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Lean Concepts in Healthcare: A Return on Investment Study

Home Town Care

USA

John D. Piccolo

This case was prepared to serve as a basis for discussion rather than an illustration of either effective or ineffective administrative and management practices. Names, dates, places, and data may have been disguised at the request of the author or organization.

Abstract

Healthcare organizations are continually looking for ways to improve quality and efficiency through new and innovative initiatives. Along with the quality and efficiency movement, return on investment (ROI) also has become a topic of interest across the healthcare system. This case study examines the impact of lean manufacturing techniques in a long-term care facility. The study utilizes the Phillips ROI Methodology to evaluate three projects that were completed during a reVIEW (Realizing Exceptional Value In Everyday Work) seven-week training and implementation program. The results begin to validate what many already know through experience; that implementing lean principles in healthcare can have a positive impact.

PROGRAM BACKGROUND

Home Town Care

Home Town Care is a senior services organization in rural Pennsylvania. The long-term care facility is the skilled nursing and rehabilitative division associated with a continuum of care retirement community. The health center offers three levels of skilled nursing care: comprehensive, rehabilitative, and memory support. The facility consists of 90 beds and 168 employees.

The reVIEW Program

The reVIEW course is seven weeks in duration. Each course consists of 16 participants. The participants meet once a week for three hours of interactive classroom time, plus additional time for one-on-one coaching. Through the seven weeks of the course, participants are introduced to the following lean principles and tools:

- Toyota Production System Model and Lean Healthcare
- Power of Observation
- Value Stream Mapping (current state and future state)
- A3 Problem Solving

During the program, participants identify a specific area or problem they wish to improve. They can choose to work individually or in teams. Participants have a homework assignment each week, and each week's assignment builds on the previous week's work. Each participant is expected to complete one observation exercise, one current-state and one future-state value stream map, and one A3 Problem Solving activity.

The primary improvement tool utilized in the reVIEW program is the A3 Problem Solving form. The A3 process teaches the participants to identify problems through the observation process. After participants report their observation during week two, they are taught to draw a value stream map, which helps identify through visualization the issues or projects to work on. Once a value stream map is completed, the participants are taught to identify the root cause of a problem by using the 5 *Why* process.

Need for Program

An executive overview of the reVIEW program was first offered to the senior leadership group of Home Town Care and six other healthcare organizations from the local healthcare industry partnership. Following the overview, a needs assessment was conducted to determine if a need existed for such a program within the above-mentioned healthcare organizations. The needs assessment revealed a need for and a true interest in the reVIEW process; therefore, an open enrollment program was offered to the partnership.

This case study focuses on three projects completed by eight employees of Home Town Care during their participation in the open enrollment reVIEW program. The program ran from June 2, 2009, through July 21,

2009. The final data were collected during the months of December 2009 and January 2010.

Project Description

Project 1: Dressing Change Delays

This project concerned the delays that took place when a resident required a dressing change. The residents' dressings are naturally changed in the privacy of their rooms. Typically, when a nurse would have a dressing change, delays would occur because the dressing supplies were stocked in three different locations. Inconsistency in what was stocked in each location meant that the nurses would have to travel from location to location to obtain the required supplies. Often, when needed supplies could not be located, a nurse would walk to the main stockroom in a different part of the building to acquire the needed supplies. During the observation phase of this project, the two project leaders (the nurse manager and a unit nurse) discovered that this process meant that a simple five-minute dressing change took anywhere from 10 minutes to one and one-half hours.

Problem Analysis

During the problem analysis phase, project leaders determined that a typical dressing change process should take approximately five minutes. Due to supply issues, the process was often delayed, taking time away from nurses who needed to conduct other critical and important quality-of-care activities.

During the root cause analysis, the project leaders found that the nurses were not always able to locate the needed supplies to perform a dressing change.

Why? The supplies were stocked in three different locations and not always available in any of the three locations.

Why? The nurses had their own preferences about where to keep certain supplies and would remove them unbeknownst to the supply personnel.

Why? The dressing supply process was not specified.

Target Condition, Countermeasures, and Implementation Plan

The target condition for this project was to have a process in place that allowed a nurse to perform a dressing change without supply delays. The project leaders discussed the process with the nurses on their wing. The countermeasure identified by the group was to implement a dressing

supply cart that was fully stocked with all the supplies needed to change a dressing.

