects of the curriculum are working, and what need to be altered?
- To what extent are the goals of the written curriculum understood and supported by all stakeholders, including students?
- To what extent are the individual courses scoped/sequenced for vertical articulation, and to what extent are they consistent with best practice recommendations and learning standards?
- Are the written materials aligned with the objectives of the course/program, reflective of best current knowledge, and free of bias/stereotyping? Are learning opportunities relevant to students and reinforced by work-based learning and mentoring relationships?

- To what extent is delivery of the curriculum (e.g., the instruction) consistent with the written goals and objectives?
- What is the quality of student assessments within the course or program? To what extent does it allow teachers to assess diverse student learning needs and individualize instruction?

Outcomes-Focused Questions

Examples; adapted from Glatthorn et al., 2012

- What students are accessing the program(s) of study? Are they experiencing any opportunity costs (e.g., unavailability for some other academic program) associated with their participation?
- What is the achievement of students within the program(s) of study, as a whole and when broken down by student subgroups, particularly those from underrepresented populations?
- What do educators want students to know and be able to do as a result of their learning experiences, and what evidence indicates that students are meeting these desired outcomes?
- What are students' experiences within the program(s) of study?
- What are the college and career outcomes for students who graduate from the institution, and how do these outcomes relate to goals and programming?

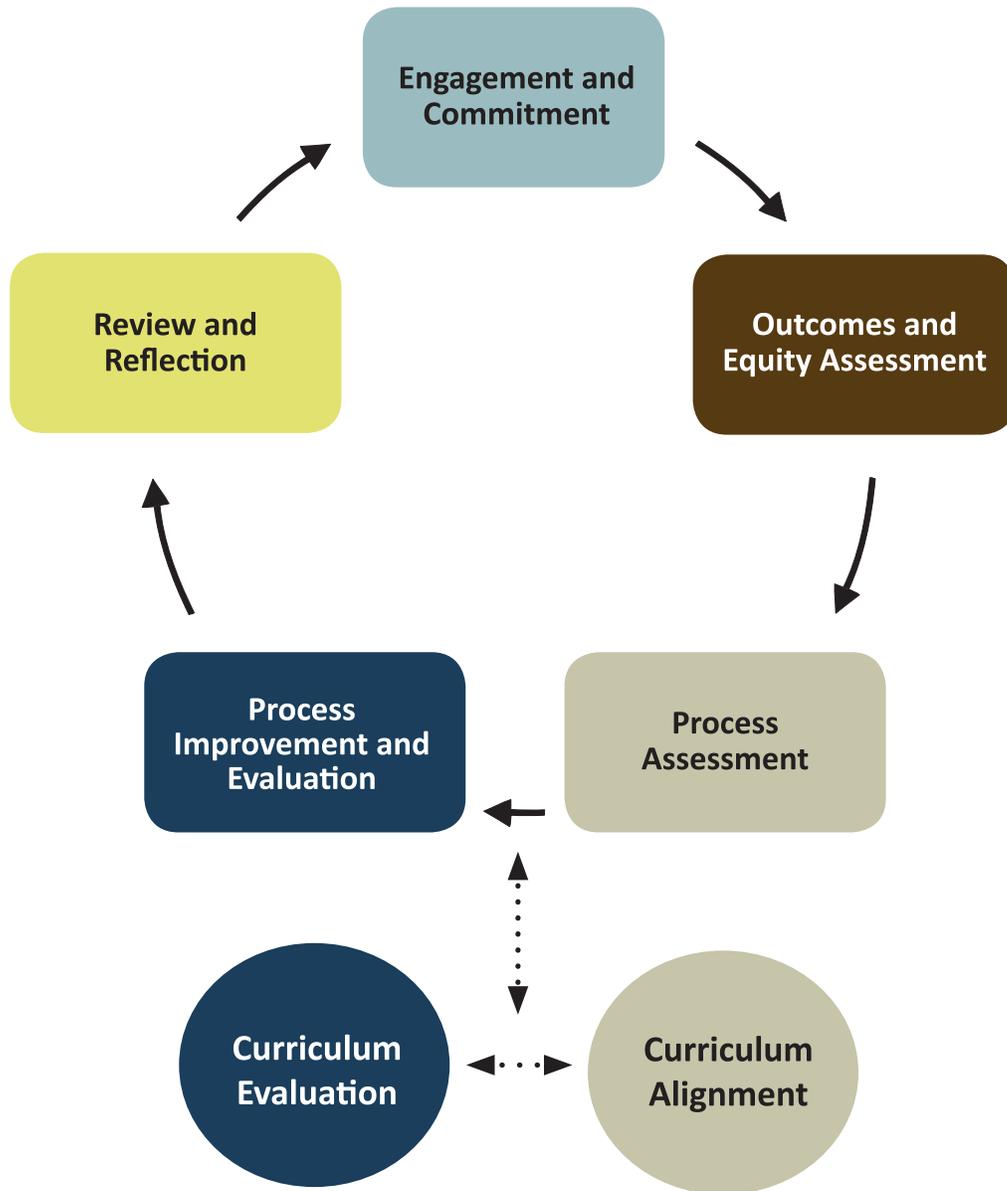
Curriculum Evaluation as Part of the Pathways to Results Process

This module is a companion to the Pathways to Results (PTR) process (Bragg & Bennett, 2012) created by OCCRL. Educators are encouraged to use, or continue to use, this process. It is highly developed and provides modules, methods, tools, and templates to address process issues that lead to inequities in student outcomes and improve student, parent organization, and system performance. To learn more, readers are referred to <http://occrll.illinois.edu/projects/pathways>.

Through PTR or similar approach, the team may identify curriculum as a key focus area. For instance, in PTR Outcomes and Equity Assessment, analysis may uncover an outcome or set of outcomes that fall short of standards or expectations. In Process and Assessment, the team may identify curriculum as a key process that, if examined and altered, would likely yield improvements. If the team is most concerned with issues of alignment, the Curriculum Alignment module should be accessed. If the team is most concerned about broader issues of curricular quality or effectiveness, this module is meant to help.

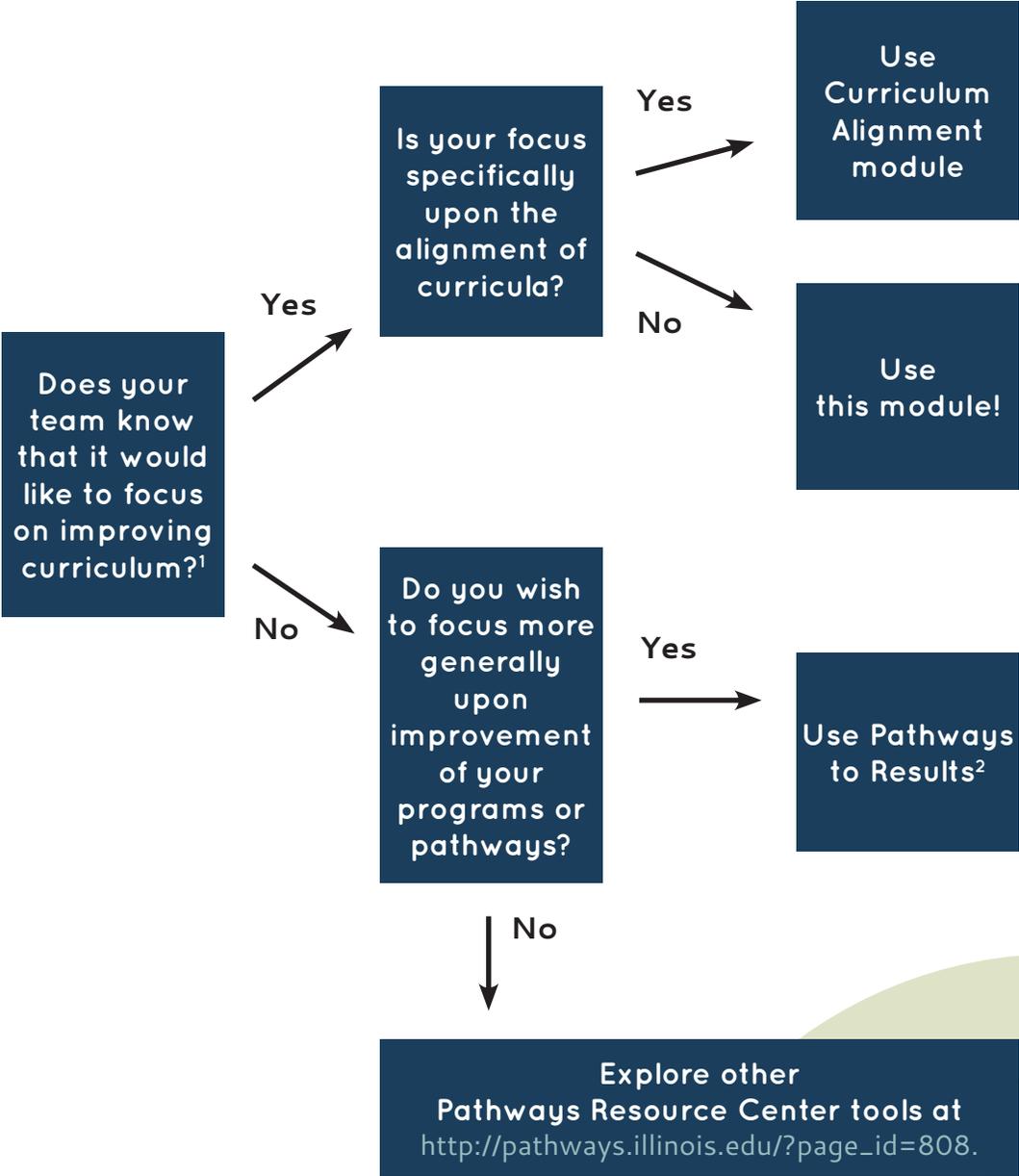
Pathways to Results Process with Curriculum Evaluation

