Logic models: A tool for designing and monitoring program evaluations

Brian Lawton, University of Hawaii at Mānoa
Paul R. Brandon, University of Hawaii at Mānoa
Louis Cicchinelli, Mid-continent Research for Education and Learning
Wendy Kekahio, Mid-continent Research for Education and Learning

Logic models can help educators plan and monitor program evaluations. This introduction to logic models as a tool for designing program evaluations defines the major components of education programs—resources, activities, outputs, and short-, mid-, and long-term outcomes—and uses an example to demonstrate the relationships among them.

Teachers, curriculum coordinators, principals, district personnel, and others involved in education are often responsible for purchasing and implementing education programs or for designing, planning, and implementing their own. Legislators, school boards, and state administrators generally require that these programs be evaluated.

This quick reference guide introduces logic models as a tool to help educators plan and monitor program evaluations. It is one of a four-part series on program planning and monitoring released by Regional Educational Laboratory Pacific.[1]

Program components and logic models

Education programs can be characterized by four components:
- *Resources*—inputs to the program.
- *Activities*—aspects of implementation.
- *Outputs*—observeable products of the completed activities.
- *Outcomes, short-, mid-, and long-term*—effects or impacts within various timeframes.

When these components are depicted as a sequence of events, the resulting graphic display reflects the logic underlying the program—thus the term "logic model" (figure 1). Logic models reveal the relationships among program resources, activities, outputs, and short-, mid-, and long-term outcomes. The relationships among program components are usually represented in a logic model by arrows that show

how one program feature (say, a teacher professional development activity) affects another (say, increased teachers' content knowledge). Educators can use these representations to plan evaluations, monitor the implementation of program activities, and determine the extent to which programs have their intended effects. Logic models also guide evaluators in determining how well evaluation questions are being addressed.

Using logic models in program evaluations

Education program evaluations are typically conducted to provide the information that stakeholders need to make decisions about program resources, activities, outputs, and outcomes. These program components are often the focus of evaluation questions such as these:

- To what degree were the program resources sufficient to implement the program effectively?
- To what degree were the program activities conducted as intended?
- To what degree were the expected program outputs realized?
- To what degree did the program achieve its short-, mid-, and long-term outcomes?

Logic models are helpful in three ways in planning and monitoring evaluations that answer these questions. First, they guide program personnel in understanding the program's activities and intended outcomes more clearly and completely. They can also help program personnel who have experience writing program proposals or plans become more systematic in thinking through the details of the program and the relationships among its components at various stages.

Second, having the program and its outcomes laid out in a logic model helps educators identify evaluation questions. With a budget for an evaluation in mind, educators can use logic models to decide which program features are most crucial and then develop evaluation questions that address the program features and their interrelationships. The model can remind educators of the program stakeholders who might be involved in preparing evaluation instruments, collecting data, and so forth. It also can remind educators of the audiences for an evaluation report (such as superintendents, board members, and legislators).