The dressing supply cart was implemented. It is located in the supply room near the nurses' station. When a dressing change is needed, a nurse wheels the cart into the patient's room. When the change is completed, the cart is immediately placed back in the supply room. To ensure that supplies remain fully stocked, the cart has an inventory checklist that is maintained on a daily basis by the head nurse.

Project 2: Short-Term Rehab Discharge to Home

The second project focused on part one of a three-part project to address the delays experienced when a short-term care rehabilitation patient is discharged to home. This project leader addressed the process with three successive A3 Problem Solving forms. The project leader followed a logic model approach, in which the completion of one project triggers the beginning of the next.

The social workers always used a standardized form to collect information necessary for a short-term care discharge. The issue was that a standardized process for obtaining the information had never been created. Therefore, gathering information for a short-term rehab discharge is sometimes a lengthy process, which causes delays in the discharge process. At times, this delay forces the patient to stay longer than required, which in turn creates missed opportunities to fill that bed with another short-term rehab patient.

Problem Analysis

During the problem analysis phase, the project leader found that gathering information for a short-term rehab discharge was sometimes a lengthy process.

Why? The social services coordinator was often unable to obtain the required discharge information in a timely manner.

Why? Staff members were busy doing other tasks.

Why? A process was not specified concerning staff input needed for a short-term rehab discharge.

Target Condition, Countermeasures, and Implementation Plan

The target condition for this three-phase process was to discharge a short-term rehab patient with no rework on the part of the social workers and no delay in the discharge date.

This first phase established a process for obtaining family input prior to the weekly rehab meeting. This phase also created a process in which nursing input is provided during the weekly meeting. Both steps were coordinated with social services and the rehab nurses and implementation was completed. Phase two of this project is now under way and will be captured in a future document.

Project 3: Chart-to-Go

The third project addressed the documentation system used by the certified nurse assistants (CNAs) to capture the activities of daily living (ADL) information for each resident in the long-term care unit. The documentation system that was in place had the CNAs handwriting the ADLs for each resident in a chart at the end of the shift. The CNAs would have to remember what they did with each resident throughout the day. This process tended to create a copycat approach, in which the CNAs would look at what was written on the prior day and often rewrite very similar information. This process was not just time consuming; it also created a situation in which the ADL information might not have been accurate. Inaccurate ADL information can create reimbursement inaccuracies, since the case mix index (CMI) might not reflect the true amount of work required for each resident.

Problem Analysis

During the problem analysis phase, the project leaders found that the existing ADL documentation system was inaccurate and time consuming.

Why? The CNAs documented ADL information in a book at the end of the shift from memory.

Why? That was the only time they had to do it.

Why? No other time or process was specified for ADL documentation.

Target Condition, Countermeasures, and Implementation Plan

The target condition for this project was to have CNAs accurately document the ADL information for each resident while the activities were being conducted.

The countermeasure put in place was the purchase of a Palm Pilot for each CNA. The new system allowed the CNA to document ADL information in the resident's room while the activities were taking place.

The implementation plan included training for each CNA on the proper way to document on the Palm. Once that step was completed, the director

of nursing added different components of the ADL documentation process week by week until the implementation was complete.

Need for Evaluation

In recent years, return on investment (ROI) has become a topic of interest in healthcare, with policymakers and consumers demanding greater accountability for dollars spent on healthcare. Medicaid, state officials, legislators, health plans, and other stakeholders are increasingly challenged to identify programs that both improve quality and control costs. One of the best ways to demonstrate this accountability is through evaluation.

As Home Town Care continues to invest both dollars and human resources in this new quality and efficiency program, evaluation will be paramount. Home Town Care will continue with quarterly follow-up meetings during their lean implementation, to better build a comprehensive cost-benefit analysis of a healthcare organization's lean transformation.

