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American Journal of Evaluation 2009 30: 554
DOI: 10.1177/1098214009349792

The online version of this article can be found at: http://aje.sagepub.com/content/30/4/554
Exploring the Intervention–Context Interface
A Case From a School-Based Nutrition Intervention

Sherri Bisset,1,2,3,4 Mark Daniel,4,5,6 and Louise Potvin2,3,4

Abstract
It has been acknowledged for several decades that programs interact with context. The nature of this interactivity, and how it defines a program, has not been adequately addressed. We view this lacuna as a function of the dominant theoretical perspectives guiding knowledge of program operations. We propose the actor-network theory (ANT) and its conceptual apparatus, the sociotechnical network, as suitable for guiding the acquisition of general knowledge on program operations. We tested this proposition with an instrumental case study of health professional practices during the implementation of a nutrition program into an elementary school setting. Data collection and analysis were guided by the ANT. Data were derived from semistructured interviews completed with six health professionals (nutritionists). Analysis procedures focused on the nutritionists’ collective representation of the microprocesses by which they aimed to build a sociotechnical network of alliances with educational stakeholders. Findings identified nutritionists as preoccupied with three overarching goals during the implementation of the nutrition program, whereby goals were found to take form interactively with the interests of the program participants (primarily students) and stakeholders (primarily teachers). Nutritionists strategically translated program components as a means of negotiating with participants and stakeholders. The findings of this study support the theoretical proposition that program implementation is a process of expanding a sociotechnical network. Beyond simply reaffirming that programs do indeed adapt to context, we interpret this adaptation through the lens of a social theory that suggests why and how adaptation is an inevitable component of program implementation.

Keywords
program implementation, school-based nutrition intervention, community health promotion, program evaluation

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Introduction

In implementation evaluation literature, there is a tacit acknowledgment that programs interact with contexts. Programs-in-practice are not expected to look exactly like programs-in-theory (Cronbach et al., 1980; Weiss, 1972). Two distinct approaches to understanding this phenomenon are dominant in the evaluation literature. On one hand, implementation is addressed among several theoretical program elements (Lipsey, 1989) or domains (Chen, 1990) requiring evaluation. Here, implementation evaluation is concerned with identifying factors exogenous to the program, which mediate its critical elements, and also with explaining how these may interrupt the underlying chain of assumptions. Alternatively, Weiss (1997) describes both program and implementation theory as subsumed under an overarching theory of change, capturing “what is required to translate objectives into ongoing service delivery and programme operation” directly related to “the responses of the people to programme activities” (Weiss, 1995, p. 58). While the former alludes to two distinct systems that are expected to interfere with one another, the later emphasizes the continuity and exchange that occur as previously unassociated systems start working together.

Program implementation tends to be associated with two related systems: a “user system” and a “resource” or “program” system. Emphasis is placed on either one of these two systems to explain the ease by which a program or new technology (Lehoux, 2006) can be adopted into a particular context. The diffusion of innovation theory emphasizes the instrumental components of the program (e.g., ease of use, trialability, relative advantage, and newness) to predict the speed and spread of adoption (Rogers, 1995). Ecological theory focuses on the user system to identify various factors from among the levels of an organization’s functioning (e.g., decision-making process and individual abilities), which may facilitate or constrain the adoption of a program (Scheirer, 1987, 1994). Common to both perspectives is what we argue to be an artificial boundary between a program and its implementation setting. Needed then is an approach to make sense of program implementation in a way that draws attention to this “inherent interactivity” (Glasgow, Lichtenstein, & Marcus, 2003, p. 1263) between the people and things, which come together in a new set of programmed actions.

Indeed, program implementation theory recognizes that programs are placed into operation by actors with a variety of styles, experiences, interests, and perspectives on the program’s underlying premise and how it operates in situ (Scheirer, 1987; Weiss, 1998). The formation of a program or policy can be further described as interacting with the adoption of new roles and the way program actors communicate about the innovation (Sussman, Valente, Rohrbach, Skara, & Pentz, 2006). However, for implementation evaluation, the identification of these diverse orientations and interpretations emerging from complex interactions are most often used for reconciling various viewpoints to “speed up” implementation (Guba & Lincoln, 1989; Scheirer, 1987) or account for effect modifications (Love, 2004). Thus, although implementation theory describes program implementation as an ongoing interactive dynamic process, its conceptualization is quite narrow. Namely, program implementation is looked upon as either an approach to build collaboration and consensus among stakeholders or as a set of “integrity” or “fidelity” measures to judge adherence to predefined, static plans. Missing is a theory that captures the reflexivity that occurs when plans are placed into action and modified as a result of becoming “active.”

The need to understand what happens during program implementation beyond the monitoring of program “drift” or “leakage” is not simply an intellectual or academic exercise. Anomalous findings from several large-scale systematic reviews assessing program effectiveness suggest the need for a new conceptualization of what is happening during program implementation to effectively link program events to outcomes (Doak, Visscher, Renders, & Seidell, 2006; Kna, Pomerleau, Lock, & McKee, 2006; Sharma, 2006; Summerbell et al., 2005). For example, a recent Cochrane review on obesity prevention recommends that interventions where stakeholders are involved in decision
making about potential implementation strategies are more likely to create a supportive environment for sustained action and positive impact than are interventions which approach “gold” standards for judging program effectiveness (Summerbell et al., 2005). After finding that ineffective programs had higher fidelity to essential criteria than effective programs, another similar review suggests the need to rethink the nature of essential program elements and how they become part of a program (Doak et al., 2006).