The visual below depicts the relationship between this module, the curriculum alignment module, and the Pathways to Results (PTR) process.



More information on the Pathways to Results process is available at <http://ocrl.illinois.edu/projects/pathways>.

Decision Chart: Identifying the Best Resource



¹If the answer to this question is uncertain (e.g., "maybe"), step one of this module will help the team to answer with more certainty.

²Other program and curriculum improvement processes are available, including Rising Star, AdvancED, and *High Schools That Work*. More information is available at http://pathways.illinois.edu/?page_id=1046.

The Importance of Curriculum Evaluation of Programs of Study

The importance of rigorous and relevant curricula for achieving desired learning outcomes cannot be overstated. Curricula, instruction, and assessments are inextricably related and altogether define students' learning opportunities and experiences; the curriculum is primary, setting the stage for these other important aspects. Matters of curriculum therefore are at the heart of education: What do we want students to learn? In what order? How will we present a concept in a manner that is relevant and interesting to students? It follows that something so important should be evaluated, both informally and formally. Specifically, through evaluation teams of educators can enhance their ability to make wise decisions, thereby improving students' learning experiences and—more broadly—helping them to reach their potentials.

By following the steps provided in this module and accessing the resources highlighted herein, teams will be equipped with processes to undergo this complex evaluative work. At the heart of evaluation is “choice making” (Gephart, 1978, p. 255), and this module outlines a process that will help teams to make these choices in a data-based and defensible manner. Depending upon the focus of a given evaluation, the team may need to make choices about:

- which curricular goal(s) are of most current importance and worthiness of focus;
- which of various alternative curricular, instructional, or assessment approaches may be most optimal;
- which modifications to an existing curriculum or program may be needed to maintain or improve its progress toward the chosen goal(s); and/or
- whether or not its outcomes for students (and/or its costs) justify its continuation. (Gephart, 1978)

With respect to STEM programs of study, the periodic, systematic evaluation of curricula is particularly important. The aspirations of STEM programs are ambitious and commendable. Program leaders invariably describe enhancement of students' preparation for future success as a topmost goal. Moreover, policymakers—and some educators—often point to the centrality of these programs for society as a whole. The United States, for instance, is said to need more individuals who are equipped to compete for a variety of STEM jobs, and educators and their partners are asked to adjust their programming (and their curricula) accordingly. Also, the state of Illinois, through its involvement in Complete College America, has established a goal of increasing the numbers of Illinois adults who hold a postsecondary credential to 60% by 2025 (Illinois Board of Higher Education, 2012). Illinois is noted as a particularly “STEM-rich” (Chicago STEM Education Consortium, 2013, p. 9) state given its confluence of STEM-related higher education, laboratories, industry, and research and development spending.

Still, one cannot take for granted that the mere adoption of a STEM program of study will result in positive outcomes for all concerned. Programs of study are complex in nature (Malin, 2014; Taylor et al., 2009) and take a variety of forms; many factors combine to influence the degree to which they are successful. The formal curriculum, of course, looms

large among these due to its centrality to student learning. Therefore, the systematic collection and review of assessment information related to curriculum in programs of study is often crucial for their appraisal and improvement. Specifically, an improvement-oriented evaluation may be geared toward appraising and improving the alignment between curriculum, instruction, and assessment, and/or the relationship of written or delivered curriculum to goals or standards (Glatthorn et al., 2012). Evaluative information will reveal areas of strength and areas of concern, thereby informing future actions. Ultimately, this information promises to help leaders to make wise, equitable decisions on behalf of students.

Why evaluate curriculum?

Curriculum assessment can serve several purposes, including:

- Identify aspects of a curriculum that are working and those that are not
- Assess the effectiveness of changes that have been made
- Demonstrate the effectiveness of a curriculum, component, or program
- Comply with regular program or curriculum review requirements
- Satisfy professional accreditations

Adapted from Wolf, P., Hill, A., & Evers, F. (2006). *Handbook for curriculum assessment: Winter 2006*. Guelph, Ontario: University of Guelph.

Purpose and Goals

The primary purpose of this module is to assist P-20 partnerships in their evaluation of curriculum for P-20 STEM programs of study. This module is particularly focused upon content areas that sometimes are neglected by STEM initiatives, including career-technical and technology-oriented education. This module begins by identifying the key stakeholders to address program of study curriculum assessment needs and concludes with suggested means of analysis. The module outlines steps to assist partnerships in working through relevant tasks involved in assessment and data analysis. The steps are appropriate for programs of study in various career cluster areas and for developing and improving programs of study. The goals of this curriculum evaluation module are to help educators to:

- Identify key partners to collect and analyze evaluative information.
- Identify important indicators, measures, and techniques for formative and summative evaluation of programs of study curriculum.
- Evaluate access and important outcomes for students as a whole, and as a function of student characteristics.
- Discuss this information and develop action steps for continual and targeted curriculum improvement.

The Challenges of Evaluation, and How to Overcome Them

Hopefully the importance of evaluation has by now been established. If not, have faith: it is important! It is also quite challenging, for several reasons. It is important, for instance, to recognize the political nature of evaluation (Weiss, 1973)—whether real or perceived. Evaluation invariably requires rendering value judgments or appraisals about one’s evaluation objects, and this reality understandably may make some people nervous. It therefore is important to take a few measures to try to maximize the utility of the evaluation while minimizing issues stemming from politics.

The first of these elements is to strive to maintain open and ongoing communications with key stakeholders, assuring that they have similar understandings of the evaluation questions and are periodically kept abreast of the team’s activities and initial findings. It is important that a final report or presentation does not come as a surprise to these stakeholders. It is particularly crucial to define and communicate the scope and limits of the evaluation (which will be discussed later). It may be wise to differentiate between evaluation of programs or curricula and evaluation of people. For instance, while teams are engaging in observation of classroom teaching and learning practices as part of curriculum evaluation, they might be well-advised to determine—and communicate to all relevant parties—that they are not interested in evaluating the teacher, but rather the translation of curriculum into instruction or assessment as it occurs within a particular course. To sum, some key advice is as follows:

- Communicate often and clearly about the evaluation plan, and provide regular updates.
- Be sure to follow pertinent district policies and procedures.
- Clearly define the scope and limits of the evaluation, and note that (at least in this case) it is not intended to evaluate teachers or personnel!

- Use multiple methods and “triangulate” data as a means of increasing confidence regarding findings. It is difficult to form reliable conclusions on the basis of one data source. Instead, look for consistencies and inconsistencies among the different information that is gathered, and work to develop a coherent and reasonable story that fits.
- When reporting results, be careful not to overreach (e.g., do not go beyond what the data tells the team).

This guide will help teams to work their way to a quality, useful, and defensible program evaluation; still it is important to acknowledge “up front” that evaluation can be a challenging endeavor requiring considerable care and forethought. For a detailed description of the politics of evaluation and some strategies for navigating them, the reader is referred to Chelimsky (1987).

Who Should Be Involved?