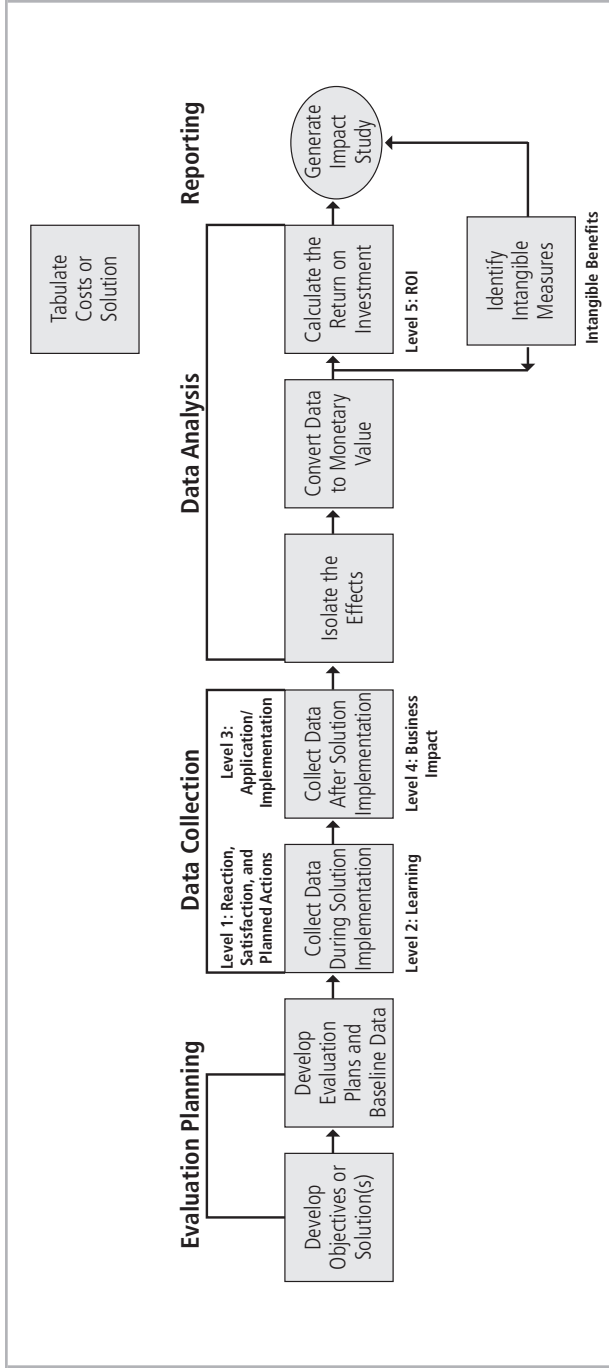
EVALUATION METHODOLOGY

The Phillips ROI Methodology

The use of evaluation processes and models, including the Phillips framework, continues to grow. The Phillips ROI Methodology has been replicated hundreds of times with more than 30 books published to support the methodology. The Phillips ROI process is used by more than 2,000 organizations in 44 different countries. The methodology has been the basis for many studies, providing a step-by-step guide from initial planning through data collection and evaluation (Figure 8.1). The four-phase, 10-step process generates six types of data and is the only documented ROI methodology to require a step be taken to isolate the impact of the program. The Phillips methodology is a time-tested, consistent, and credible approach for ROI studies and one with a track record of success in both for-profit and non-profit organizations. The Phillips ROI Methodology utilizes five levels of evaluation (Table 8.1) to provide a framework to categorize the different types of data.

Any process or research study should clearly define the standards and principles by which data is collected and analyzed. Without such a protocol, one cannot ensure consistency from study to study or within the same study. The Phillips ROI Methodology provides guiding principles that form

FIGURE 8.1 ROI Process Model



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TABLE 8.1 Five Levels of Evaluation

Level	Brief Description
1—Reaction and Planned Action	Measures participants’ reaction to the program and outlines specific plans for implementation. Participant reaction questionnaires are typically completed at the end of the program.
2—Learning	Measures skills, knowledge, or attitude changes. Learning is typically assessed through observations, exercises, role-plays, and subjective assessments from the program faculty and mentors.
3—Application and Implementation	Measures changes in behavior on the job and specific application and implementation. Follow-up evaluation data are usually obtained from questionnaires, observations, and focus groups.
4—Business Impact	Measures business impact of the program, linking key performance measures directly to the program. Business impact is often obtained from participants as they apply what they learn.
5—Return on Investment	Compares the monetary value of the results with the costs for the program, usually expressed as a percentage.

Source: Phillips, Phillips, Stone, and Burkett (2007).

the basis for the ROI operating standards. The 12 Guiding Principles are as follows:

1. When a high-level evaluation is conducted, data must be collected at lower levels.
2. When an evaluation is planned for a higher level, the previous level of evaluation does not have to be comprehensive.
3. When collecting and analyzing data, use only the most credible source.
4. When analyzing data, choose the most conservative among the alternatives.
5. At least one method must be used to isolate the effects of the solution.
6. If no improvement data are available for a population or from a specific source, it is assumed that little or no improvement has occurred.

