# THE RECIPROCAL RELATIONSHIP BETWEEN IMPLEMENTATION THEORY AND PROGRAM THEORY IN ASSISTING PROGRAM DESIGN AND DECISION-MAKING

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**Abstract:**   The focus of this article is how Theory Driven Evaluation (TDE) and two of its central tenets—program theory and implementation theory—can be simultaneously used to inform and assist programmatic decision-making. The article argues there is a paucity of evaluation literature demonstrating how program theory can be beneficial to the design and interpretation of implementation theory. A case example is used to illustrate the importance of program theory in developing and interpreting implementation theory.

**Résumé :**   Cet article porte sur comment l'évaluation fondée sur la théorie et deux de ses principes de base, la théorie de programme et de la mise en œuvre, peuvent simultanément servir à éclairer la prise de décision sur les programmes. L'article soutient que peu d'articles ont été publiés démontrant comment la théorie de programme peut être bénéfique à la conception et à l'interprétation de la théorie de la mise en œuvre. Une étude de cas démontre l'importance de la théorie de programme pour développer et interpréter la théorie de la mise en œuvre.

Evaluating process and impact are two fundamental purposes of program evaluation. The strength and importance of each evaluation purpose is well documented in the evaluation literature

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(Mark, Henry, & Julnes, 2000). There are many approaches for evaluating program process (e.g., Bond, Becker, Drake, & Volger, 1997; Chen, 2004; Coşkun, Akande, & Renger, 2013; Johnsen et al., 1999; Mills & Ragan, 2000; Mowbray, Holbray, Teague, & Bybee, 2003) and program impact (e.g., Chen, 1990; Chen & Rossi, 1983; Donaldson, 2007; Patton, 2008). Whether process or impact is being evaluated, the approach used must be carefully selected to ensure staff and administrators will (a) use the results (Patton, 2008) and (b) have the best possible information upon which to base programmatic decisions (Mark et al., 2000).

The focus of this article is the use of Theory Driven Evaluation (TDE) to evaluate process and impact. From a TDE perspective, the evaluation of impact rests on first making the *program theory* explicit (Chen & Rossi, 1983; Donaldson, 2007; Renger & Titcomb, 2002). This is not required with other approaches to impact evaluation, but is a necessary prerequisite when using a TDE approach. Similarly, there are many approaches to evaluating process. From a TDE perspective, however, articulating the *implementation theory* is essential for a meaningful process evaluation to be completed (Palumbo & Oliverio, 1989; Scheirer, 1987; Weiss, 1997a).

Program theory attempts to make the mechanisms of change explicit (Blamey & Mackenzie, 2007; Donaldson, 2007; Renger & Titcomb, 2002). Within the logic model literature, mechanisms of change are referred to by many names, including exogenous factors, antecedent conditions, predisposing factors, enabling factors, protective factors, risk factors, programmatic assumptions (Chen & Rossi, 1983; Green & Kreuter, 1999; Renger & Hurley, 2006; Renger & Titcomb, 2002).

Implementation theory pertains to program activities (Weiss, 1997a). However, implementation theory refers to something deeper than simply the steps of an activity; it captures the essence of how the activities are presumed to affect the mechanisms of change identified in the program theory—the process of implementation (Scheirer, 1987). As Chen and Rossi (1983) note, "too much of the attention has been given to worrying about whether programs were delivered as intended, and not enough attention has been given to understanding the process of implementation" (p. 296).

An excellent example of recognizing the power of the process implementation theory comes from the work of Renger, Wood, Granillo,

and Attakai (2011) in the field of emergency preparedness. The authors developed online courses to convey knowledge about important principles of emergency preparedness. The steps in developing and delivering the online courses were clearly articulated and the fidelity of delivery examined using checklists. Despite being delivered with fidelity, the evaluation of the impact of the online courses revealed the courses to be largely ineffectual. In response to this problem, the authors developed a more refined implementation theory by rooting the online courses in experiential learning theory. Two central tenets of experiential learning theory are that the adult learner must (a) be engaged and (b) have an opportunity to reflect. Thus, online courses were designed with an interactive component (in contrast to the previous passive model) and included exercises to force the learner to reflect. In this example, the experiential learning theory is the implementation theory. Therefore, when completing the evaluation of the implementation theory Renger et al. (2011) not only evaluated whether the steps of online delivery were followed, but also evaluated *whether adult learners felt engaged and had an opportunity to reflect*. The concept of fidelity extended beyond simple steps to the implementation theory underlying the activities.