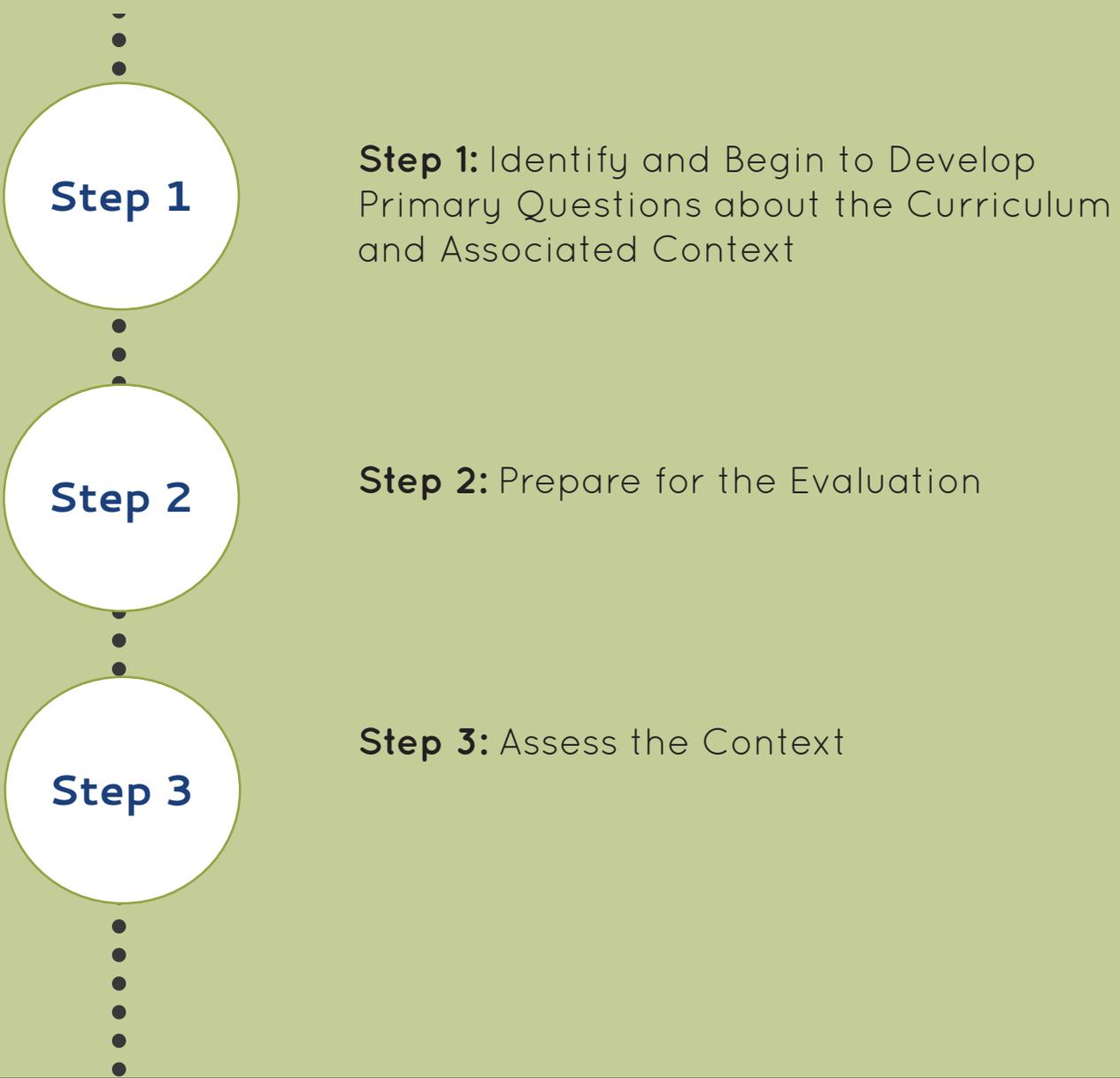
Through these processes, all team members will be able to individually and collectively analyze and interpret evaluative data. Early on, specific roles will be established; for instance, a particular team member might be most responsible for collection of data, or of certain types of data. If desired, institutional researchers and specialists (e.g., those at the Pathways Resource Center and Office of Community College Research and Leadership) may be consulted to play significant roles in helping the team through these processes. Readers are referred to OCCRL’s Team Leader Guide (Jones & Bragg, 2014), which contains an abundance of information about forming and leading teams to support PTR Processes. As well, the Strengthening Partnerships (Nicholson–Tosh & Kirby, 2013) guide might contain helpful information.

Curriculum Evaluation Steps at a Glance

In this module, curriculum evaluation is broken into seven steps, the first five of which relate to planning and the remaining two steps related to implementing the evaluation. In fact, program evaluation (including evaluation of curriculum) is time intensive on the front end, such that the first two steps will likely take up the greatest amount of time. However, time spent meticulously planning for the evaluation is certainly time well spent. Without developing a clear focus, for instance, the evaluation experience can become cumbersome and unwieldy. Thus, this module includes detailed description of these initial steps.

Part 1:

Planning for Evaluation



Step 1

Step 1: Identify and Begin to Develop Primary Questions about the Curriculum and Associated Context

Step 2

Step 2: Prepare for the Evaluation

Step 3

Step 3: Assess the Context



Step 4

Step 4: Establish the Evaluation Focus and Questions



Step 5

Step 5: Complete the Evaluation Design



Part 2:
Implementing Evaluation



Step 6

Step 6: Carry Out the Design



Step 7

Step 7: Develop and Present Findings, Recommendations, and Action Plan



Detailed Steps for Part One: Planning for Evaluation

Step 1: Identify and Begin to Develop Primary Questions about the Curriculum and Associated Context

Overarching questions: Is it the curriculum? If so, what in particular do we wish to know about it?

At this step, the team will identify and develop primary questions about the curriculum. These questions ultimately will drive the assessment/evaluation and directly lead to the selection of outcomes and measures. Equally important, at this step teams will begin to determine what will fall outside of the scope of this assessment. In brief, the team will be focusing its purpose and limits (Glatthorn et al., 2012).

Teams ideally will have entered into this step while participating in the Pathways to Results process; as such, they likely already will have engaged in some assessment and might already have a clear sense of their purpose. However, this module does not make that assumption; therefore, this step is discussed in a comprehensive fashion, beginning at “square one” but with the understanding that some teams might be able to enter the process at different points or move through it relatively more quickly.

As well, this module makes no assumptions about the type of evaluation teams might wish to conduct. Educators and evaluators, beginning with Scriven (1967), frequently distinguish between formative and summative evaluation approaches, and each (or a combination) may be justified under different circumstances. For instance, the onset of a program often begs for attention as to how its elements (including curriculum and instruction) are working; such an evaluation is formative in nature. Also, at regular intervals, it is imperative to review outcomes regarding existing programs (summative), as a means of continually improving them, or a means of determining whether they justify continued investment. This module will discuss the decision-making process in greater detail within step two, and distinguishes between formative and summative evaluation in Appendix A.

First, the team should meet at least once—and, preferably, more—to pose and discuss a series of questions. Please see Appendix C for a suggested set of questions, and teams are free to adjust or add to these as desired. They are aimed to help a team of educators to determine whether or not curricular concerns are a current priority—and, if so, to help the team to zero in on aspects of particular interest.

Upon completing this reflective work, the team will be well positioned to develop a curricular assessment/evaluation design. Please note, however, the very real possibility that the team will reach the conclusion that curriculum assessment ought not be its top current priority. That is fine! Before going further, educators must first decide if their top priority is to evaluate the curriculum—the topic of this module—versus to focus instead upon some other process or aspect of the program of study. Let us first consider four instances (non-exhaustive) in which teams might determine not to immediately proceed to evaluate the curriculum:

Example 1: Access and outcomes data indicate success in relation to goals, and all available information suggests a well developed and aligned curriculum is in place. Moreover, in engaging in this reflection process, the team has identified another area of current attention (e.g., a logistical constraint to overcome, or an implementation-related topic). Therefore, the team determines not to proceed to step two of this process.

Example 2: Although the access and/or outcomes data are not indicative of success in relation to program goals, the group's confident appraisal is that factors separate to curriculum primarily are responsible. This decision would hinge upon a high level of confidence that the curriculum itself is well developed and of a high quality, but that some other process or issue is impacting program success. For instance, it may be that program implementation (which could reflect insufficient articulation or professional development) is problematic, or that some students and families are not sufficiently aware of the program and its benefits to choose to access it. Therefore, the team determines not to proceed to step two of this process.

