# Logic Models as a Way to Support Online Students and Their Projects

Jesse Strycker, East Carolina University, Greenville, North Carolina, USA

## Abstract

As online enrollment continues to grow, students may need additional pedagogical supports to increase their likelihood of success in online environments that don't offer the same supports as those found in face to face classrooms. Logic models are a way to provide such support to students by helping to model project expectations, allowing students to demonstrate their current and changing understanding of relationships for different projects and instructors to review and comment on those understandings, and as a vehicle for reflecting on the outcomes of a project.

**Keywords:** logic models, distance education, instructional scaffolding, reflective pedagogy

## INTRODUCTION

Students taking online classes do so for a variety of reasons. Full-time work schedules aren't always compatible with campus-based programs featuring classes that meet during regular work hours. Night classes will work for some students, but other mays need flexibility to have different nights be when they work on their assignments. Physical distance may also make campus attendance impractical. In these different instances, a distance education class or program may be the only viable option.

While enrollment numbers have slowed over recent years, online enrollment continues to grow (Allen and Seaman, 2015). Despite the continued growth in online courses, they aren't without their concerns, such as dropout rates that are higher than traditional classes (Roby, Ashe, Singh, & Clark, 2013) and the possibility of outcomes being negatively affected (Allen & Seaman, 2014). A challenge to online courses and the learners who take them can be the lack of the kinds of support, instructional scaffolding that occur in face to face classrooms, as well as the need for greater self-regulated learning by students online (Delen, Liew, & Wilson, 2014). One way to provide online students with support and scaffolding, and one utilized by the author, are logic models. The author's use of logic models with online students draws conceptually from schema theory and metacognition. Schemas are the prior knowledge that individuals have accumulated over time, how that knowledge is organized, and have also been identified as the plans that they can follow when approaching different situations (Wiseman, 2008). A logic model provides a way to illustrate a student's current understanding or schema of how their project will be designed and executed. This physical representation also provides a vehicle for their metacognition. Often summarized as thinking about thinking, metacognition "refers to the processes used to plan, monitor, and assess one's understanding and performance…includes a critical awareness of a) one's thinking and learning and b) oneself as thinker and learner" (Chick, n.d. para. 1). Students' metacognition provides a basis for illustrating their existing schema in the form of a logic model for how they will carry out each project, assess their current plan, and later reflect on their execution of the plan and how it may have varied from their model and what they have learned as a result.

## What is a logic model?

The W.K. Kellogg Foundation (2004) defines a logic model as a "systematic way to present and share your understanding of the relationship among the resources you have to operate your program, the activities you plan, and the changes or results you hope to achieve" (p.1). You may also know logic models under different names since "common synonyms for logic models include idea maps, frameworks, rich pictures, action, results or strategy maps, and mental models" (Knowlton & Phillips, 2013, p. 4). While the Kellogg Foundation uses program logic models as part of their grant funding decisions, logic models can be used with other kinds of projects as well. Some of the projects that logic models have previously been used with include public health programs (De-Regil, Pena-Rosas, Flores-Ayala, & del Socorro Jefferds, 2014), as a basis for evaluating change in vocational rehabilitation programs (Groomers, Jones, & Lewis, 2014), developing program theory for a father support program (Gervais, Lacharité, & Dubeau, 2015), and assessing effective practices of out of school programs (Wilkerson & Haden, 2014), just to name a few. Regardless of what they are used for, at a basic level a logic model is used to identify relationships between inputs, outputs, and outcomes (W. K. Kellogg Foundation). Such models can vary in level of detail from the basic (see Figure 1) to the more advanced (see Figure 2)


*Figure 1: Basic logic model with three elements and an informing context.*

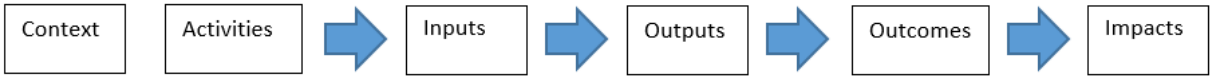


*Figure 2: Advanced logic model with five elements and informing context.*

## Why use a logic model?

The use of a logic model requires students to think through an entire project or program and how the different pieces fit together in a meaningful way. This holistic approach may lead to discoveries of inputs that have been overlooked or identifying limited consideration of outputs, outcomes, or impacts, if not in the short term, then in the intermediate and longer terms. These kind of models are unique to each individual and are always changings as learners develop new understandings and modify their old ones (McNeil, 2015). This evolutionary aspect of logic models increases their utility for use with online class projects.