When the implementation theory is conceptualized in this way, activities are more than just steps: they are the catalysts that affect the mechanisms of change. As catalysts, activities (e.g., an online learning module) must contain specific attributes to affect the mechanisms of change (e.g., experiential learning). Further, the implementation theory must be meaningfully related to the program theory (i.e., the mechanisms of change). Within the logic model literature, activities are always shown to the right of programmatic assumptions depicting the importance of logically connecting the second element (activities) to the first (programmatic assumptions). If implementation theory is not meaningfully connected to the program theory, then the likelihood of the activities having their intended impact is attenuated (Chen, 1990).

Weiss (1997a) explains that program theory and implementation theory are frequently confused because "sometimes the mechanisms seem to be the program activities" (p. 510). For example, program theories developed in public health often identify linkages between knowledge, skills, attitudes, and behaviours to explain health outcomes (Green & Kreuter, 1999). Many public health activities are education-based whether conducted in the classroom, workshops, health fairs, or other places. If the evaluation of the program theory

suggests that improvements in health outcomes occurred, then it is tempting to conclude the educational intervention was the reason for the change. However, it is the change in the mechanisms—that is, knowledge, skills, attitudes, and behaviours—that led to the change in health outcomes, not the educational intervention per se. The educational intervention was the catalyst needed for the change mechanisms to take effect.

There is abundant literature discussing the importance of both implementation theory and program theory (Chen & Rossi, 1983; Palumbo & Oliverio, 1989; Scheirer, 1987). Many of the earlier publications focused on the consequences of these theories in the context of experimental design and knowledge development (e.g., Palumbo & Oliverio, 1989). These early theory-driven evaluators cautioned about the lessened ability to interpret the evaluation of program theory when the implementation theory could not be validated (Palumbo & Oliverio, 1989; Scheirer, 1987; Trochim, 1986).

As teachers of evaluation we noticed how our students struggled with reading the early TDE publications. Our students could not bridge the gap between the research paradigm and practice. As practitioners of evaluation we needed a better way to explain TDE to our clients. We needed to explain, simply, the importance of simultaneously considering implementation theory and program theory when making programmatic decisions. In our review of the evaluation literature we were unable to find illustrative examples where the analysis of the program theory was critical to the development and interpretation of the implementation theory. We are certain this happens in reality, as we routinely use program theory to inform implementation theory in our own practice; however, there seems to be a paucity of examples in the evaluation literature. It is our experience that such examples are critical for practitioners to bridge the theory-to-practice gap.

The purpose of this article is to first demonstrate the way in which results from an evaluation of implementation theory and program theory can be used simultaneously to assist programmatic decision-making. Then, through the use of a case example, we will illustrate how program theory can be beneficial to the design and interpretation of the implementation theory.

HOW THE EVALUATION OF IMPLEMENTATION THEORY AND
EVALUATION OF PROGRAM THEORY WORK TOGETHER TO ASSIST
DECISION-MAKING

The evaluation of program theory and implementation theory can be completed independently and provide important information to assist decision-making (Scheirer, 1987). However, power is added when the results from the implementation theory and evaluation theory are analyzed together (Chen, 1990; Mills & Ragan, 2000; Weiss, 1997a). The TDE literature makes numerous references to the importance of considering the evaluation of implementation theory in interpreting policy and program theory (DeGroff & Cargo, 2009; Scheirer, 1987). One of the earliest examples of how the evaluation results of both program theory and evaluation theory are used in conjunction to make programmatic decisions is the work of Suchman (1967). Suchman noted that deciding on whether to proceed with an experiment depended on being able to implement it with fidelity (Stufflebeam & Shinkfield, 2007). However, while there seems to be consensus about the importance of simultaneously considering the evaluation of implementation theory and program theory in making programmatic decisions, we could find no place in the evaluation literature that explicitly describes how programmatic decisions vary as a function of simultaneously considering the differing results from an evaluation of program theory and implementation theory. This observation was confirmed by our colleagues during our presentation on this topic in Helsinki at the European Evaluation Society (EES) conference (Renger, 2012).