7. Estimates of improvements should be adjusted (discounted) for the potential error of the estimate.
8. Extreme data items and unsupported claims should not be used in ROI calculations.
9. Only the first year of benefits (annual) should be used in the ROI analysis of short-term solutions.
10. Costs of the solution should be fully loaded for ROI analysis.
11. Intangible measures are defined as measures that are purposely not converted to monetary values.
12. The results from the ROI methodology must be communicated to all key stakeholders.

Evaluation Planning

During this stage, a detailed data collection plan and an ROI analysis plan are assembled. The data collection plan lays the initial groundwork for the ROI study. This plan answers the questions (a) what do you ask, (b) how do you ask, (c) whom do you ask, (d) when do you ask, and (e) who does the asking. The data collection plan for this study is shown in Table 8.2.

The second planning document is the ROI analysis plan, which requires the researcher to identify (a) methods for isolating the effects of the program, (b) methods for converting data to money, (c) cost categories, (d) intangible benefits, (e) communication targets for the final report, (f) other influences and issues during application, and (g) researcher comments (Phillips and Phillips 2005). The ROI analysis plan for this study is shown in Table 8.3.

Data Collection

Data collection is central to the Phillips ROI Methodology. Both *hard data* (e.g., output, quality, cost, and time) and *soft data* (e.g., job satisfaction and customer satisfaction) are collected. This study utilized a combination of action planning, assignments, questionnaires, interviews (individual coaching sessions), observation, and on-site follow-up visits to obtain relevant data. A case study database was developed by maintaining a copy of all the forms and instruments used for each project. A succession of evidence was demonstrated by collecting and maintaining chain-of-impact data at each of the five levels of the Phillips framework.

TABLE 8.2 Data Collection Plan

Purpose of this evaluation: <u>To evaluate the impact of the reVIEW program</u>						
Program/Project: <u>reVIEW program</u>		Responsibility: <u>John Piccolo</u>		Date: <u>06/29/2009</u>		
Level	Broad Program Objective(s)	Measures	Data Collection Method/ Instruments	Data Sources	Timing	Responsibilities
1	<p>Satisfaction/Planned Action</p> <ul style="list-style-type: none"> • Rate the facilitators as effective • Perceive the reVIEW program as relevant to the job • Recommend this program to other healthcare providers • Indicate an intent to use the reVIEW skills on the job 	Average ratio of 4.0 out of 5.0 on quality, quantity, and usefulness of the reVIEW program	Standard questionnaire	Participant	End of program	Researcher
2	<p>Learning</p> <ul style="list-style-type: none"> • Define IDEAL, and recognize when their organization's outcome is not IDEAL • Explain the importance of studying work as it is actually done rather than work as espoused • See patient care and supporting systems as processes • Explain what "specify an activity" means, and identify when a given activity is not sufficiently specified • Explain the term "connection," and identify when a given connection is not simple or direct • Explain the term "pathway," and identify when a care pathway is complex 	Ability to explain and demonstrate the learning objectives through application and articulation during the program	Skill practice Facilitator assessment Participant assessment on questionnaire Assignments Coaching sessions	Participant Facilitator	During the program	Facilitator

<p>3</p>	<p>Application/Implementation</p> <ul style="list-style-type: none"> • Observe an organization’s activities and create an understandable, pictorial description of the current condition • Create a “map” of a process, collect data to quantify processing times and interval times between process steps, and use the data to determine process performance measures • Create a future state map of flow of processes that is a visualized improvement over the current state map • Diagnose a workplace “problem” by seeking out root causes in terms of activity specification, connections, and pathways • Envision a target condition that moves the organization closer to IDEAL by improving activities, connections, and/or pathways 	<p>Completion of all steps of the action plan</p>	<p>Standard questionnaire Action plan Assignments Observation Coaching sessions On-site meetings with researcher</p>	<p>Participant</p>	<p>During the program</p>	<p>Researcher</p>
<p>4</p>	<p>Business Impact</p> <ul style="list-style-type: none"> • Redesign work activities by specifying the content, sequence, and timing of individual steps, and desired outcomes; and document the new design • Redesign workplace connections to establish simple, yes/no communications along patient care pathway • Redesign pathways such that delivery of the good or service is simple, direct, and consistent • Design improvement activities as experiments, with explicit hypotheses about expected outcomes and specific outcome measures 	<p>Each project will be different and identified on the action plan</p>	<p>Action plan Coaching sessions On-site meetings with researcher</p>	<p>Participant</p>	<p>During the program</p>	<p>Participant Researcher</p>
<p>5</p>	<p>ROI 18%</p>	<p>Comments:</p>				