In an online course where the instructor cannot always be present to meet with students for regular mentoring and scaffolding, logic models can be a way to help outline expectations and demonstrate understanding. From the instructor perspective, a logic model provides structure to students to know exactly which elements in a project they need to think about when planning and designing a project. From a student perspective, they are able to demonstrate their understanding in several ways. This back and forth interaction using the logic models as a basis for discussion is an example of an instructional scaffold (Delen et al., 2014). At a basic level students are able to fill in each portion of the model to meet the requirements, but on a more advanced level they can demonstrate their understanding of a situation. This can be accomplished by having a model that acknowledges their unique context and how it informs the project, the different kinds of inputs they have available to them to work with, and the different types of results they can expect and hope for in the short, intermediate, and longer terms. The logic model can also serve as a map to help keep students on task when they are outside of class as they have constructed a map of their project, identifying both starting and ending points.

The end of a project does not signify the end of a logic model's usefulness. The use of logic models also provides a built in basis for comparison when assessing a project and reflecting on it. As noted earlier, these kinds of models evolve as students develop new knowledge (McNeil, 2015). The reflecting on the logic models helps students to make more meaningful learning from the experiences (Guthrie & McCracken, 2010) of each project that the logic models informed. A student is able to review the logic model of how they intended for the project to be carried out and its results versus how the project proceeded and its results. Through reflection students may realize they actually had greater access to inputs then they were initially aware. For example, many students will overlook the instructor as an input that has provides both feedback and continue guidance and may also not consider colleagues on who they can rely at their internship sites. They can ask themselves further questions, such as, if they overlooked certain inputs, were unaware of certain inputs, or if they didn't use the inputs as well as they could have. Students can also consider how well the outputs, outcomes, and impacts matched those they had identified. If they are unable to identify a fit, this time for reflection could also lead to a restructuring of the logic model to allow the results to be more likely or to better inform future logic models so that they are more accurate. This reflective practice can aid instructors in assessing student learning in classes they may otherwise have limited interactions with through an online class setting or with students with whom they may be unable to visit at sites where their projects were executed.

## How to use a logic model?

Using a logic model begins by considering its different parts. The context or situation that is informing the model should first be identified as this will inform what the model is addressing. Next the inputs should be considered, which can be broken down into activities and other types

of inputs depending on how it is being approached. General inputs are the resources available, individuals contributing support in some way, and may also include the activities being utilized to garner results. One consideration for thinking about activities separately is that only certain inputs may apply for given activities. For example, one activity might use only certain resources and individuals who do not cross over to support other activities.

Outputs are the results that are yielded by the activities and inputs, such as artifacts which are generated and exercises or trainings completed. Outcomes can sometimes be less tangible as there may not be immediate results. Instead, outcomes might be increased skill or confidence. Impacts can be more nebulous as they are based on the outcomes. For example, a participant in a professional development activity may need to produce an artifact to demonstrate what was learned as part of the session. The artifact of that session could be a lesson plan that incorporates a technology the participant knew little about before the session. The outcome for that participant is she or he is now more confident in incorporating the technology learned about and will do it more often (short term impact), which potentially results in an impact of the participant becoming a teacher that uses more technology in her or his classroom and having students who are more engaged (intermediate or longer term impacts).

While logic models can be prepared offline by students and feedback offered by instructors using the grading functionality within a learning management system, another technology can better support the evolving nature and scaffolding opportunities of logic models. Through the use of a collaborate technology, such as GoogleDocs, both student and instructor can pose questions to each other via inserted comments or using the built-in chat feature. Collaborative editing also provides students and instructors with additional real time support options. Finally, instructors are able to view changes to the models over time via the version

control options within GoogleDocs. The use of such a Web 2.0 tool can also be a way to increase instructional presence (Tunks, 2012), helping to add more of the support that would more regularly be found in a face to face class.

### How might logic models be used in a specific online course?

In an online K-12 technology leadership internship class taught by the author, students must identify a mentor or mentors and have them approved before discussing what projects they might pursue and how they'll go about them. Once they have this initial brainstorming session completed they must put together a brief proposal and logic model for each of their projects. In doing so they must not only consider the activities they wish to pursue, but also the inputs they have going into the projects, the activities they'll be undertaking, the outcomes they're hoping for, and the impacts that they plan for and hope will result from those outcomes.