Critiques dating back decades have suggested that implementation evaluation neglects process program components (e.g., underlying values and principles) in favor of structural program components (quality of program delivery, dose, participation) (Blakely et al., 1987; Dusenbury, Brannigan, Falco, & Hansen, 2003; Mowbray, Holter, Teague, & Bybee, 2003). The authors of these critiques have argued that although complex process components may be more difficult to measure, they may well have a greater influence on program outcomes than many more easily accessible and reliable measures of structural components. This perspective concurs with the Cochrane review, whereby anomalies are suggested to be associated with a well-intentioned but inappropriate focus on standard implementation measures alone. Thus, although current approaches to implementation evaluation respond to the imperative to avoid “black box” evaluation (i.e., to ignore process or implementation altogether), perhaps a large part of this box still remains in the dark.

Intervention research has begun to question the role assigned to implementation evaluation as an approach that traces an idealized efficacy-to-effectiveness diffusion model (Glasgow et al., 2003; Hawe & Riley, 2005). Calls have been made for newer approaches to program evaluation, which “embrace and study the complexity of the world” (Glasgow et al., 2003, p. 1264). Thus, in contrast to evaluating the operation of a program according to prescribed program theory (Chen, 1990) that may become interrupted during implementation by exogenous factors (Lipsey, 1993), current research in public health suggests that program theory “emerges” from the dynamic contexts where interventionists “interpret, translate, subvert, or deploy” (Hawe, Shiell, Riley, & Gold, 2004, p. 790) the official project rhetoric with the socioenvironmental contexts of their practices.

Exploring this interface where “innovation meets context” lies at the heart of social studies of technology (SST). This field of study has relevance to intervention research in its exploration of the constitution of innovation (or technology), where it addresses questions such as why some innovations succeed but others fail or why an innovation took on one form but not another (Akrich, Callon, & Latour, 2002a, 2002b). Of particular interest is that the formation of innovation focuses on a duality between “the social” and “the technical” components of an innovation. By following this approach, the operative implementation processes include both tangible (e.g., services, resources, and logic planning models) and intangible (e.g., up-to-date scientific knowledge and state-of-the-art know-how) things (i.e., technical components) in conjunction with the uptake of roles and the development of new relationships (i.e., social components). This approach is particularly interesting and timely, given broad calls from many fields of evaluation and intervention research to expand our focus beyond technical or structural program components to assess how social values and interpretations contribute to the operations of a program. We thus follow others who have applied the SST framework to study the constitution of health technologies (Denis, Hebert, Langley, Lozeau, & Trottier, 2002; Lehoux, 2006).

From within this large field of SST, we selected the actor-network theory (ANT) that approaches social and technical components as mutually constitutive, that is, in a continuous process of coformation. The “network” provides a conceptual tool with which programs can be understood to take form during implementation through the formation of connections. By explaining the formation of these connections using the ANT terminology, we describe the implementation of a health promotion program as a set of coordinated movements or negotiations (i.e., the actual work or action that permits connections to take form) between interested actors (Akrich et al., 2002a; Callon, 1986b; Latour, 1987). We propose that programs take form during their implementation through the process
of building the connections of an emerging sociotechnical network. In a previous work, we used these tools to analyze the transformation of a program through time (Bisset & Potvin, 2007). In this article, we produce an analysis of the microprocesses of the actions undertaken by program interventionists (i.e., nutritionists) in their collective efforts to implement a nutrition intervention in the elementary school setting.

**Case Study of a School-Based Nutrition Education Intervention**

The nutrition education intervention Petits cuistots—Parents en réseau (PC-PR; translated as little cooks—parental networks) is a school-based initiative promoting nutritional and culinary education for primary school children and their families’ participation in school activities. The program was initiated in 1989 by mothers who were active in their children’s school with lunchtime supervision. Based on their own need for active involvement with their community and their recognition of widespread poor quality lunches among school children, this small group of women initiated a nutrition intervention that became increasingly professionalized over time (Bisset & Potvin, 2007). Despite several iterations, the program resembles its ancestry through continued parental (i.e., parental networks) and students’ active involvement in food preparation (i.e., little cooks). As a community initiative, the program is not based exclusively on research knowledge of health behavior change theory but rather incorporates lay, health practitioner, and education specialist’s knowledge.

A total of eight schools participated in the PC-PR nutrition intervention during the year of this study (2004/2005). All schools are part of the Montreal School Board and serve the top 20% of disadvantaged primary school-aged children living in Montreal (Anonymous, 2007). Schools were recruited through their involvement with a community initiated program serving lunchtime meals or through the active recruitment of the hosting community organization Les ateliers cinq épices. During the 2004–2005 school year, the program was implemented in kindergarten through grade 5 classrooms, which included a total of 113 classrooms and 2,156 students. The number of students participating in the program per school ranged from 126 to 435 and the number of classes per school ranged from 12 to 22.