In response to this need to bridge the gap to application, we developed the matrix in Figure 1 to summarize how the different results from an evaluation of implementation theory and program theory, when considered together, impact decision-making.

Figure 1 shows how the evaluation of program theory (i.e., whether the mechanisms of change as identified in the program theory changed) can be significantly aided by simultaneously considering the results of the evaluation of the implementation theory. If the evaluation did not validate the program theory and did not validate the implementation theory, the best decision is then to focus effort on improving the program implementation model. This is because if the program was not delivered according to the implementation theory, then it is impossible to determine whether the failure to observe changes in outcomes was due to the design of the intervention or

simply because the program was not executed correctly (Chen, 1990; Mills & Ragan, 2000). Alternatively, if the evaluation did not validate the program theory, but did validate the implementation theory, then revisiting the validity of the program theory might be recommended.

**Figure 1**
**Decision Matrix for Simultaneous Consideration of Evaluation Results of Program Theory and Implementation Theory**

Does the Evaluation of Program Theory Support Mechanisms of Change?

| | No | Yes |
|---|---|---|
| **No** | Improve Implementation | Uncertainty |
| **Yes** | Revisit Program Theory | No Change to Implementation or Program Theory |

Does the Evaluation of Implementation Theory Support Implementation with Fidelity?

## HOW PROGRAM THEORY ASSISTS THE DESIGN AND INTERPRETATION OF THE IMPLEMENTATION THEORY

How program theory can assist in the design and interpretation of implementation theory is now illustrated through the use of a case example. The evaluation focused on a school-based program in Ludwigshafen-Oggersheim, Germany. The program consisted of several activities including cooking classes, a field trip to a baker, computer

classes, and so forth, and the teacher wished to evaluate the impact of her program as mandated by the school district. Very little direction was forthcoming from the school district (Renger, 2013) regarding how to proceed with the evaluation.

A TDE approach was used to develop the program theory (Donaldson, 2007; Weiss, 1997a). The program theory was made explicit (Weiss, 1997a) by applying Root Cause Analysis to available source documentation (e.g., teacher lesson plans) and interviewing the teacher (Renger, 2011; Renger & Titcomb, 2002). The resulting program theory is shown in Figure 2.
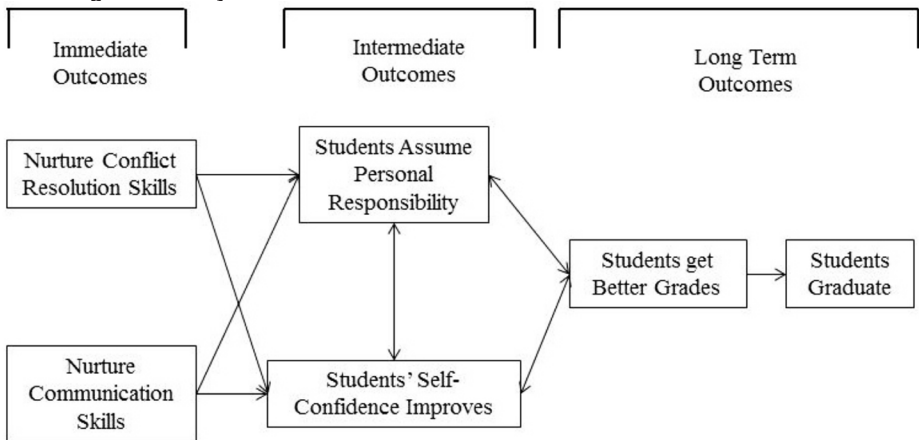
**Figure 2**
**The Program Theory**



Figure 2 shows that the teacher's long-term goal was for students to pass their courses and graduate. To meet this goal it was necessary for students to build self-confidence, which in turn was contingent on building communication skills, conflict resolution skills, and personal responsibility.

In summary, communication skills, conflict resolution skills, responsibility skills, and self-confidence were the mechanisms of change central to the program theory. Indicators were identified for each mechanism of change and evaluated by analyzing videotape of the cooking class using behaviour observation checklists.