In this particular class students must construct logic models for a minimum of one needs assessment, one professional development session, and one community outreach project. They are given the freedom to brainstorm with their mentor(s) on the focus of each of these projects, but they then must be able to explain their reasoning within their proposal and logic models to gain approval from the instructor. While the proposal language will include what the students are hoping to accomplish, the logic models show the instructor a map of how the students plan to reach their goals. The logic models also provide an opportunity for the instructor to identify missing components, understand students' current thinking, and identify areas that students may not have considered or understand at that point. Student are also encouraged to regularly revisit their logic models as changes occur at their internship sites so that they can continue to see how changes affect not only the logic models, but also the different relationships and outcomes of the projects.

Before students get to this point, they often must be introduced to what a logic model is and how to construct one. Each semester the author has taught this internship class there have only ever been two or three students who had heard of logic models and fewer still who had used them. Students typically listed To-Do lists as their organizational method for such projects in the past if they weren't just planning everything out in their heads and following a simple timeline to stay relatively on track. In a face to face class or one where the instructor is able to visit internship sites on a regular basis, the site visits may help students to avoid simple To-Do lists or spur of the moment thinking and allow discussion with students about their process and steps, reviewing any notes that may exist as well. These casual, non-systematic approaches by students, such as the planning everything in their heads approach, can be harder to assess since there is little or no documentation of their thought process present, and which provide fewer opportunities for students to more deeply and meaningfully reflect. An example of a student intern's original logic models and an excerpt from their reflection statement are provided at the end of this article (see Appendix A).

In the internship class students must provide a report after each project is completed, with a final report on the entire internship experience being the final project. Students must present their original logic models for each project and discuss how closely their project ended up resembling their model and plan. In these reports students must discuss the sources of changes, any factors that they may have overlooked, any surprises that occurred, and finally what they would change if they either could do a particular project over again knowing what they know now or if they were to carry out a particular project again in the future. This opportunity to reflect on the logic models and project experiences helps students to continue to develop their understanding and evolve their models. According to Guthrie and McCracken (2010), "reflective

pedagogies have the potential to dramatically facilitate and extend significant learning when implemented in online learning environments" (p.15). The use of logic models and reflection in this internship class allow students to better understand what they have learned; it could also provide a meaningful way for the instructor to better understand what students have learned as well.

## SUMMARY

Online instruction continues to grow each year (Allen & Seaman, 2015) and effective strategies continue to be necessary to support online students. Online classes often lack the kinds of support and instructional scaffolding in place to support face to face students (Delen et al., 2014). One way to help address this is the inclusion of logic models in an online class to support student projects and planning. Logic models are a way to help identify and understand relationships between inputs, outcomes, and impacts (W.K. Kellogg Foundation, 2014).

Whether a simple graphical model or a more advanced one, such models can help students to demonstrate their understanding of relationships, especially as new knowledge is added and their own unique models evolve to reflect this growing understanding (McNeil, 2015). The models themselves provide a way for instructors to better understand students' thinking and understanding through the process and provide a basis for instructional interactions to support online students (Delen et al. 2014). Logic models can also provide a way to support students' reflective and evaluative process within the class and beyond (Guthrie & McCracken, 2010). While logic models may not provide all of the answers in supporting projects for online students, they have provided instructional scaffolding, a window into student understanding, and reflective pedagogical device for the author and helped to support the success of many online K-12

technology leadership student interns. The use of logic models could help other instructors support their online students to be more successful as well.

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Appendix A: Excerpt of Student Intern Logic Models and Reflective Statement