The program component “little cooks” is a nutrition workshop facilitated by community dieticians hired full time by the administrating community organization Les ateliers cinq épices (the five spices workshops; see www.cinqepices.org and www.cacis.umontreal.ca for activity reports). Each of the eight annual workshops was specifically designed for each of the six grades that form primary schooling in Quebec. Workshops feature an instructive component on a food item and theme, along with a practical component with a recipe guiding students in small groups through the preparation of the featured food, finishing with a tasting experience. Although the nutritionist leads a nutrition workshop, the classroom teacher is present to provide classroom management and program support. Teachers are also asked for support prior to the workshop by way of a preparatory exercise. The content of the workshop includes instruction on food preparation, food types, nutrition content and health benefits of food, alternative or uncommon foods, and cooking procedures and techniques. In addition, preparatory and reinforcement activities are proposed to teachers to integrate notions related to food, nutrition, and recipes into regular curriculum such as mathematics (use of fractions) language, social studies, or biology. The recipe and a tasting sample are provided to students as take-home examples of their cooking experience, which provides a link to the “parental networks” component of the program; parents are also invited to volunteer and assist with the nutrition workshop. Parent volunteers may also be met by a community development worker, also working full time for the PC-PR program. In this respect, the families of participating students are invited to take part in extracurricular activities that touch upon the food and nutrition themes introduced in the nutrition workshops (e.g., evening dinners, visits to local food producers).
Guiding Principles From the Sociology of Translation

Although stakeholders are recognized as interpreting interventions that are translated during implementation, implementation models do not facilitate inquiry to uncover these social processes. According to the sociology of translation (i.e., ANT), diffusion models attribute a passive role to social groups and in so doing restrict the role that actors may play during program implementation. The sociology of translation literature thus argues that diffusion models provide limited insight into how and why innovations are interpreted. Diffusion models often describe people in terms of their role as “transmitters” where actions are explained by the degree to which stakeholders either take-up or resist an innovation and the fidelity with which intervention workers implement the intervention. The sociology of translation (or ANT), advanced by Callon (1986b), Latour (1987, 2005), and Akrich et al. (2002a, 2002b), however, attributes rationality as to why and how innovations may be taken up (or dropped) and how this decision making may alter the innovation.

The sociology of translation or ANT conceptualizes an innovation as a network that is built from a need to correct or improve a practical situation. The innovation becomes established through connections (or alliances) that form from the interests and capacities of individual actors, that is, both human and nonhuman entities. During the formation of connections, the relationships between actors are being defined or negotiated, so the network and its connections are dynamic, fluid, and unstable. Connections become stable through the efforts (or “work”) that take place between the actors. Here, actors are interpreting, translating, and negotiating their own goals in relation to others. A connection becomes stable with a mutual recognition that the other actor is needed for the achievement of their own goals.

ANT is relevant to the study of program implementation. Implementing a health promotion program into a setting such as a school usually requires the participation of actors whose preoccupations are not centered upon health and whose interest to participate in the resolution of a health problem may be low. The actors primarily responsible for implementing the program in the school setting (i.e., nutritionists) are not school employees and are, therefore, in a somewhat precarious position, whereby, according to the theory of translation, the success of their innovation (i.e., the nutrition education program) will reside in the alignment of interests with actors whose need for the innovation is uncertain (i.e., teachers, students, and parents). In other words, program interventionists need to build connections with actors from a given setting and in so doing must consider not only the goals of the health program but also the goals of the education actors. The theory of translation describes this process of establishing connections (or aligning interests) as “interesting the otherwise uninterested.”

Methods

Within this expansive field of ANT, we have extracted a small, manageable, and useful vocabulary suited to an insightful exploration of the process of program implementation. In this respect, we apply a conceptual apparatus to illuminate the microprocesses that underlie program implementation and thus aim to highlight the complexities of program implementation in a way that reveals a particular form of intelligibility. In line with ANT, we propose that program practitioners (i.e., nutritionists) are building connections between the program and the school by making compromises and negotiating the use and utility of nonhuman actors to become an indispensable response to the interests, goals, and values, which are part of the school.

We present here a case study centered upon the representations of program practitioners. Cross-sectional data were obtained through interviews with each of the six project nutritionists. The
semidirective interviews queried nutritionists’ interpretation of the underlying premises of the program, their work with school personnel, students, parents, and other intervention workers, their impressions of how this work interacted with the program operations, and their expectations regarding potential outcomes. Representations were thus based on nutritionists’ experiences working with the 113 classes (kindergarten to grade 5) across eight participating elementary schools. Interviews were performed between March and April 2005 and lasted from 60 to 90 min. Interviews were recorded and transcribed verbatim.

Following the definition of innovation as a network of social and technical entities whose interests and capacities become aligned with one another through the work of actors, we analyzed the nutritionists’ accounts of their work to build connections and align program interests with those of the education stakeholders. The approach taken to analyze the interview data was guided by the ANT framework in general but was particularly inspired by an empirical work that applied these concepts to a case study (Callon, 1986b). Similar to our approach, this ANT case study describes the strategies by which a focal actor group (i.e., primum movens) builds a network of alliances to advance their own interests. The current analysis aims to identify these strategies as an implicit component of the nutritionists’ discourse regarding their experiences implementing the program in the school.

More specifically, in line with ANT, we expected nutritionists to describe the issues or the practical problems confronted by the school actors and to situate these issues in relation to the role of the program to respond or resolve them. In ANT terminology, this is referred to as problematization and describes the process by which the focal actor group defines a problem and their position within it. Problematization describes the manner in which the focal actor group identifies and defines other actors in relation to practical problems or issues and situates themselves as essential for its resolution. In addition, in line with ANT, we expected nutritionists to describe themselves as taking concrete action to strategically reinforce their essential role toward the resolution of these issues. In ANT terminology, this is referred to as interessement and is defined as the group of actions or strategies by which the primary actor group attempts to impose and stabilize the identity, motivations, or interests of the actors they have defined through the problematization. Interessement is described by acts of negotiation and compromise, whereby actors attempt to maintain or gain the interest of other actors.