Using Program Theory to Design a Better Implementation Theory

> The next task was to define the implementation theory. The teacher's initial implementation strategy was fairly straightforward: it was simply a series of steps for several independent lesson plans. Once the teacher was made aware of the concept of an implementation theory, she was able to plan a more coherent set of activities. To do this the teacher drew heavily on social work literature and the concept of an *erlebnis*, a concept grounded in social work literature. In layman's terms, if the activities were not fun and interesting they would not act as a catalyst, students would disengage from doing the activities, and the mechanisms of change identified in the program theory would not be affected (see Figure 3).

**Figure 3**
**The Addition of Implementation Theory to the Existing Program Theory**
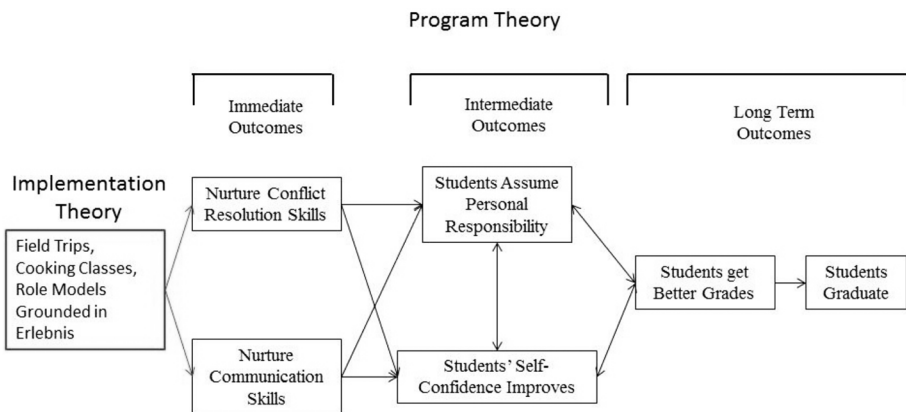


> After making the implementation theory explicit, steps associated with each activity could be more meaningfully constructed (McGrew, Bond, Dietzen, & Salyers, 1994; Renger, 2011). Activity steps were designed to engage students while simultaneously targeting the mechanisms of change in the program theory. To assist the teacher in linking her implementation theory to her program theory she was asked to write the details of each step, or *schritte*, of each lesson plan for her cooking class. This process took her several months to complete (Renger, 2013). Once she documented each step of each lesson plan, a simple checklist to be completed by an outside observer was developed to monitor whether each step was implemented as intend-

ed. In addition, a questionnaire was developed to assess the catalytic effect of the activities under the implementation theory. Students were asked about whether the activity was indeed an *erlebnis*.

For each step of the lesson plan the teacher was challenged to explain how elements of the activity related to the program theory. Of course, not every activity step needed to be related to the program theory. However, for the implementation theory to be defensible, the link between the activity steps and the mechanisms of change needed to be clearly explained. This is fundamental to any logic modelling process (Renger & Titcomb, 2002).

This linking exercise significantly impacted how the teacher thought about her work. For example, one of the first steps in the cooking activity was to divide students into four groups of four students each. Prior to considering program theory, this was done by random assignment. However, after considering the implementation theory, students were deliberately grouped (a) to maximize enjoyment (i.e., the catalyst) and (b) to provide opportunities for the mechanisms of change to operate (e.g., adding a step in the cooking activity that forced group communication to resolve a conflict).

This linking exercise resulted in a more detailed and descriptive implementation theory. This was primarily because the teacher was forced into a deeper level of processing, to make explicit the tacit, to think more deliberately and meaningfully about each element within a lesson and how lessons related to each other (Renger, 2013). The linking exercise is advantageous because it increases the likelihood the implementation theory will act as the catalyst for the program theory to have its intended impact (i.e., by avoiding activity traps). The documentation resulting from the linking exercise is advantageous because it (a) provides the foundation necessary for developing a comprehensive checklist needed to evaluate fidelity of implementation, (b) improves the likelihood the activity could be replicated internally (e.g., by a substitute teacher) and (c) is replicated externally (e.g., by other schools who operate from a same program theory foundation).