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TABLE 8.3 ROI Analysis Plan

ROI Analysis Plan: reVIEW program _____ Program/Project: reVIEW ROI Study _____		Responsibility: John Piccolo _____ Date: 05/29/2009 _____					
Data Items (Usually Level 4)	Methods for Isolating the Effects of the Program and Process	Methods of Converting Data to Monetary Values	Cost Categories	Intangible Benefits	Communication Targets for Final Report	Other Influences and Issues During Application	Comments
Three business impact measures identified in conjunction with management and the reVIEW facilitator	Control group Participant estimate Management estimate Customer input	Standard value Expert input Participant estimate Management estimate External studies	Program administration, implementation, facilitation, and overhead Program materials Travel and lodging Participant salaries and benefits Project team salaries and benefits Evaluation	Leadership development Standardized process improvement method Employee confidence and satisfaction	Board of directors Management team Workforce investment board PSUCE units		

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Instrumentation

This study used several instruments as the basis for data collection, such as questionnaires, action plans, and observation templates. Central to the study is the action planning form depicted in Table 8.4.

The action planning process has several inherent advantages for data collection. First, “for business impact data, the action plan is more focused and credible than a questionnaire” (Phillips and Phillips 2007, p. 221). Also, since much of the data is collected by the participants, it will have the credibility needed for the analysis. And, with data collection responsibility shifted to the participants, a study such as this can be conducted with limited resources (Phillips and Phillips 2007).

TABLE 8.4 Action Plan

Name: _____ Instructor Signature: _____ Follow-Up Date: _____		
Objective: _____ Evaluation Period: _____ to _____		
Improvement Measure: _____ Current Performance: _____ Target Performance: _____		
Action Steps		Analysis
Steps	Date	A. What is the unit of measure? _____ B. What is the value (cost) of one unit? _____ C. How did you arrive at this value? _____ D. How much did the measure change during the evaluation period? (monthly value) _____ E. What factors influenced the change in performance? _____ F. What percent of this change was actually caused by this program? _____% G. What level of confidence do you place on the above information? (100%=Certainty and 0%=No Confidence) _____%
1. _____	_____	
2. _____	_____	
3. _____	_____	
Intangible Benefits:		
Comments:		

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This study followed the Phillips action planning sequence of activities:

1. Before the reVIEW program, the researcher
 - communicated the action plan requirement at the executive overview
 - discussed the importance of identifying operating measures for improvement.
2. During the reVIEW program, the researcher
 - described the action planning process at the beginning of the program
 - taught the action planning process as part of the reVIEW program
 - allowed time to develop the plan
 - had the facilitator approve the action plan
 - required participants to assign a monetary value to the plan
 - reviewed each plan during a coaching session
 - explained the follow-up mechanism.
3. After the reVIEW program, the researcher
 - required participants to provide improvement data
 - asked participants to isolate the effects of the program
 - asked participants to provide a level of confidence for estimates
 - collected action plans at the predetermined follow-up time
 - summarized the data and calculated the ROI.

Prior to the first reVIEW class, an executive overview was offered. During the overview, a brief introduction of the action planning process was delivered to senior leaders, managers, and training coordinators. Also, the importance of identifying operating measures for improvement was discussed. On the first day of the program, the action planning process was described to the participants during a 10-minute overview of the evaluation process, setting the stage for program expectations. Also, on day one, each participant received a handout on which to capture cost data throughout the program (see Figure 8.2).

The action planning process was discussed in greater detail during a one-hour session on week five of the program. This discussion included an overview of the Phillips ROI Methodology, action plan forms, guidelines for developing action plans, a worksheet to help convert data to money, and examples to illustrate what a complete action plan should look like. A complete packet of this information was provided to each participant. Each item on the action plan was discussed to ensure that the participants