To identify instances where nutritionists were building a network of connections between the program and the school, interviews were coded deductively according to the ANT concepts, problematization and interessement. Coding thus began by capturing the manner in which nutritionists identified and described the educational (human) actors. In accordance with ANT, human actors are individuals or collectives whose role within a network becomes mobilized through a problematization. Thus, any human actor to whom nutritionists referred to in terms of a program preoccupation, problem or issue was considered part of their network. Thus, interviews were coded for problematization in terms of the goals or what the actors in the network (including the nutritionists themselves) wanted. According to ANT, this process allows the analyst to identify how the focal actor group is building their network, by focusing on who the actors are and what they want. Two types of problematization subcodes were used to identify these instances in the data: identity and goal codes. Problematization was thus operationalized by first coding interviews with the name of the actor (e.g., teachers, students, parent, nutritionist, or educational director) followed by a code referring either to identity or goal. Identity codes aimed to capture the nutritionists’ descriptions of the various actors according to their qualities, qualifications, capacities, expertise, or role. Goal codes aimed to capture the nutritionists’ descriptions of the interests, goals, or preoccupations of these actors (i.e., what these actors wanted).

Once all the interviews were coded for problematization, “higher order” or more abstract identity and goal categories were induced from these descriptive codes. This process collected codes into
categories with distinct properties and resembled the operations of grounded theory methodology (Strauss & Corbin, 1998). This procedure permitted the analysis to sort through codes with the aim of comparing and contrasting how nutritionists both collectively and distinctively problematized the actor network and the role they attributed to themselves in this respect.

Next, following the same process outlined for problematization, interviews were analyzed for occurrences of the overall moments of interessement, whereby a descriptive “subcode” was a component of the overarching interessement code. Here, only one type of “subcode” was used to describe the specific nature of the negotiation strategy or actions used to render the nutrition program “interesting” to educational actors. Again, a categorization process organized the interessement codes into mutually exclusive higher order categories. The content of categories was compared and contrasted across nutritionists with the aim of identifying how nutritionists both collectively and distinctively strategized to capture the interest of educational actors.

Parallel to the coding procedures of problematization and interessement, the analysis also sought to identify and code for the nonhuman actors or entities that also played an important role in nutritionists’ attempts to build a sociotechnical network. Nonhuman entities were coded in accordance to their role as devices of interessement. Thus, nonhuman entities and their collective functioning were understood for the purposes of this analysis as devices of interessement. Recall that interessement was operationalized by coding for instances where the nutritionist took strategic action to reduce an obstacle or increase an opportunity toward the resolution of an issue. In accordance with ANT, reducing obstacles and increasing opportunities occur through negotiation, whereby the focal actor group weighs the risks and benefits of compromising her role and goals to respond to the explicit interests or preoccupations within the network. The substance of these negotiations takes form through mediators that are described as anything that “passes between actors in the course of a relatively stable transaction” (Latour, 1999, p. 25). Negotiations are understood as transactions where nonhuman entities take on value through their capacity to respond to the interests of the actors in the network. Nonhuman entities could be tangible, such as food or a cooking utensil, or it could be intangible, such as knowledge or ability. Nonhuman entities could also be used to organize human activity (i.e., meetings, a lesson plan, a work method, or timetable).

Analysis proceeded through an iterative process of abstracting and connecting the collective problematizations to the interessement strategies and verifying these associations back against the raw interview data. Beginning with overarching goals common across all nutritionists, the problematizations and the strategies that followed were sufficiently abstract that they could capture a broad representation of the sociotechnical network as it was shared across nutritionists. Although analyses of interviews also identified variations in these formulations between nutritionists, this presentation of the analysis does not explore internutritionist variation in the operation of sociotechnical connections.

A process was set up to ensure that the coding of interviews captured the underlying conceptual framework and that the collection of codes into higher order categories was trustworthy. A qualifying check by an external coder with knowledge of the sociology of translation and the PC-PR nutrition intervention was used to assure that the framework guided data analysis in an accurate and consistent manner. Namely, the coding of the interview was reviewed by an external reviewer and discussions between the analyst and the reviewer on the appropriateness of the codes pursued. Additionally, the analyst checked her understanding of the moments of translation and its practical application to the data during a qualitative research discussion group for which meetings took place on a monthly basis.

Findings present strategies taken by the nutritionists as a collective during the assembly of pertinent connections serving to expand and stabilize the PC-PR sociotechnical network through classrooms and participating schools. Boldface text illustrates the connection that the nutritionist aims to establish, italic text refers to the identity and problematization attributed to an entity, with
Results

The findings indicated that nutritionists were preoccupied with three overarching goals during the implementation of the nutrition workshop. These were (a) connecting students to their future health; (b) optimizing nutrition workshop functioning; and (c) assuring the long-term stability of the intervention in the school. In addition to justifying these goals based on what was in the “best interests” of students and the responsibility of the school as a public institution, nutritionists appealed to the interests of the program participants (primarily students) and stakeholders (primarily teachers) to connect the goals of these education actors to those of the program (Figure 1). By identifying this diversity of interests and explaining its insertion into the program, beyond their role as health professionals, nutritionists were also acting as negotiators between the health education goals of the program and the goals of education actors. Here, nutritionists translated their role and the operation of the nonhuman entities of the intervention to provide a legitimate response to participants and stakeholder needs (or goals) and in so doing, aimed to expand and stabilize the connections of an emerging sociotechnical network. Two overarching coupled processes were found to underpin nutritionists’ strategic actions: building alliances with students and building alliances with the school. By following the assembly of these connections, we can capture the “movement” of the program (i.e., the work of building connections and forming a sociotechnical network) through the dynamic interplay and coformation of the program’s socio- and technogram.