Using Program Theory to Interpret and Refine the Implementation Theory

Because of the uncontrolled and sometimes even chaotic nature of the teacher's activities (e.g., four cooking stations and 16 students), unanticipated events arose affecting the fidelity of the implementa-

tion theory. Thus, there were many deviations from the implementation theory requiring on-the-fly adjustments. The extent to which such deviations should be expected and their impact on evaluation have been previously noted and discussed in the evaluation (Scheirer, 1987).

For example, sometimes a student was absent, which affected the level and type of communication. Such deviations from the original implementation theory jeopardized the ability to interpret the evaluation of the program theory. This is because it is impossible to (a) anticipate the deviations, (b) document a priori the permutation and combination of approaches the teacher might take in addressing these deviations in real time, and (c) assess the quality of the corrections to the implementation theory.

To meet this challenge the teacher wore a small lapel-mounted HD camera. The camera produced high quality video that she could review and reflect upon after implementation. Initially the teacher struggled with interpreting the videotape. The main reason for this was that there was no frame of reference upon which to judge the appropriateness of the remedies she used to address deviations from implementation theory. This is where the program theory became extremely valuable. The teacher could now consider whether actions she took to address deviations were consistent with how the implementation theory was hypothesized to affect the program theory. Actions deemed consistent were filed as strategies to consider in the future should similar circumstances again present themselves. Actions deemed inconsistent with creating the conditions necessary for the mechanisms of change to be affected were noted and to be avoided under similar future circumstances.

In summary, before learning about program theory the teacher used a shotgun approach to dealing with deviations from the implementation theory. There was no foundation from which she operated to decide on appropriate corrective actions. She simply made some kind of change and hoped the lesson would be effective. Now through the use of program theory she was able to determine whether the corrections to deviations made on the fly were appropriate and then make meaningful and targeted changes to her implementation theory. Further, unanticipated benefits included the teacher becoming less fearful of evaluation (Renger, 2013). Evaluation is a tool to improve her lessons and, it is hoped, their effectiveness at changing underlying mechanisms of change.

DISCUSSION

From a TDE perspective, implementation theory and program theory are fundamental to evaluating program process and program impact, respectively. Evaluators are challenged in keeping these purposes distinct and understanding how (a) the evaluation results from each can be used to compliment each other in making programmatic decisions and (b) the articulation of each can aid the development and interpretation of the other.

How implementation theory and program theory work together to assist decision-making has been well documented in the evaluation literature. However, we could find very few examples to illustrate how program theory can assist in the design of implementation theory and in the interpretation of deviations from the implementation theory. This is not to suggest that evaluators do not recognize this reciprocal relationship and use it in practice, but how this might be done does not appear to be succinctly summarized.

From a TDE perspective, developing a more targeted and meaningful implementation theory through the use of program theory increases the likelihood of achieving program impacts. However, the authors have found that there is often resistance to investing and detailing an implementation theory. This could be due to a number of very practical reasons, including (a) fear of making things explicit (i.e., fear of being held accountable), (b) not truly wanting to know the impact (i.e., an underlying political motivation), (c) unwillingness to make changes to something that has been ongoing and funded for many years, or (d) simply not having the resources to do so. Pointing out the additional benefits of detailing the implementation theory, such as being able to replicate results internally, or noting that such documentation is a necessary pillar of a model program is often motivating to the clients.

It is well known that programs can drift. The drift is often described as occurring during implementation (Bond, 1991), but drift can and does occur during activity planning. Such drift can lead to "activity traps," which are well-intended and faithfully implemented activities that in truth do not target the underlying mechanisms of change (Renger & Titcomb, 2002). It is here where the use of program theory becomes central to assisting with significantly strengthening the implementation theory.

Programs often operate in complex environments (Blamey & Mackenzie, 2007). Despite the best intentions, deviations from the implementation theory will occur because of the inability to control the environment in which the activity is implemented (Scheirer, 1987). Using the program theory as a frame of reference can assist in determining whether corrections to the implementation theory were appropriate. This intertwined and reciprocal relationship between implementation theory and program theory leads to further support of Weiss's (1997b) conceptualization of "theories of change evaluation for evaluations that explore both [process and impact] elements" (p. 77).

It is hoped this article will stimulate other evaluators to think about the reciprocal nature of implementation theory and program theory and to share ways in which these two TDE concepts can be used to improve program implementation and the likelihood of achieving intended program impacts.

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