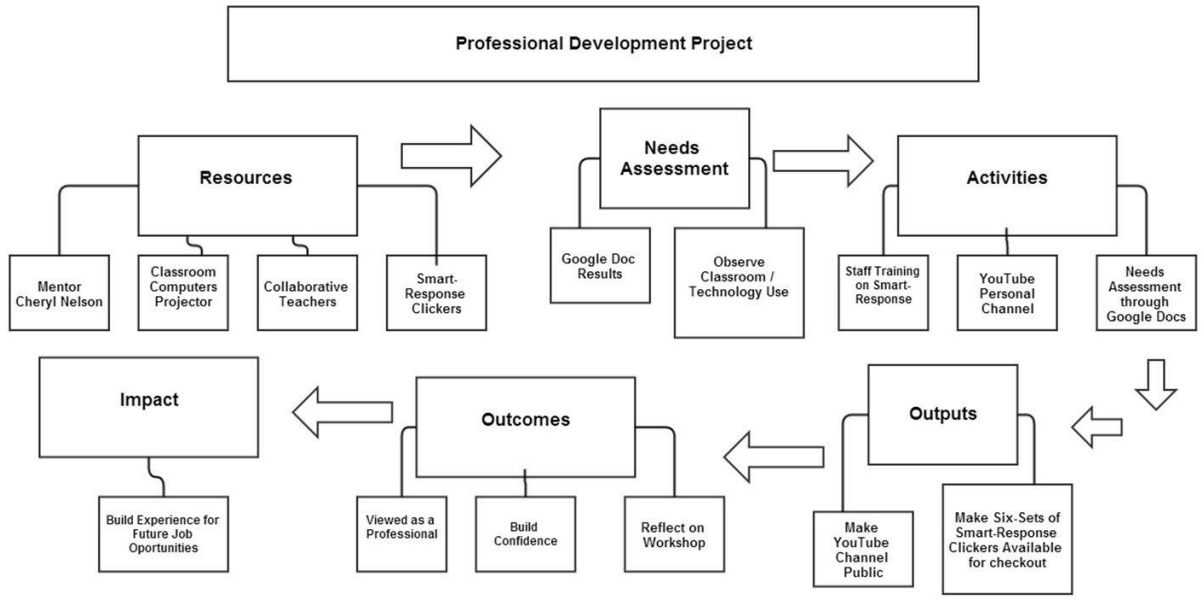


*Figure 1. Student intern's original logic model for their professional development activity.*

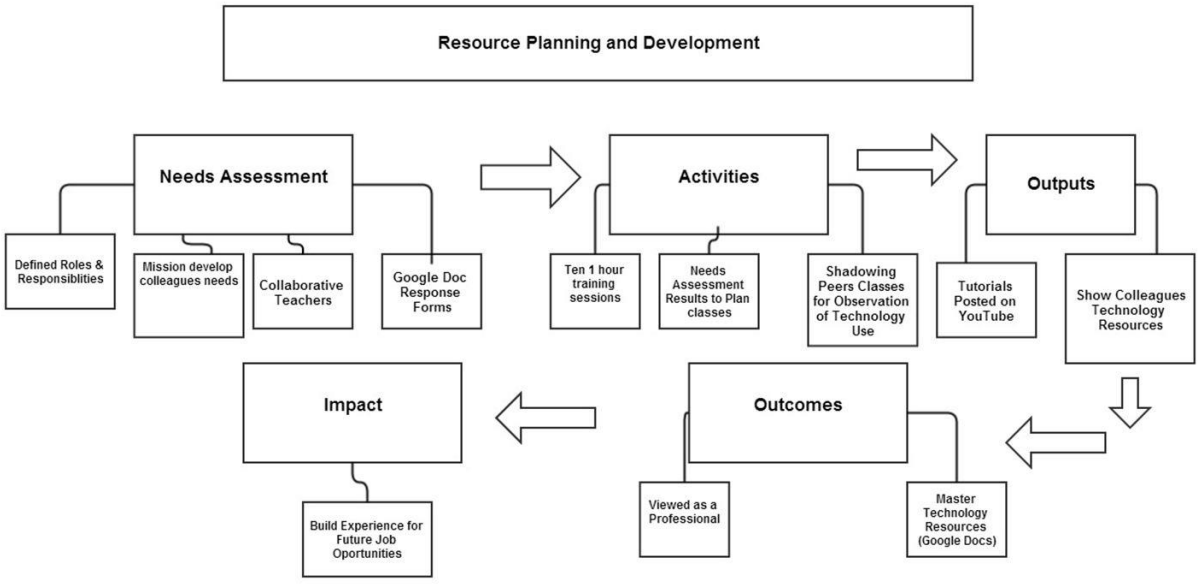


*Figure 2. Student intern's original logic model for resource development. The resource development was carried out after the professional development session was completed.*