Through their primary role as animators of the nutrition workshop, nutritionists identified themselves as providing students with a connection to their future health as adults. Students were identified as being at risk of preventable diseases associated with poor diet due to a range of familial and societal influences. The nutrition workshop was identified as providing students with essential tools to maintain health into adulthood: If they (students) have interest in food and in cooking, an interest in health will follow. Although the nutrition workshop is clearly defined here as essential for the students’ longtime health, importantly, nutritionists concomitantly recognized that action centered uniquely on this goal was insufficient to engage students. Identified in nutritionists discourse was a set of strategies to translate the workshop such that its operations were aligned with students’ interests. Three overriding interessement strategies were identified, whereby the goals of the students became integrated into the operation of the nutrition workshop. Namely, nutritionists built alliances with students by reinforcing familiar connections with food, creating new connections with food, and expanding students’ interpersonal connections.

Nutritionists further identified themselves as indispensable due to the schools’ responsibility to protect students against chronic disease and the schools’ lack of nutrition expertise, time, and resources to fulfill this responsibility. Beyond identifying their role as essential, nutritionists recognized that a limited focus upon nutrition alone may disinterest schools and jeopardize their stability. Several interessement strategies were found to describe nutritionists’ goal of becoming indispensable to the school. In this respect, nutritionists built alliances with the school by connecting the educational institution with nutrition education and the nutrition workshop within teachers’ timetables.
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<th>Strategies</th>
<th>Goals</th>
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<td><strong>Students</strong></td>
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<td>To reduce long-term health risk</td>
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<td>- building healthy eating knowledge and know-how</td>
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<td>- Creating new connections with food</td>
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<td>- building professional credibility</td>
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<td>To experience collective achievement</td>
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<td><strong>Goals</strong></td>
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<td>To participate in decision making</td>
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<td>To build autonomy</td>
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<td>To experience collective achievement</td>
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<td>To enlarge role in home</td>
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<td>To demonstrate achievement</td>
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**Figure 1.** Strategies Identified by Nutritionists to Connect Interests of Participants and Stakeholders to the Program

Note: QEP = Quebec Education Program.
Building Alliances With Students

Reinforcing Familiar Connections With Food. By reinforcing familiar connections with food, nutritionists emphasized the value of food as a means to good health. This connection was established by building healthy eating knowledge and know-how. The nonhuman entities, knowledge about food and cooking tools, were, respectively, enacted to bring out the nutritive value of food and the technical meaning of food. Nutrition knowledge illuminated the nutritional composition of food gathered into food groups and associated food groups and food properties with healthy physiological functioning. Manipulation (i.e., utensils) and instructive (i.e., recipe) cooking tools were associated with the technical meaning of food by prescribing the manipulation of food according to standardized procedures. This strategy, rooted with professional practice and disciplinary knowledge was also identified among nutritionists as defining a professional identity among school personnel.

Although all nutritionists identified themselves as implementing this strategy, it was not consistently emphasized across all schools. Strategies to build healthy eating knowledge and know-how were associated with teachers who had health and well-being goals or who were using health education within their teaching curriculum. In contrast, alternatives to this strategy were found with teachers identified as modeling poor dietary practices to students where the nutrition workshop may have been perceived as “just a cooking class” and a waste of time.

Creating New Connections With Food. By creating new connections with food, nutritionists identified food as a multidimensional complex entity, which was commonly misunderstood and oversimplified. Here, food was something to be explored and experienced with open-mindedness and freedom. This strategy, described as guiding students toward discovering food in new ways, was associated with a problematization of students as needing school experiences where they could learn by doing and experience success. This strategy describes a negotiation in the enactment of nutrition knowledge and cooking tools. Namely, by introducing new objectives into the operation of the nutrition workshop, nutritionists also responded to what students themselves wanted as opposed to exclusively what the intervention defined, a priori as being in the students “best interests”:

... I can see, you know, they (students) have a need to discover things ... with food, we can do this in a way that is different from school ....

... there are children who are always getting put down, made to feel (they) are not good. By cooking, they can see that they can be good, that they are capable, and that they are OK.

Accordingly, the nonhuman entities, knowledge about food and cooking tools, were enacted to bring forth the explorative and experiential value of food. Information about food was not exclusively grounded in professional expertise but rather revealed how food connected students to people and places both near and distant through their own lived experiences and that of others. The cooking tools were associated with the experiential value of food and the self-achievement value of food, whereby students were given freedom of trial and error. Experiencing new tastes and textures identified a taste value of food as something that could be discovered and determined by the student, and by presenting food as having a potential to be liked or disliked, food validated individual preferences and attributed students with the reward of venturing into the unknown to further reinforce the self-achievement value of food.

The operation of this strategy was realized by attributing students an active role. This was accomplished by collecting information from students’ experiences and observations, traditional and religious practices. Students may also have been given more freedom of trial and error when the nutritionist emphasized the process as opposed to the final product. In these circumstances, cooking tools became enacted with a chaotic rhythm where the process needed to be sufficiently loose and challenging to students. The presence of these operations depended on the teachers comfort with
noise and chaos and also the cooperation of the students. Here, expectations regarding the role of the student and nutritionist were compared by one nutritionist to that of another who did not take the same approach:

... the students took too many things for granted, because (the nutritionist) placed the measure with the ingredient at the right place. It was (the nutritionist) who directed everything all the time.