Example 3: The team's reflection process reveals that curriculum is central to the improvement of the program of study. However, they have determined that the issue is specific to the alignment of curriculum. In this case, the team is referred to the Curriculum Alignment module. Here, they will be guided through a series of steps that will directly address the issue.

Example 4: The team does not currently possess enough data that relate to outcomes and equity; moreover, they have reason for concern. Therefore, they jointly determine that a deeper analysis upon Outcomes and Equity Assessment (part of the Pathways to Results process) is of primary importance.

In many cases, however, teams will determine that the curriculum is central to the continual improvement process. If this determination is made, proceed to step two.

Note: Because this module is particularly focused upon STEM programming, Appendix D includes a set of resources and considerations specific to STEM. Particularly, numerous frameworks and guides are available to help teams define what constitutes high quality curriculum in a given area, and clear definitions are a key to any successful evaluation. Also, Pathways Resource Center and the Illinois State Board of Education have developed a STEM Program of Study Self-Evaluation instrument that could be quite useful to educators and evaluators. It is described in Appendix E, and it can be accessed from the [Pathways Resource Center](#) webpage.

Focus on STEM

As the team contemplates whether or not to evaluate, and begins to consider what to evaluate, it is helpful to think in terms of best practices in the STEM fields. In this vein, Zemelman, Daniels, and Hyde (2005) produced a list of ten best practices for teaching math and science. An evaluation could potentially be geared toward the extent to which any or all of these are occurring, and might be aimed toward identifying curricular improvements to increase their frequency and quality in a particular course or program:

- use manipulatives and hands-on learning,
- cooperative learning,
- discussion and inquiry,
- questioning and conjectures,
- use justification of thinking,
- writing for reflection and problem solving,
- use a problem solving approach,
- integrate technology,
- teacher as a facilitator,
- use assessment as a part of instruction. (Zemelman et al., 2005)

Step Two: Prepare for the Evaluation

Overarching question: What (more specifically) do we need to find out? Who will be part of this discovery process?

Now, the team will make important preparations. First, the team should ensure that key stakeholders are informed—ideally, they also will be supportive and engaged—of the plan to assess/evaluate curriculum. It is important at this stage to be able to articulate its rationale, including a broad purpose and anticipated benefit of engaging in the evaluation process (see inset on next page). To do so, the group should draw from what was learned at step one. It is also great timing to collect and incorporate feedback from key individuals and groups regarding what they believe to be most pertinent. Before moving further, the team should be assured that they have a “green light” to proceed from key officials and decision makers. Next, the team will need to work through three substeps: (2a) setting project parameters, (2b) selecting a project director and otherwise assigning roles, and (2c) preparing background evaluation documents (Glatthorn et al., 2012).

Substep 2a: Setting project parameters

Here, the team will define both the purpose and the limits of the project. The purpose should be identified first, because it will drive what is and what is not to be examined. For example, the team may determine that its broad purpose is to assess student learning and progress as part of the nursing assistant program of study, in relationship to stated goals and objectives. Or, perhaps its scope will be limited to a particularly new or pertinent course or experience within the program of study, such as the introductory course in the sequence. Generally speaking, it is wise to carefully consider purpose and limits from the vantage points of relevance/importance and feasibility. A broad and/or ill-defined evaluation could prove to be logistically unfeasible and/or insufficiently focused to provide sufficiently detailed or actionable information. In identifying the limits of the project, the team should answer the following questions (Glatthorn et al., 2012, p. 367):

- How much time can be allocated to the project, and by what date should the evaluation be finished?
- What resources will be provided relating to the completion of this evaluation?
- Which programs, courses, or components will be evaluated?
- What constituencies will be involved? Specifically, how will parents, community members, and/or students be part of the evaluation?

Preparing Evaluation “Elevator Speeches”

It is important to be able to articulate a rationale and purpose of the evaluation to key stakeholders, so that the evaluation team can secure their support. The specifics of what a team will say will vary. Here is one example:

Evaluation Team Member (to a district leader/stakeholder):

“Through our school improvement review process, we have identified our Engineering Technology program of study curriculum as needing a systematic evaluation. As you know, this program is relatively new, and we are not certain that the curriculum is fully integrating the mathematics knowledge that our community partners explain is needed to prepare students for college and career, and that is laid out in the Common Core State Standards. We are specifically interested in assessing this aspect of the Engineering Technology program, with an eye toward identifying ways to improve in this area. We are planning to compare our curriculum against the [x] standards so that we can most effectively gauge the program’s strengths and needs. We have tentatively identified [x] team members and, although we have not yet worked through all details, we believe we have the will and skill to proceed with your support and input. What do you think? Are you willing to partner with us?”

Substep 2b: Selection of a project director and assignment of additional roles

With the purpose and parameters set, the team will now be well positioned to select a project director and supporting individuals to comprise a task force or analogous body. This person is ultimately responsible for conducting the evaluation as planned. The project director should be a person who possesses substantial expertise in curriculum evaluation and/or program evaluation. S/he could be internal or external to the organization and will need to work closely with a team of educators who will help by providing advice and planning. Selection of a project director is a consequential and somewhat complex decision, involving consideration of trade-offs within the context of the evaluation purpose and goals. Budgetary factors may need to be considered, particularly if a decision is made to hire an outside evaluator to serve as project director. In any case, the supporting individuals ideally represent all key stakeholders and function to advise and monitor the project director over time. The inclusion of students should be considered: This decision should depend upon the comfort level of the team.

It also is important at this time to develop a task force, which may include some or all of the original team members, and should expand to include representatives of all key constituencies. In this instance, key stakeholders might include teachers that represent both secondary and postsecondary, other faculty members, administrators, parents, school board members, Education for Employment system directors, business/industry partners, Learning Exchange colleagues, and community organization representatives. Potentially, secondary students could be included as well. The purpose of this task force, ultimately, is to offer advice and assist with planning, and ultimately monitor and facilitate the project director's ability to complete the evaluation. Too, some task force members might assist with gathering of data or information.

Substep 2c: Preparing background evaluation documents

Next, the project director and supporting individuals should begin to assemble background documents that will be assistive for program review. The following are examples of items that likely will be useful (Glatthorn et al., 2012):

- A statement of curriculum goals for the program of study or portion that is to be evaluated
- A comprehensive description of the community and student body
- A list of all required courses in the program of study, with time allocations and brief descriptions of each course
- A list of all elective courses in the field, including time allocations, course descriptions, and most recent enrollment figures
- Students' participation in work-based experiences and career and technical student organizations
- A random selection of student schedules
- Syllabi or course guides for all courses offered
- Faculty schedules, showing class enrollments

Concluding Thoughts

It may be helpful at this point to visualize a skeleton of what a completed evaluation will include. Most evaluations tend to be sectioned in a fairly similar fashion, and one approach is depicted in Appendix F.

Likewise, it is beneficial to learn from completed evaluations from the field. Appendix G contains links to a small number of completed evaluations in the field. Most take the form of full program evaluations, with curriculum forming one aspect of the evaluation. The reader is advised to focus particularly upon portions dealing with curriculum, examining the specific evaluation questions and the measures that were used.

An Evaluation Example from the Field

Setting up a Regular, Standard Curriculum Evaluation Process: The Case of Bernards Township School district (New Jersey).

A promising approach is to build regular curriculum evaluation into a school's or district's routines and decision-making processes. Bernards Township School District in New Jersey does just that, engaging in approximately 14-month review processes of curricula. Typically, these processes begin in the summer and involve some paid committee work in the summer months for staff members. In the first summer, staff members work with administrators in a committee to accomplish the following:

- create surveys and develop a survey administrative plan,
- evaluate past goals and objectives,
- review comparative schools and assessments, and
- schedule meetings to occur during the school year.

During the school year and in the following summer (as needed), the committee wraps up its work, and prepares a written and oral report. An example of a recently completed report is accessible at http://www.bernardsboe.com/BernardsBOE/CMFiles/Docs/Curriculum/Science_K-5_Program_Eval_2011.pdf.

Step Three: Assess the Context

Overarching question: What aspects of our context have noteworthy impact upon our program of study curriculum?