FIGURE 8.2 Cost Sheet

	Name																
	Week 1	Week 2	Week 3	Week 4	Week 5	Week 6	Week 7	Week 6		Week 7		Week 7					
	Time	Time	Time	Time	Time	Time	Time	Time	Time	Time	Time	Time	Time	Dollars	Dollars	Dollars	Dollars
How many hours did you spend on your project?	hrs	hrs	hrs	hrs	hrs	hrs	hrs	hrs	hrs	hrs	hrs	hrs	hrs				
How many hours did others spend on your project?	hrs	hrs	hrs	hrs	hrs	hrs	hrs	hrs	hrs	hrs	hrs	hrs	hrs				
What is the average dollar amount spent in salaries (Get salary from HR)																	
Average salary and Benefits × Time	\$	\$	\$	\$	\$	\$	\$	\$	\$	\$	\$	\$	\$	\$	\$	\$	\$
Did you purchase or utilize company supplies for your project? Yes or No																	
If yes, what are they and what did it cost?																	
1) _____	\$	\$	\$	\$	\$	\$	\$	\$	\$	\$	\$	\$	\$	\$	\$	\$	\$
2) _____	\$	\$	\$	\$	\$	\$	\$	\$	\$	\$	\$	\$	\$	\$	\$	\$	\$
3) _____	\$	\$	\$	\$	\$	\$	\$	\$	\$	\$	\$	\$	\$	\$	\$	\$	\$
4) _____	\$	\$	\$	\$	\$	\$	\$	\$	\$	\$	\$	\$	\$	\$	\$	\$	\$
Are there any other costs associated with your project? Yes or No																	
If yes, what are they and what did it cost?																	
1) _____	\$	\$	\$	\$	\$	\$	\$	\$	\$	\$	\$	\$	\$	\$	\$	\$	\$
2) _____	\$	\$	\$	\$	\$	\$	\$	\$	\$	\$	\$	\$	\$	\$	\$	\$	\$
3) _____	\$	\$	\$	\$	\$	\$	\$	\$	\$	\$	\$	\$	\$	\$	\$	\$	\$
4) _____	\$	\$	\$	\$	\$	\$	\$	\$	\$	\$	\$	\$	\$	\$	\$	\$	\$
Total	\$	\$	\$	\$	\$	\$	\$	\$	\$	\$	\$	\$	\$	\$	\$	\$	\$

understood how to answer all questions. A form that offered information on each item was also included with the handouts.

Participants were asked to complete the action plan, through item C (see Table 8.4) prior to the start of class on week six. This step allowed for meetings with participants on week six to ensure that they understood how to fill out the form.

After a predetermined amount of time (three months for this study), participants completed the remainder of the form, parts D, E, F, and G (see Table 8.4), as well as listing any intangible benefits and comments. This process was monitored through on-site follow-ups.

Reaction and Learning

Reaction data were collected using a standard questionnaire during week six of the program. The questionnaire focused on issues such as relevance of the material to participants' jobs, if the participants felt they had learned new skills, and participants' intention to use the skills in the workplace. The course content, delivery, and facilitation were also evaluated.

Learning

Learning improvement was measured throughout the program by participants conducting report-outs on the previous week's assignment. This allowed the facilitator to assess the amount of learning by each participant and document the results on the form displayed in Figure 8.3. Learning data were also captured on the end-of-course questionnaire.

Application and Implementation

The end-of-program questionnaire included application and implementation data. On-site visits by the researcher were also used to determine the extent to which the skills were being used and to check progress on the action plan. During the visits, the participants were also asked about the following topics:

- skill usage and frequencies
- additional linkage to organizational business measures
- barriers and enablers to implementation
- progress with the action plan
- additional intangible benefits.

FIGURE 8.3 Observation Template

Workshop Name: reVIEW Program
COMPETENCY: Learning
 Workshop Participant's Name: _____

Skills to Be Demonstrated	Unsatisfactory	Needs Improvement	Satisfactory	Role Model
Define IDEAL and recognize when their organization's outcome is not IDEAL				
Explain the importance of studying work as it is actually done				
See patient care and supporting systems as processes				
Explain what "specify an activity" means, and identify when a given activity is not sufficiently specified				
Explain the term "connection," and identify when a given connection is not simple or direct				
Explain the term "pathway," and identify when a care pathway is complex				

EVALUATION RESULTS

Level 1

To what extent did the program participants have a favorable experience with the reVIEW program?