Expanding Students’ Interpersonal Connections. Nutritionists also aimed to build aligned interests with students by expanding the students’ interpersonal connections with fellow students and with family members. Students were identified as wanting to “... have the feeling that they are a part of something” at school with other students and, in response, nutritionists devised a strategy described by highlighting collective success and identities. Students were also identified as wanting to play a larger role in the home in terms of showing off capacities, informing and influencing family practices. In this respect, the nutritionists were providing usable and applicable information and sending students’ accomplishments home. In contrast with strategies seen until now, this strategy was not centered upon food but when enacted, used food as a medium to build interpersonal relationships.

The collective activity of completing the recipe imposed codependence and provided the opportunity for cooperation during the interpretation and completion of the instructive recipe. The completed food sample and the recipe were used to connect students to their parents first by demonstrating a school accomplishment and providing a child–parent activity. Practical information about food could further link students to members of their family by informing family food purchasing and transmitting healthy messages. Younger students and newly immigrated students were described as wanting to bring parents into school.

In some schools, highlighting collective success and identities took on a formal identity. Name tags, distributed by the teacher, placed students into a team and attributed to them a specific role within the team. This techogram appeared uniquely with teachers aiming to develop collective learning competencies. Teachers identified as lacking health and nutrition goals were more likely to operate the nutrition workshop in this way.

Sending students’ accomplishments home was a key strategy to expanding students’ interpersonal connections with family. However, to the surprise of the nutritionists, the identity that they attributed to the take-home sample was not the same as the identity to which it was attributed by the students:

At one point, I really saw the reality, “Who wants mine?,” “You want to give me yours?” ... It was like traffic! It was nothing like, you know, we say, “Oh, the child is proud to bring this home ... Thus, the realization of this strategy depended on the implication of the teachers throughout the school day (and possibility the lunchtime school monitors or volunteers) and also on the students’ experiences at home. Students were identified as having a potential disinterest to bring home their food sample, where “... it doesn’t do anything to bring that at home because the parent will not taste it or will not like it.”

Building Alliances With the School

Connecting the Nutrition Workshop Into the Teachers Timetable. Strategies employed by the nutritionist to build alliances with students interacted the teacher’s engagement with nutrition workshop. Teacher engagement was needed to optimize workshop functioning due to nutritionists’ lack of pedagogic knowledge and experience. In particular, when teachers played an active role, they offered pedagogic input and influenced nutrition knowledge (content and means for communication).
by advising on developmental learning capacities, preparing the class, suggesting how to improve learning potential, contributing antidotes, and controlling class behavior. This input could increase students’ readiness to learn, which concomitantly influenced the nutritionists’ motivation to share knowledge.

Teachers were identified as having an overburdened workload or resource deficit resulting in being challenged to complete the educational program. To avoid adding “stress” to an already “stressed” timetable, nutritionists sought to avoid imposing upon teachers. However, reducing the level of imposition upon teachers did not provide sufficient conditions for teacher engagement, where “teachers embark because they really see that the program shows more than just what to and what not to eat.” Nutritionists thus aimed to interest teachers in the nutrition workshop as a valuable and indispensable curricular resource by providing the nutrition workshop as a pedagogic tool:

... if we can integrate the project, if the teachers can pass their pedagogic material or their teaching through the workshops, they might not see them as a waste of time.

Nutritionists further aimed at acquiring teachers’ interest by building a trusting relationship and professional credibility. Trust was built over time and was associated with being present in the school beyond the time and space of the nutrition workshop. By maximizing presence in the school, nutritionists would socialize with teachers and/or attend staff meetings. In this respect, getting to know teachers created the conditions necessary through which nutritionists increased trust and knowledge exchange and mutual respect for professional identity.

Connecting the Educational Institution With Nutrition Education. Although health education is part of the Quebec Education Program (QEP), the legitimacy of the nutrition education program was often associated with domains not traditionally associated with health. Broadly speaking, the program was legitimated by responding to new components in the QEP, collectively referred to as “the reform”:

With the new reform, learning by project, we can touch many competencies with the nutrition workshop at the same time. Teachers do not have time or the resources to create projects like this that respond to the reform.

Nutritionists also built alliances between nutrition education and the educational institution by appealing to the educational values that were part of the school. In particular, while parental participation may have been enriching for the school, schools were challenged to obtain parental participation. The PC-PR program was thus situated as being essential for building school and parental links. Namely, the PC-PR program was of interest to parents to please their child, find various resources, meet other parents, and get to know the teacher. Similarly, the PC-PR program was of interest to the school as parents (who were often disenfranchised with the educational institution) could see their child having positive experiences at school and thus ultimately see the school in a positive light. Nutritionists also situated the program as responding to the teachers’ need to build professional credibility. By showcasing classwork for all teachers to see and by transferring teachers’ practices from one teacher to another, nutritionists were appealing to teachers’ interest to stay up to date and appealing to an innate sense of competition among teachers.