Although the team has identified the curriculum to be the main focus of this assessment, invariably some contextual factors are pertinent to fully understanding the curriculum within the program of study. Focusing upon the context at this time will allow the project director and supportive individuals to identify salient aspects of the environment that impact the program of study curriculum and/or that relate to the particular needs of students in the institution. The project director and supportive individuals should be able to complete this step in collaboration. Depending upon the composition of the group, it is possible that additional informants or sources will be needed to confidently answer certain questions. Questions at this stage should include a focus upon relevant aspects of context in the following areas (Glatthorn et al., 2012):

1. Attitudes, values, and expectations of the community
2. Significant aspects of the institution that impact the program of study: size, organizational structure, leadership, funding resources
3. Special characteristics of school facilities that are relevant
4. Special characteristics of the student body that are relevant (background characteristics, aptitudes, interests, etc.)
5. Special characteristics of the faculty that are relevant (experience, values, background, collaboration).

Upon completing this step, the team will have highlighted pertinent contextual factors that impact the program of study curriculum, including particular learner needs.

Step Four: Establish the Evaluation Focus and Questions

Overarching questions: What will be our evaluation focus? What, specifically, will be our evaluation questions?

In step two, the team has defined the parameters. In step three, it has considered important contextual aspects and concerns. Now, the team is ready to fully specify the questions or “issues” that it will aim to explore and address as part of this evaluation. The team will want to ensure that the evaluation is sensitive to the special stakeholder concerns and fully addresses the evaluation purpose (Glatthorn et al., 2012).

Several aspects of the curriculum are essential: the written, the supported, the taught, the assessed, and the learned curricula. It is critically important that each area is considered (if not ultimately assessed), because each is intimately related to students’ learning experiences. In order to achieve the necessary information to make improvements, each aspect must at least be contemplated within this planning step. It is possible, for instance, to have an excellent written curriculum, but a breakdown in terms of the time allocations or staff development (both support curriculum) required for successful implementation (Glatthorn et al., 2012).

As stated previously, establishing the scope and limits of the evaluation is crucial. If too broad in its aims, the evaluation may become unmanageable. If too narrow (and/or if focused on aspects that are not of interest to primary stakeholders), risk is elevated that an evaluation will have wasted educators' time and will be of little use to the organization. So, the team needs to find a sweet spot. The exercises outlined in step one through four should help a great deal as the team identifies its focus. It might also be helpful to engage in brief, exploratory discussions or interviews with key stakeholders (e.g., teachers and responsible administrators) to gain a sense of their priorities and perceptions of strength and need.

It will be particularly helpful to ascertain, if it has not been done already, what are the goals or objectives of the program of study curriculum (in total, or within a particular course or aspect of interest). In fact, a common and useful evaluation approach is to compare the current program with its actual program design or original goals (Rockwood [MO] School District Curriculum Department, 2013). As well, or instead, the team might wish to ask, "How do the actual program results for students conform with the expected or intended results?"

These are but two examples of potential ways of focusing the evaluation. Other strong possibilities include:

- Evaluating the curriculum against a set or sets of curricular standards (e.g., the Next Generation Science Standards; the Common Core State Standards; Common Career Technical Core)
 - Important Note: Evaluating against standards is common, practical, and helpful. In the absence or scarcity of relevant external standards, the team would need to identify its own internal standards. These likely will relate to the expressed or implied goals of the curriculum or area of curriculum assessed. Or, the team might choose a smaller subset of standards from external sources and include local standards as well. In any case, the resultant set of standards will serve to ground the evaluation. In Appendix D, several resources and links are provided to assist educators in this endeavor.
- A comparison of implemented curricula in two similar programs in different schools. This approach is best suited when one can be confident that at least one of these schools is performing at a high level with respect to the question of interest.
- A descriptive evaluation, in which the team aims to simply clarify how curricula are being implemented, and/or the actual (current) relationship of curricula to instruction and assessment.
- An evaluation of the quality of a particular component or aspect of the curricula, such as the quality of work-based experiences or job shadowing opportunities.
- An evaluation of the relevance of the curriculum for students and/or the manner in which students are experiencing the curriculum.

Focus on STEM

With respect to STEM education, inquiry or problem-based learning may take on a heightened importance. Roberts (2013), in fact, provides an 8-step model of how STEM should be implemented in a problem-based fashion, to promote student learning:

1. Select a central standard
2. Align the standard with a relevant societal problem
3. Support the lesson by matching with STEM standards
4. Instruct according to the content standards
5. Engage students in design and development of a solution to the problem
6. Troubleshoot by identifying and correcting problems
7. Evaluate by ensuring that students and teachers identify and fix the problem
8. (Students) Present the results

Of course, other models exist. The point is that models such as these might provide a focus and a foundation for an evaluation of STEM curricula and programming.

As well, the goal of cross-curricular integration of STEM programming (e.g., the integration of math and science education) is a common and worthy goal (Stohlmann, Moore, & Roehrig, 2012). An evaluation could be focused around the question of the degree to which desired integration is occurring, and might likewise be aimed to generate recommendations for improvement in this area.

Next, the team will need to convert this focus into specific evaluation questions that they will aim to answer. It is therefore important to choose questions that are anticipated to be answerable based upon the data and the available resources. For instance, suppose that a team has chosen to focus upon the work-based experiences afforded to students. Its next task, then, was to convert this focus into specific questions. Upon doing so, the team has come up with the following four questions:

1. What is the quality of work-based experience afforded to students?
2. How many students are currently afforded work-based experiences, and how does this compare to the expressed demand by students for such experiences?
3. What are the work-based experiences that are currently offered, and how does this list of experiences compare to the demand by students and the supply of potential local work-based learning opportunities?
4. What are the benefits experienced by students and/or by work partners?

Now, as one can imagine, the team is in business! Questions are “the essence of evaluation,” and with them come “an immediate entrée to the evaluation” (Hunt, 1978, p. 260). It is time to complete the design, question by question.

An Evaluation Example from the Field

Austin Independent School District’s (AISD) April 2014 evaluation of the success of the Career and Technical Education (CTE) program (Pazera, 2014). This evaluation sought to evaluate the success of the CTE program in meeting its mission, which is “to provide opportunities for students to acquire 21st century academic and technical skills for entry into the global workforce and into postsecondary education.” The evaluator determined to use a measure of college readiness among CTE concentrating students to assess the program’s success in relationship to this mission. Importantly, she disaggregated the data according to gender. As well, she assessed the cost effectiveness of the program by analyzing and reporting upon the cost per student for the programming across time, alongside the student enrollment. The evaluator concluded that the program is improved in terms of its cost effectiveness, that college readiness was trending upward among students concentrating upon CTE, and that no significant differences exist among CTE concentrating seniors and seniors who are not CTE concentrators. This evaluation therefore offered affirming news about the programming.

Qualitative and Quantitative Data

Quantitative Data is numerical in nature, and might include:

- Student achievement (e.g., test scores or grades)
- Survey results – rankings or ratings
- Participation and/or attendance data
- College enrollment, attrition, completion, and placement
- Rates of homework completion
- Graduation rates
- Structured observational data (e.g., counts of participation, etc.)
- Students needing development coursework in postsecondary institutions

Qualitative data is descriptive and often conveyed in narrative form, and might include:

- Case study information (e.g., regarding curriculum intentions in relationship to actual implementation)
- Interview or focus group analysis
- Unstructured observations of classrooms and student learning experiences
- Open-ended survey responses
- Analysis of student written work

Source: Adapted from Curriculum Management Plan, Rockwood School District Curriculum Department, 2013

*It is beyond the scope of this module to provide detailed information regarding how to analyze different types of data. The Pathways Resource Center is available on a case-by-case basis to assist school district with questions of this sort. As well, freely available on the World Wide Web are a variety of resources providing guidance regarding data analysis.

Step Five: Complete the Evaluation Design

Overarching questions: For each of our questions, what data will we need, how will we collect it, and how will we analyze it? Also, who will be responsible for which tasks?

Now, it is time to complete the evaluation design. Worthen's (1981) framework might wisely be followed at this point, as a team. For each evaluation issue that you identified, identify the required information, the sources of information, and the methods for collecting that information. Also, as suggested by Glatthorn et al. (2012), this is the time to "identify the specific tasks to be undertaken, the names of those responsible for each task, and the deadline for accomplishing the task" (p. 372). Please note that qualitative methods (e.g., surveying or interviewing) are perfectly acceptable (indeed, often desirable) as a means of collecting and analyzing the desired information. Often, some combination of qualitative and quantitative information will be necessary to fully answer the questions. Below, a description and list of common qualitative and quantitative data is provided.

In Appendices H and I, tables are provided to demonstrate organized approaches for identifying and recording detailed planning information. Also, companion electronic files are included at http://pathways.illinois.edu/?page_id=818. At this point, the evaluation design is finalized, and it is time to carry out the evaluation to its completion!