Third, logic models allow for general evaluation questions to be fine-tuned into clear, specific, and actionable evaluation questions. Conversely, general evaluation questions can serve as the starting point for developing a logic model. General evaluation questions are often identified before the logic model is developed but selecting more specific evaluation questions usually comes after a logic model has been created and evaluators have a clear understanding of the evaluation resources needed to adequately address them.
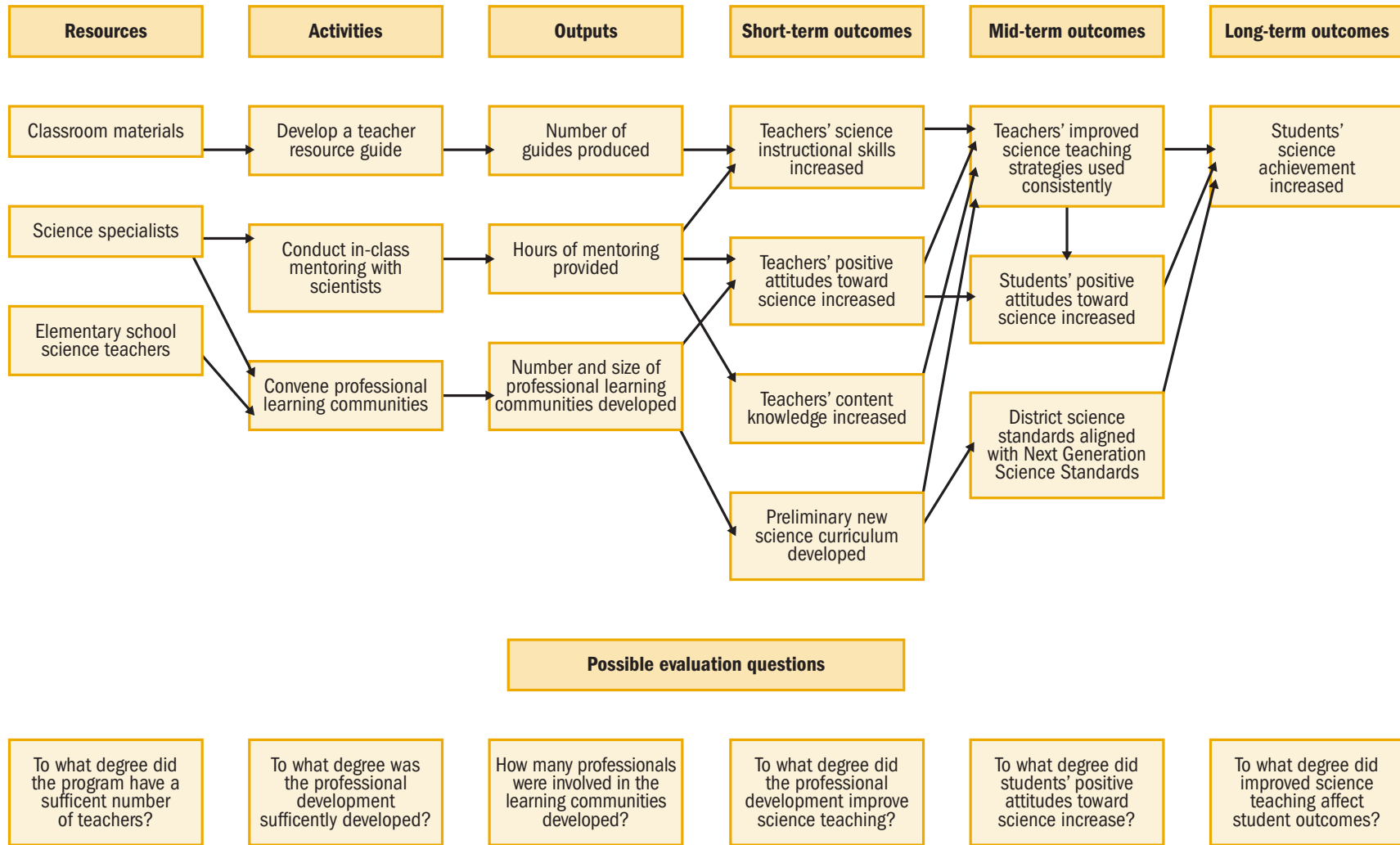
A sample logic model

A sample logic model is helpful for understanding its use in evaluations (figure 1).

Suppose a district curriculum development team is developing an early elementary school science program in order to increase students' academic outcomes in science. Figure 1 shows a logic model that the team might produce and the evaluation questions that might be associated with each program component.

The boxes in the first row of the figure identify the project components. The boxes below each component show the features of the program that address that component. The arrows show relationships among the boxes. Only major features of the program are displayed in the logic model. The evaluation questions at the

Figure 1. Sample logic model showing components and features of the program and associated evaluation questions

Resources	Activities	Outputs	Short-term outcomes	Mid-term outcomes	Long-term outcomes
Classroom materials	Develop a teacher resource guide	Number of guides produced	Teachers' science instructional skills increased	Teachers' improved science teaching strategies used consistently	Students' science achievement increased
Science specialists	Conduct in-class mentoring with scientists	Hours of mentoring provided	Teachers' positive attitudes toward science increased	Students' positive attitudes toward science increased	
Elementary school science teachers	Convene professional learning communities	Number and size of professional learning communities developed	Teachers' content knowledge increased	District science standards aligned with Next Generation Science Standards	
			Preliminary new science curriculum developed		

Possible evaluation questions

To what degree did the program have a sufficent number of teachers?	To what degree was the professional development sufficently developed?	How many professionals were involved in the learning communities developed?	To what degree did the professional development improve science teaching?	To what degree did students' positive attitudes toward science increase?	To what degree did improved science teaching affect student outcomes?

bottom of the figure reflect the issues whose answers educators or program funders might consider essential for each component of the program.

<p align="center">*   *   *</p>

This guide, along with other guides and a computerized application designed to build a logic model, will be available for download in 2014 from the REL Pacific website (relpacific.mcrel.org) or by contacting REL Pacific at relpacific@mcrel.org.

Note

1. For more information on the series of guides and other resources, see the Institute of Education Sciences website (http://ies.ed.gov/ncee/edlabs/regions/pacific/) or the REL Pacific website (http://relpacific.mcrel. org/).