The strategy of appealing to health values that were part of the school was identified when school administration and teachers were placing value in health education. In this way, nutritionists presented the program material as attractive for teacher to use toward the fulfillment of their own health goals in relation to themselves and/or their students. Nutritionists might prepare the recipe exclusively for teachers, which permitted teachers to approach them with personal questions related to nutrition and health. By representing the program as a comprehensive project with a holistic
Discussion

This study aimed to explore program implementation through a theoretical lens different from those which are currently dominant within the evaluation research field. In accordance with ANT, we proposed that program practitioners would strategically situate the program as an indispensable response to the goals of program participants and stakeholders. This proposition was supported by interpretation of our data. Nutritionists provided rich descriptions of students’ and teachers’ preoccupations and detailed how they were able to respond by translating the operations of the nutrition workshop. By translating the workshop operations, the technical entities (or nonhuman actors) were differentially interpreted according to the identified preoccupations among education actors. These actions thus illustrate program implementation as a process where interventions are (a) building practical, and timely, knowledge relevant to the goals of program participants and stakeholders and (b) using this knowledge to negotiate program operations with the aim of (c) reducing the distance between the goals of the program and those of the relevant program actors. Importantly, program interventionists were found to represent their practices in terms of goals that were both “inside” and “outside” the program boundaries.

This article offers evaluators a novel methodological approach to describe the processes of program implementation. In so doing, it responds to an important need in the program evaluation literature to expand our lens of observation and interpretation beyond the current primary focus on the structural elements of implementation. This method, with its foundations in relevant social theory, offers a tool to capture the process of implementation and to reflect upon its inherent qualities. Through this perspective, evaluators may broaden their interpretation of adaptation and, as well, their definition of the implementer’s role. The ANT framework highlights the strategic nature of implementation, whereby the implementer’s actions are constantly informed and reformed through their actions and interactions in program settings. Hence, quality implementation evaluation must consider not only defined program operations and objectives but also emergent operations and goals relevant to local actors. Our study offers a framework that evaluators may call upon to understand and follow implementation as an evolving and dynamic process.

According to ANT, advancing an innovation requires that the innovation responds to the interests of actors who are “targeted” for its use, whereby the spread or take-up of an innovation occurs only when the associated actors make an investment and contribute to its form (Callon, 1986a; Latour, 1999). Thus, obtaining rich detail on the actors (their identities and goals) with whom and by whom the program seeks to build connections is necessary to determine how the range of interests within a context may or may not align with the program. Depending on the outcome of this assessment (i.e., the presence of aligned interests between context and program actors), the deployment of intéressement strategies would be recognized as an essential component of implementation evaluation. In this respect, judging implementation may assess the richness with which actors from across contexts (i.e., human and nonhuman entities) have been identified and described, and, when necessary, evaluators may further judge how well intéressement strategies concurrently respond to program and contextual goals.

Beyond expounding on the role of the interventionist, we believe this study makes three key contributions to program evaluation knowledge in general and implementation in particular. First, although programs are operating in complex environments rendering them difficult to control, our study suggests this does not preclude possibility for knowledge to be generated from their operation. By incorporating the ANT social theory and operationalizing some of its key concepts, we revealed...
some essential features of program operations, which can be expected to be stable across time and reproducible across various settings. Second, we described the program–context interaction as a process of building relationships and explained the formation of these relationships in terms of negotiations that consider goals from both “inside” and “outside” the program boundaries. Here, in accordance with the ANT social theory, we highlighted the powerful role played by nonhuman entities and thus suggest that evaluators pay greater attention to nonhuman actors and their important “structuring” influence on human activities. Third, and finally, our findings dispute the simplistic trajectory image of the diffusion model by illustrating that program actors (both human and nonhuman) play an active (as opposed to a passive) role in forming a program during its implementation, leading to unanticipated program operations and effects.

Our open-ended interview schedule did not specifically ask nutritionists to identify educational stakeholders or to elucidate their needs or interests. However, data analysis not only revealed educational actors to be represented in this way but found nutritionists to correspondingly negotiate their own goals in relation to these interests. In this respect, our results are in line with descriptions of the complex nature of practice and a general inability to capture this complexity with current approaches to evaluation (Schwandt, 2005). Contrasted with practice viewed uniquely as an instrumental device for scientific rationality or “best practices,” Schwandt (2005) frames practice as a hermeneutic reasoning involving “an interpretation of the situation based on understanding or grasping the relevant features of the case at hand in concert with values, principles, and standing commitments, such that one is able to see an appropriate and effective way of acting” (Schwandt, 2005, p. 98). Nutritionists did not solely rationalize the enactment of the nonhuman entities of the program in relation to problematization of students, which corresponded to their own identity and goals as health professionals. By translating these nonhuman entities to be aligned with the interests of educational stakeholders and participants, nutritionists were interpreting the intervention based on the needs of these education actors.

This study aimed to reveal strategies that were common across interventionists and thus to provide a general model to advance our thinking about program implementation. Although the results revealed variations across settings, we emphasize the collective nature of the strategies with which interventionists advanced the program goals. Our findings confirmed the presence of these strategies. In addition, findings showed that the program had a formalized structure wherein operations to achieve goals were negotiated. It thus would be possible to track how these adaptations associate with program impact and sustainability. For example, some nutritionists encountered teachers whose interest in nutrition education was low and consequently adapted the workshop to resemble a pedagogic tool. Nutritionists were less preoccupied with adaptation when teachers viewed health education as responding to their educational goals.