Detailed Steps for Part Two: Conducting the Evaluation

Step Six: Carry Out the Design

Overarching question: Can we deliver on our evaluation, overcoming any obstacles we encounter?

As one can see, a great deal of time was invested in mapping out the evaluation. Hopefully, teams also will see that the time engaged in planning for the evaluation was well spent. At this point, presumably the team is a well-oiled machine, and this step involves gathering information and documenting results in relationship to the design. The project director has an important leadership and coordination function at this time, in ensuring that the tasks are completed as planned, and within the timeframes established. The director will also have primary responsibility of integrating information into a coherent whole.

Step Seven: Develop and Present Findings, Recommendations, and Action Plan

Overarching questions: In light of the data we have gathered, what are our key findings? How can we best share and disseminate the results? Who will be responsible for sharing results?

After all information has been gathered and compiled, the project director (in collaboration with the evaluation team) will be responsible for integrating the information into a set of findings. These findings should relate back to the evaluation purpose, which will differ from case to case but will invariably include identification of strengths and improvement areas in relation to (all or part of) the program of study curriculum. Ideally, the findings are clearly

stated and relate directly to a set of recommendations. It is important that a team does not overstate its findings and recommendations, or form conclusions that do not arise from your data. Rather, the team should strive to make reasonable statements that are supported by the information that has been obtained. Moreover, if some findings are tentative or uncertain, it is best to say so, perhaps labeling them as areas for further discussion or exploration.

At this point, the group may also exhale for a moment and celebrate the completion of a meaningful evaluation! Two final considerations are as follows:

1. How will the team share and disseminate the results?
2. Will part or all of the team, or will some other entity, be responsible for converting the recommendations into changes and action steps? The team should consider how to most effectively participate in this process. This will include a careful consideration of the key stakeholders, and what their needs will be in relation to the findings and recommendations.

Conclusion

The aim of this supplementary module to the Pathways of Results process has been to provide a user-friendly resource to support educators interested in engaging curriculum evaluation. This module has also highlighted additional, helpful resources that can provide assistance to teams of educators as they assess the quality of their curricula. It is hoped that this information has provided a measure of support to educators who are seeking to systematically assess and improve their curricula.

References

- Chen, H. (2005). *Practical program evaluation: Assessing and improving planning, implementation, and effectiveness*. Thousand Oaks, CA: Sage.
- Chelimsky, E. (1987). The politics of program evaluation. *Society*, 25(1), 24–32.
- Chicago STEM Education Consortium (2013). Putting it all together: Supporting K–12 STEM education in Illinois. Retrieved from http://c-stemec.org/wp-content/uploads/2013/10/putting_it_all_together.pdf
- Eisner, E. W. (2002). *The educational imagination* (3rd ed.). Columbus, OH: Merrill.
- Glatthorn, A. A., Boschee, F., Whitehead, B. M., & Boschee, B. F. (2012). *Curriculum leadership: Strategies for development and implementation* (3rd ed.). Los Angeles, CA: Sage.
- Gephart, W. J. (1978). Who will engage in curriculum evaluation? *Educational Leadership*, 35(4), 255–258.
- Guba, E., & Lincoln, Y. (1981). *Effective evaluation*. San Francisco, CA: Jossey-Bass.
- Hunt, B. (1978). *Who and what are to be evaluated?* *Educational Leadership*, 35(4), 260–263.
- Illinois Board of Higher Education. (2012, August). *State accountability report. Goal 3: Postsecondary credentials*. Springfield, IL: Author. Retrieved from http://www.1illinois.org/PDF/Goal_3_2012.pdf
- Jones, A., & Bragg, D. (Eds.). (2014). *Pathways to Results team leader guide* (Rev. ed.). Champaign, IL: Office of Community College Research and Leadership, University of Illinois at Urbana–Champaign. http://ocrl.illinois.edu/files/Projects/ptr/PTR_Team_Leader_Guide.pdf
- Malin, J. R. (2014). *STEM Pathways and programs of study in the Land of Lincoln: A high school companion to the Illinois Programs of Study Guide*. Champaign, IL: Office of Community College Research and Leadership, University of Illinois at Urbana–Champaign. Retrieved from <http://pathways.illinois.edu/wp-content/uploads/2014/03/POS-Supplement-Web.pdf>
- NGSS Lead States. (2013). *Next Generation Science Standards: For states, by states*. Washington, DC: The National Academies Press.
- National Association of State Directors of Career Technical Education Consortium/National Career Technical Education Foundation. (2012). *The Common Career Technical Core*. Silver Spring, MD: Author.
- National Governors Association Center for Best Practices and Council of Chief State School Officers. (2010). *Common Core State Standards*. Washington, DC: Authors.
- Nicholson-Tosh, K., Kirby, C. (2013). *Strengthening partnerships*. Champaign, IL: Office of Community College Research and Leadership, University of Illinois at Urbana–Champaign.
- Office of Career, Technical, and Adult Education. (2010). *Career and technical programs of study: A design framework*. Washington, DC: U.S. Department of Education, Division of Academic and Technical Education. Retrieved from <http://cte.ed.gov/nationalinitiatives/rposdesignframework.cfm>

- Ornstein, A. C., & Hunkins, F. P. (2009). *Curriculum: Foundations, principles, and issues* (5th ed.). Boston, MA: Pearson.
- Pazera, C. (2014). *Career and technical education: College readiness and cost-effectiveness, 2012-13*. Retrieved from http://www.austinisd.org/sites/default/files/dre-reports/rb/13.24_RB_Career_and_Technical_Education_College_Readiness_and_Cost_Effectiveness_2012-2013.pdf
- Peters-Burton, E. E., Lynch, S. J., Behrend, T. S., & Means, B. B. (2014). Inclusive STEM high school design: 10 critical components. *Theory Into Practice, 53*(1), 64-71.
- Ragan, W. B., & Shepherd, G. D. (1971). *Modern elementary curriculum* (4th ed.). New York, NY: Holt, Rinehart and Winston.
- Roberts, A. (2013). STEM is here. Now what? *Technology and Engineering Teacher, 73*(1), 22-27. Retrieved from <http://www.iteea.org/Publications/TTT/sept13.pdf>
- Rockwood School District Curriculum Department. (2013). *Rockwood curriculum management plan*. Eureka, MO: Author.
- Scriven, M. (1967). The methodology of evaluation. In R. W. Tyler, R. M. Gagne, & M. Scriven (Eds.), *Perspectives of curriculum evaluation* (pp. 39-83). Chicago, IL: Rand McNally.
- Stohlmann, M., Moore, T. J., & Roehrig, G. H. (2012). Considerations for teaching integrated STEM education. *Journal of Pre-College Engineering Education Research (J-PEER), 2*, 28-34. doi: 10.5703/1288284314653
- Taylor, J. L., Kirby, C. L., Bragg, D. D., Oertle, K. M., Jankowski, N. A., & Khan, S. S. (2009, July). *Illinois programs of study guide*. Champaign, IL: Office of Community College Research and Leadership, University of Illinois.
- Tsupros, N., Kohler, R., & Hallinen, J. (2009). *STEM education: A project to identify the missing components*. Pittsburgh, PA: Leonard Gelfand Center for Service Learning and Outreach, Carnegie Mellon University and the Intermediate Unit 1 Center for STEM Education.
- Weiss, C. H. (1973). Where politics and evaluation research meet. *Evaluation, 1*(3), 37-45.
- Weiss, C. H. (1998). *Evaluation* (2nd ed.). Englewood Cliffs, NJ: Prentice Hall.
- Wolf, P., Hill, A., & Evers, F. (2006). *Handbook for curriculum assessment: Winter 2006*. Guelph, Ontario: University of Guelph.
- Worthen, B. R. (1981). Journal entries of an eclectic evaluator. In R. S. Brandt (Ed.), *Applied strategies for curriculum evaluation* (pp. 58-90). Alexandria, VA: ASCD.
- Zemelman, S., Daniels, H., & Hyde, A. (2005). *Best practice: New standards for teaching and learning in America's schools* (3rd Ed.). Portsmouth, NH: Heinemann.

APPENDIX A

FORMATIVE AND SUMMATIVE EVALUATION – A PRIMER

The distinction between formative and summative evaluation, first proposed by evaluation guru Michael Scriven (1967), is an important one. In brief, the distinctions are as follows:

Formative evaluations are primarily focused upon analysis of program implementation, with the intention of providing advice to those “on the ground” (Chen, 2005, p. 21).