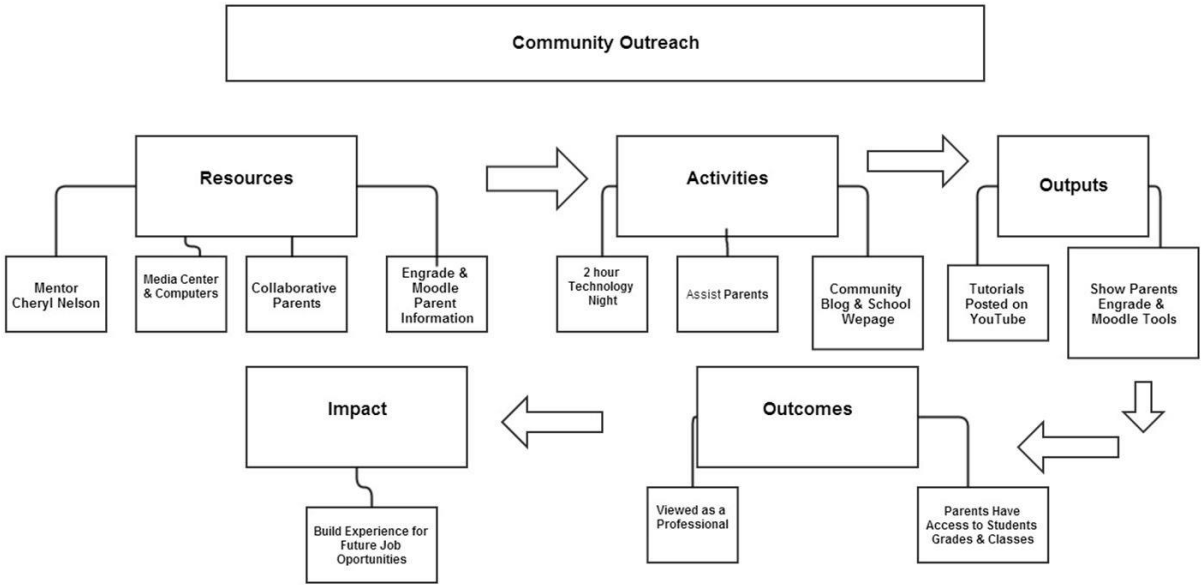


*Figure 3. Student intern's original logic model for their community outreach project.*

Appendix B: Author's Notes

I followed the logic model as I first designed the Needs Assessment, reviewing the results to guide me in making the instruction for the training. I ensured the clickers were available to teachers, and while building my confidence, I feel I became a professional leader.

Teachers have been checking out the clickers and using them to prepare their students for the end-of-grade testing. Many teachers utilize test questions from our PowerSchool resource, SchoolNet, and have the students click in their responses. The method provides instantaneous feedback for both teachers and students. The clickers have been employed for assessments, group work, and class discussions.

The after-school tutorials were part of my Resource Planning and Development logic model. The outcomes from these one-hour tutorials were very beneficial to the teachers. I received the most positive feedback from this component of my internship. Teachers gushed about the Web 2.0 tools and the endless possibilities of both the Promethean/ Smart series boards.

The logic models faced innumerable changes throughout the semester. For the Needs Assessment, I didn't use a Google Form, but instead gave the staff a short survey about what classes they would be interested in. Also, I hoped to teach ten classes, but I will only be able to teach six. Overall, I was able to master the technology resources that I taught and the staff ultimately viewed me as a professional technology facilitator.

Comprehensively, the outcome of the Community Outreach project was very helpful to the parents and legal guardians that attended. Parents were guided through the process of setting up a parent account for Engrade in addition to seeing how to access their students work through Moodle. I was able to follow the guideline of my Logic Model almost completely, except for

adding a parent/guardian blog to the school's website. The night was a success because over the following two weeks I received positive feedback from the school counselor, teachers, and administration. They informed me that parents appreciated the guidance on using Moodle and Engrade.

Overall, my internship was a very successful experience. I can remember finishing my undergraduate coursework and being placed in my first internship as a student teacher. I mistakenly thought I could not be any more prepared after studying philosophers, strengthening my knowledge on my content areas, and working in schools with small groups. I was in for a rude awakening. The classroom was a completely different environment, many times I found myself thinking back to the class discussions and wondering how to deal with the situations that arose. In my head, and many times there was a blank slate because the situation was new and I needed to think on my feet. My internship experience as a graduate student was comparable.

Teaching colleagues was very similar to teaching my students. The knowledge for 21st learning had a wide range, the instruction needed to be differentiated, and many staff members required the one-on-one attention. As I went through the internship, I realized that I had many misconceptions about teaching adults. I had to work longer and harder with some, but it was very rewarding when they came back with praise and excitement after learning about the new technology resources and tools.

As an educator, one must be very flexible and ready to adapt to new and changing environments. Overall, my internship was a very smooth experience and I was able to adapt to my audience. If I were to do it all over again, I would take advantage of my exceptional staff members. Many colleagues mastered certain technology skills, and I should have used them as a resource for my classes. Additionally, I would also have more incentives to come to my tutorials.

Throughout the internship, I often found myself working one-on-one with a teacher and I should have planned more efficiently. I would spend over an hour with one teacher and the next day do the exact same lesson with another teacher. I also had some issues with software updates, therefore prior to trainings, I would make sure that each teacher had the updates installed before the professional development.