Although the operations and underlying components of what a program is (i.e., its theory of operation) are indeed recognized as emerging during practice (Hawe et al., 2004; Schwandt, 2005; Scriven, 1991), at present, the methodological “tool kit” disposed to evaluation research does not identify instruments that could capture these “emergent” processes (Birkeland, Murphy-Graham, & Weiss, 2005; Morell, 2005; Schwandt, 2005). We thus find recurrent calls for a new evaluation methodology that can capture both anticipated and unanticipated events and goals that occur as a natural part of a real-life intervention (Morell, 2005; Scriven, 1991). We advance the potential of a social theory of innovation (i.e., ANT) to reveal what a program is in practice in terms of how and why it operates in one way and not another. Moreover, by “following” the formation of the program through a discourse analysis of interventionists’ representations based on the systematic operationalization of this ANT conceptual framework, we respond to this call with a novel evaluation methodology to follow the programs’ “innovative” operations over time and between settings.

Programs tend to be portrayed by their composition of actors playing predefined roles, whereby adaptation is disfavored over fidelity (Dusenbury et al., 2003; Love, 2004). Our empirical
observations suggest that adaptation is an essential component of program implementation. We have shown that technical actors can appear (i.e., student workgroup) or disappear (i.e., take-home samples), and how the role taken on by actors (i.e., teachers as coteachers vs. teachers as participants) can translate the nonhuman components (i.e., a cooperative learning activity) or disassemble them (i.e., food becomes objective of trade instead of object of pride to show parents). This relates to what in ANT terminology is defined as an emerging sociotechnical network: a dynamic network characterized by the creation of new alliances, roles, and identities. Adaptations may be represented as the redefinition of roles, identities, and alliances within a network, whereby roles, identities, and alliances within an emerging network cannot be taken for granted. In contrast, a consolidated sociotechnical network is characterized by roles that are well defined and accepted and where new alliances are limited and formed without negotiation or controversy. Consolidated networks are characterized by established complementary relationships and predictable outcomes with a shared and validated knowledge base (Callon et al., 1999). Although ANT does not address issues related to the level and need for adaption, which is of high relevance to implementation evaluation, by understanding the distinctive characteristics of an emerging sociotechnical network, the ANT framework explains why the intervention–context interface is often described by a need for adaptation. Empirical research to link these distinctions between emerging and consolidated networks with dimensions of program implementation such as complexity, knowledge, and adaptation is needed to develop practical appraisal of program implementation.

We can find examples in the evaluation literature illustrating the presence of the theoretical propositions advanced by ANT. For example, a nutrition intervention using stickers as incentives for healthy snacks found the expected “neutral” role of the sticker to take on a “market value” among students, and consequently, to impose new power dynamics among students into the operations of the program (Power et al., 2005). Namely, to maintain the incentive role attributed to the sticker and cope with a large (unanticipated) demand, new plans emerged, whereby selected students were attributed a “daily helper” role thus imposing a new power structure among students. This recursive relationship between the planning of an implementation is well known among researchers who follow the use of technology in the classroom (Weston, 2004). This research asserts that the role an innovation takes on cannot appear until it is operated in a classroom. Here, several physical (e.g., access, facilities) and social (teacher collegiality, culture for technology use, classroom management) conditions are identified as interacting with the role the technology has been assigned and the role it takes on in a classroom.

We acknowledge that our findings rest uniquely on one method applied to one of the several stakeholder groups involved in the planning and implementation of this intervention. We used this focused approach to discover whether the practices of the program interventionists corresponded to the moments of translation described by ANT. Thus, our case study aimed to establish the occurrence of actions that corresponded to those defined by ANT. Our results provide a strong case for considering the dynamics of program implementation as a process of translation. Future evaluation research could well build on this method to provide a broader and more informed view of the process of program implementation applying to a wider range of stakeholders. Indeed, the relevancy of our framework rests on future research to identify in other settings and contexts the processes revealed in this study, and also, the corresponding assessments of the use of such information in other studies.

Conclusions and Contributions

This study describes program implementation as a process of translation with program implementers strategically assembling connections between social and technical entities. By considering the needs and constraints of students, teachers, and the educational institution in general, nutritionists illustrate
an intuitive awareness that the realization of their goals is intimately connected to the ability of the intervention to respond to the goals of the education stakeholders and participants. This study adopts a methodology that does not constrain a program’s action within a predetermined model, thus, allowing the identification of new and unanticipated roles for program actors during the “real-world” happenings of program implementation.

This study has both theoretical and practical implications for the field of evaluation. First, although evaluation research has long recognized the limitations of implementation methodologies that do not capture the dynamic nature of program practices, the field is still grappling to locate a suitable analytic approach. We provide a theoretical framework to help reorient and advance the thinking about what a program is and what it becomes during implementation. Importantly, we propose a theoretical framework that permits the underlying patterns and processes to be identified.

Second, we recommend a new approach to systematically defining what implementation looks like in practice. The program interventionists in this study were found to be actively evaluating the context, how they could fit the program into it, and how this context might mediate their influence on the students. Quality implementation then might consider the presence of a “sketched” network, whereby the interventionists have identified and described a range of actors with whom they aim to build alliances. Quality implementation then could begin by considering the richness of detail, the variation and completeness with which these identities have been built, along with the strategies by which interventionists consequently adapt the program.

Note
1. The French term *interessement* is used consistently in its untranslated form within the English translation (Callon, 1986b) of the original French (Callon, 1986a). This is done where there is no equivalent English term representing a given concept.

Declaration of Conflicting Interests
The authors declared no conflicts of interest with respect to the authorship and/or publication of this article.

Funding
This study was supported by a doctorate research bursary awarded to Sherri Bisset from the Canadian Institute for Health Research R0012607.

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