Summative evaluations, by contrast, are primarily concerned with whether or not a program has achieved its intended outcome(s).

In practice, these distinctions tend not to be so clear. It is not uncommon to see evaluations in practice that are concerned with both formative and summative questions. Still, evaluations tend to be slanted in one direction or the other when we view them in terms of their intended uses (Chen, 2005; Weiss, 1998). From this lens, formative evaluations are aimed to improve programs and summative evaluations are more focused on asking “tough questions,” including those relating to whether a program should be continued and whether it justifies current expenditures, etc. Yet another way of viewing these evaluation differences is as follows: evaluation for development (formative) and evaluation for accountability (summative) (Chelimsky, 1997).

The assumption in this module is that, most often, teams will be interested in formative evaluation; however, the tools and strategies that are offered will allow the team to do either.



APPENDIX B

EVALUATION STRATEGIES/TYPES DEPEND ON MATURITY OF THE PROGRAM

This table, adapted from Chen (2005, p. 48), illustrates the relationship between program stage and evaluation purposes, which also translate into different strategies and approaches. It is useful to demonstrate that teams might naturally wish to pursue different approaches depending upon the current stage of implementation of the evaluation object (e.g., new program vs. mature program).

Program Stages and Approaches	Evaluation Strategies	Evaluation
<p>Program Planning Stage</p> <ul style="list-style-type: none"> • Provide useful information and assistance to help stakeholders in developing a program rationale and plan 	<ul style="list-style-type: none"> • Provide background information • Facilitate program development • Troubleshoot • Partnership development 	<ul style="list-style-type: none"> • Needs assessment • Formative evaluation/assessment • Concept mapping • Pilot testing • Assistance with Conceptualization
<p>Initial Implementation Stage</p> <ul style="list-style-type: none"> • Provide timely information regarding implementation of programs and sources and ideas for fixing any problems to stabilize the program 	<ul style="list-style-type: none"> • Troubleshooting • Partnership development • Assess implementation integrity, identify areas of strength and growth 	<ul style="list-style-type: none"> • Formative evaluation • Program review
<p>Mature Implementation Stage</p> <ul style="list-style-type: none"> • Provide information on implementation problems and sources/ideas for improving implementation; • Assess implementation quality for accountability purposes; monitor progress of implementation; • Assess process surrounding implementation 	<ul style="list-style-type: none"> • Troubleshooting • Facilitation of program development • Assessment of student performance/learning • Assess implementation relative to standards 	<ul style="list-style-type: none"> • Formative evaluation • Program review • Fidelity evaluation • Process Evaluation
<p>Outcome Stage</p> <ul style="list-style-type: none"> • Measure outcomes, comparing to standards/expectations; • Holistic assessment of impact or quality of program; evaluate for accountability and/or program improvement 	<ul style="list-style-type: none"> • Performance Monitoring • Performance Assessment • Program Quality Assessment 	<ul style="list-style-type: none"> • Outcome monitoring • Efficacy evaluation • Theory- or standards-driven outcome evaluation

APPENDIX C

SUGGESTED QUESTIONS FOR TEAMS CONSIDERING OR PREPARING FOR CURRICULUM EVALUATION

1. With respect to the curriculum itself, what do we know, what do we believe, and what do we not know about its quality and/or effectiveness in relationship to our program goals?
 - a. What we know:
 - i. Evidence to support this knowledge:
 - b. What we believe:
 - i. How confident are we?
 - ii. How could we confirm this belief?
 - c. What we do not know:
 - i. How important is it (to us, to our students, and to our program) that we acquire this knowledge?
 - ii. What information or data do we need?
2. With respect to the context surrounding the curriculum, what issues are so important that anyone interested in looking in depth at this topic would need to know and incorporate into her/his thinking? Consider this question in each of these areas:
 - a. The development of the curriculum:
 - i. Who was involved?
 - ii. To what degree did the developed curriculum reflect the initial goals for the program and for students?
 - iii. Is the developed curriculum aligned with state, national, or industry standards?
 - iv. Looking back at curriculum development, what went according to plan and what did not?
 - b. The logistical and financial context:
 - i. Were there any notable time constraints during the development and refinement process that might have affected the final product?
 - ii. Were financial, space, or other logistical factors influential? If so, please describe.
3. With respect to the implementation of the curriculum, to what degree has it reflected our initial goals and plans? Please consider the following:
 - a. If/when we step into the classroom/lab, do we see alignment between written curricula and instruction?
 - i. If we do not, what are the key factors explaining this issue? Consider the following possibilities: *(continued on next page)*

APPENDIX C – CONTINUED

SUGGESTED QUESTIONS FOR TEAMS CONSIDERING OR PREPARING FOR CURRICULUM EVALUATION

1. Curriculum is not as well developed as would be desirable
 2. Instructors are not yet sufficiently well trained in the curriculum to apply it reliably
 3. Instructors do not wish to implement the curriculum as written (for instance, due to questions they may have about its quality) and/or do not believe that they must follow it
4. With respect to student access and student outcomes, what do we know, what do we believe, and what do we not know? Please consider the following:
- a. Who is accessing the program?
 - i. What we know:
 1. Evidence:
 - ii. What we believe:
 1. How confident are we?
 2. How could we support this belief?
 - b. What outcomes are students experiencing?
 - i. What we know:
 1. Evidence:
 - ii. What we believe:
 1. How confident are we?
 2. How could we support this belief?
 - iii. What do we not know?
 1. How important is it (to us, to our students, and to our program) that we acquire this knowledge?
 2. What information or data do we need?
 - c. Looking broadly at student access and outcomes, to what extent does what we know align with what we would have hoped for when we began to develop the program?
 - i. To what extent might curriculum versus other factors relate to access and outcomes that are not aligned with what we desired for students?

APPENDIX D

FOCUS ON STEM CURRICULA: RESOURCES OF POTENTIAL USE TO EDUCATORS AND EVALUATORS

It may help to get into a mindset early on as to what constitutes “good” or high quality program of study curricula, so that the team can more easily identify area(s) of focus for evaluation. In this vein, and particularly with respect to STEM programming, several resources may be of great use:

- The **Program of Study Design Framework** (OCTAE, 2010; <http://cte.ed.gov/nationalinitiatives/rposdesignframework.cfm>) includes descriptions of 10 elements, which closely relate to curriculum.
- The Pathways Resource Center, in partnership with the Illinois State Board of Education, has developed an **Illinois Program of Study Self-Assessment Instrument** (<http://pathways.illinois.edu/wp-content/uploads/2014/07/Illinois-Programs-of-Study-Expectations-Tool-Revised-2232012-2.pdf>). Parts are particularly relevant to curriculum evaluation. It is wise to periodically complete the full tool as a team, to gain a larger sense of key areas of strength and need. This document is further described in Appendix E.
- The **Common Career Technical Core** (National Association of State Directors of Career Technical Education Consortium/National Career Technical Education Foundation, 2012; <http://www.careertech.org/cctc.html>), for the first time, provides “a common benchmark for what students should know and be able to do after completing a program of study” (p. 1). It includes both a list of career ready practices and a separate common and technical core, by career cluster and career pathway.
- The **Next Generation Science Standards** (NGSS Lead States, 2013; <http://www.nextgenscience.org/next-generation-science-standards>) and **Common Core State Standards** (National Governors Association Center for Best Practices and Council of Chief State School Officers, 2010; <http://www.corestandards.org>) provide clear standards against which to judge programming or curricula.
- Taylor et al. (2009) have produced an **Illinois Programs of Study Guide** that includes guiding principles to the development and implementation of quality programs of study. Each guiding principle includes design elements that help educators to identify areas of strengths and needs. Malin (2014) produced a companion to this guide, the **STEM Pathways and Programs of Study in the Land of Lincoln: A High School Companion to the Illinois Programs of Study Guide**, that is tailored for high school educators, and might also be of use to the team at this stage. These documents can be accessed at http://pathways.illinois.edu/?page_id=372.
- Peters–Burton, Lynch, Behrend, and Means (2014, <http://ospri.research.gwu.edu/publications>) identified 10 critical components at inclusive, STEM–focused high schools. Several relate directly to STEM curriculum and could be useful for evaluators. The study is also summarized by Education Week: http://blogs.edweek.org/edweek/DigitalEducation/2014/04/model_inclusive_stem_high_scho.html

Note: These tools and resources will be helpful in later stages of planning also. If the team chooses to conduct a standards–based evaluation, these resources may help to identify standards or criteria against which to compare to what is occurring at the team’s site.

APPENDIX E ILLINOIS PROGRAMS OF STUDY SELF-ASSESSMENT INSTRUMENT

It is recommended that teams complete this instrument early on, as part of the decision process regarding whether—and what—to evaluate. *The full version of this instrument is available at* <http://pathways.illinois.edu/wp-content/uploads/2014/08/Illinois-POS-Self-Assessment-6-6-14.docx>.

The instrument is intended to stimulate thoughtful conversation regarding the POS status within a school or district. For each of 10 components, a set of indicators are provided, and teams are asked to rate their status. As well, teams are asked to indicate next steps based on their assessment. An example for component two (Partnerships) is provided below.

2. PARTNERSHIPS

Component: Ongoing relationships among education, business, and other community stakeholders are central to POS design, implementation, and maintenance.

Subcomponents: Collaborative partnerships should:

- Create written memoranda of understanding that elaborate the roles and responsibilities of partnership members.
- Conduct ongoing analyses of economic and workforce trends to identify statewide (or regional) POS to be created, expanded, or discontinued.
- Link into existing initiatives that promote workforce and economic development, such as sector strategies and other activities supported by the Workforce Investment Act.
- Identify, validate, and keep current the technical and workforce readiness skills that should be taught within a POS.

Indicators of Effective School District Practices	Current Status
A. Partnership members are thoughtfully selected and a Memorandum of Understanding (MOU) is created that articulates each partner's roles and responsibilities.	<input type="checkbox"/> In the Planning Stages <input type="checkbox"/> Partially Implemented <input type="checkbox"/> Fully Implemented
B. Labor market analyses are conducted to determine local, state, and regional forecasted workforce demands for the program of study. Resources of Pathways Resource Centers, Learning Exchanges, and other initiatives are accessed to assist with POS identification. Student interests in the POS are also assessed.	<input type="checkbox"/> In the Planning Stages <input type="checkbox"/> Partially Implemented <input type="checkbox"/> Fully Implemented
C. The partnership assumes some ownership of POS development, working with educational leaders to implement a high quality POS that is accessible to all students.	<input type="checkbox"/> In the Planning Stages <input type="checkbox"/> Partially Implemented <input type="checkbox"/> Fully Implemented
D. Partner expertise is utilized to ensure the POS is rigorous, relevant, and aligned with technical and workforce readiness skills.	<input type="checkbox"/> In the Planning Stages <input type="checkbox"/> Partially Implemented <input type="checkbox"/> Fully Implemented
E. Identified partners are willing to work with students in some valuable capacity, relative to work experience, job shadowing, and mentoring of careers related to student interests. Specific student opportunities should be identified.	<input type="checkbox"/> In the Planning Stages <input type="checkbox"/> Partially Implemented <input type="checkbox"/> Fully Implemented
Our overall current status for Component 2 Partnerships is:	<input type="checkbox"/> In the Planning Stages <input type="checkbox"/> Partially Implemented <input type="checkbox"/> Fully Implemented

Our next steps are (include timeline to complete each step):

APPENDIX F

SUGGESTED STRUCTURE OF A FINAL EVALUATION REPORT

Although it is certainly possible to construct an evaluation report in different ways, there is significant consistency as well, and therefore a suggested structure is provided.

Suggested Evaluation Report Structure (in order):

Executive Summary: In two pages or less, provide an overview of the evaluation, focusing upon results and implications/suggestions. This summary is optional but could significantly increase the likelihood of use of the evaluation. This executive summary should be able to stand alone, so should include title and author information as well.

(Begin Full Evaluation Report on a clean page—include title and author information, and dates; consider a title page)

Program Description and Context: Concisely describe the program and any relevant background information.

Evaluation Context: Concisely describe the background concerning the decision to conduct an evaluation, who was involved in the decision, etc.

Evaluation Purpose and Audience: Concisely describe the overall purpose of the evaluation (e.g., “This evaluation aspires to...”) and describe the intended audience(s). It is okay to list more than one set of constituents, and you differentiate primary from secondary audiences. Many different types of evaluations exist, although we submit that all curriculum evaluations should be concerned with responsiveness and usefulness.

Key Evaluation Questions: List the evaluation questions that you have generated and that you will address.

Key Criteria for Judging Program Quality: List and describe the key criteria that you have used to judge program quality, as well as the reasoning (or precedents/sources) for choosing these criteria. It is important to state these clearly so that a reader can understand and appraise the basis for your judgments and findings.

Design: Describe the type of design you use (for instance, descriptive design; experimental design; etc.). Also include a subsection detailing your methods (e.g., interviews, surveys, review of documents, etc.) and samples (e.g., all teachers, a random sample of students, etc.). Any protocols or fine-grained details can be put into appendices.

Results: Present the results of the evaluation in a manner that makes sense to the team, and, as anticipated, the reader. One possibility is to present results by question.

Discussion/Implications/Suggestions: Here, teams should address the “so what” of the findings. What is going well, and what are some potential areas for growth? What is recommended?

Appendices: The body of the report should be kept concise, and appendices may be used liberally to provide fine-grained detail for the small percentage of readers who might be interested in technical detail and/or who might wish to replicate the team’s approaches at a different time and place.

Adapted from Weiss (1998).

APPENDIX G RECOMMENDED SITES AND RESOURCES

Curriculum Evaluation in the Field

Austin Independent School District (Texas) – Department of Research and Evaluation <http://www.austinisd.org/dre>

Rockwood School District (Missouri) – *Curriculum Management Plan*
<http://www.rockwood.k12.mo.us/curriculum/Pages/DevelopmentMaintenanceofCurriculum.aspx>

Illinois STEM – Recommended Resources/Reading

Achieving their goals: Implementing an Individualized Learning Plan http://pathways.illinois.edu/?page_id=928

Illinois Pathways (Science, Technology, Engineering, and Math) Website <http://www.ilpathways.com>

Illinois Programs of Study Guide <http://ocrl.illinois.edu/files/Projects/perkins/POSGuide.pdf>

Illinois State Board of Education Career and Technical Education (CTE) Website <http://isbe.net/career/default.htm>

National trends in high school graduation requirements and diploma options: Considerations for policy and practice in Illinois http://ocrl.illinois.edu/files/Projects/ISBE_HS_POS/HS_Graduation_ISBE.pdf

Pathways to Results (PTR) Landing Page <http://ocrl.illinois.edu/projects/pathways>

Putting it all together: Supporting K-12 STEM education in Illinois
http://c-stemec.org/wp-content/uploads/2013/10/putting_it_all_together.pdf

STEM Pathways and Programs of Study in the Land of Lincoln: A High School Companion to the Illinois Programs of Study Guide http://pathways.illinois.edu/?page_id=372

APPENDIX H
DEVELOPING THE EVALUATION DESIGN: A TEMPLATE

Evaluation Question	Information Required to Answer the Question	Sources of Information Required	Methods for Collecting the Information	Target Date or Timeline for Completion

This template is available at http://pathways.illinois.edu/?page_id=818.

APPENDIX I EVALUATION QUESTIONS, METHODS, AND ANALYTICAL APPROACHES

Table 1. Evaluation Questions and Data Collection Methods

Evaluation Question	Data Collection Method(s)	Source of Data
1.		
2.		
3.		

Table 2. Data Analysis and Interpretation

Evaluation Question	Criteria/Indicator	Standards (“Success”)
1.		
2.		
3.		

**APPENDIX I - CONTINUED
EVALUATION QUESTIONS, METHODS, AND ANALYTICAL
APPROACHES**

Table 3. Data Analysis Plan (part 1)

Evaluation Questions	Data Collection Method	Activities Needed	Person(s) Responsible	Due Date
1.				
2.				
3.				

Table 4. Data Analysis Plan (part 2)

Analysis to be Performed	Data to be Analyzed	Person(s) Responsible	Due Date
1.			
2.			
3.			

Source: Adapted from Center for Disease Control (CDC) Individual Evaluation Plan Outline Module 1 Draft: Asthma Program Evaluation Guide. Retrieved from CDC website (<http://www.cdc.gov>).

This template is available at http://pathways.illinois.edu/?page_id=818.





Office of Community College
Research and Leadership
University of Illinois
51 Gerty Drive, 129 CRC
Champaign, IL 61820
occrl@illinois.edu
<http://occrl.illinois.edu>
(217) 244-9390



COLLEGE OF EDUCATION AT ILLINOIS