Reaction data was collected at the end of the reVIEW program using an end-of-course questionnaire. The overall average response for all questions was 4.5 out of 5 on a Likert-type scale, with 1 being "strongly disagree" and 5 "strongly agree." A visual summary of the Level 1 (reaction) responses

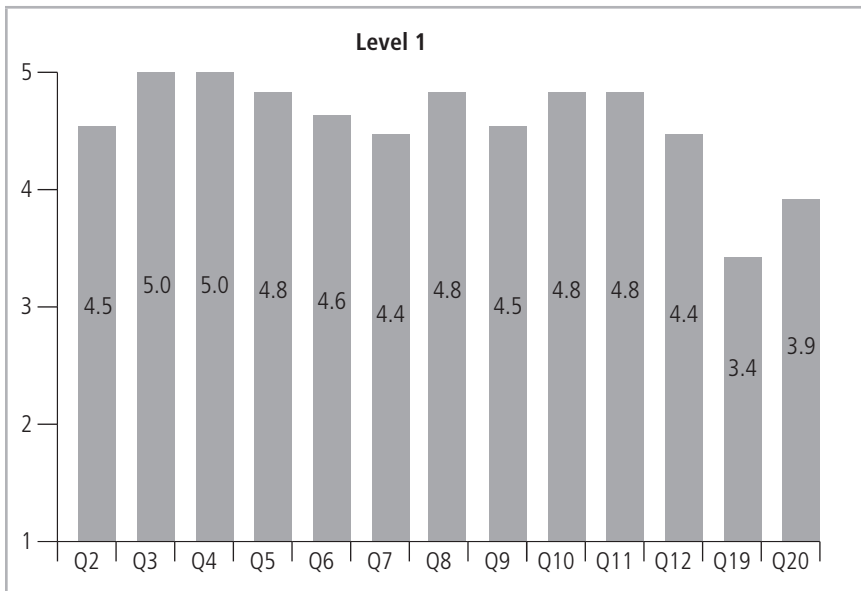
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from the end-of-course questionnaire can be found in Figure 8.4. The following Level 1 responses relate directly to the participants from the target organization:

- To what extent did the reVIEW program and materials meet participant expectations?
 - a. (Q2) The reVIEW course met my expectations. The participants responded 4.5 out of 5 on a Likert-type scale.
 - b. (Q12) The material was organized logically. The participants responded 4.4 out of 5 on a Likert-type scale.
- To what extent did the instructor meet participant expectations?
 - a. (Q3) The instructor was prepared and organized for the class. The participants responded 5 out of 5 on a Likert-type scale.
 - b. (Q4) Participants were encouraged to take part in class discussions. The participants responded 5 out of 5 on a Likert-type scale.
 - c. (Q5) The instructor was responsive to participants' needs and questions. The participants responded 4.8 out of 5 on a Likert-type scale.
 - d. (Q6) The instructor was knowledgeable about the subject. The participants responded 4.6 out of 5 on a Likert-type scale.
 - e. (Q7) The instructor related the training to my work. The participants responded 4.4 out of 5 on a Likert-type scale.
- To what extent was the program relevant to participants' jobs?
 - a. (Q10) The program content was relevant to my job. The participants responded 4.8 out of 5 on a Likert-type scale.
 - b. (Q19) What percentage of your total work time requires the knowledge and skills presented in this program? The participants stated that, on average, 51 percent of their total workday requires the knowledge and skills taught in the review program.
- To what extent was the program important to participants' jobs?
 - a. (Q11) The program content was important to my job. The participants responded 4.8 out of 5 on a Likert-type scale.
 - b. (Q20) On a scale of 0 percent (not at all) to 100 percent (extremely critical), how critical is applying the content of the reVIEW program to your job success? The participants stated that, on average, 65 percent of their job success comes from applying the content taught in the reVIEW program.

- To what extent will participants recommend the reVIEW program to others?
 - a. (Q8) I will recommend this program to others. The participants responded 4.8 out of 5 on a Likert-type scale.
- To what extent is there room for improvement with facilitation, materials, and the learning environment?
 - a. (Q9) The learning environment was conducive to learning. The participants ranked the learning environment 4.5 out of 5 on a Likert-type scale.
 - b. This was an open-ended question: Please provide us with suggestions for improving the program’s facilitation, content, and utility.
 - (a) Perhaps developing a way to ensure that weekly report-outs remain within the specified time frame.
 - (b) Spend more time on instruction and less time on the report-outs.
 - (c) Spend less time on the report-outs.

FIGURE 8.4 End-of-Course Questionnaire Responses for Level 1 (Reaction)



Level 2

To what extent did the participants learn the skills taught in the reVIEW program?

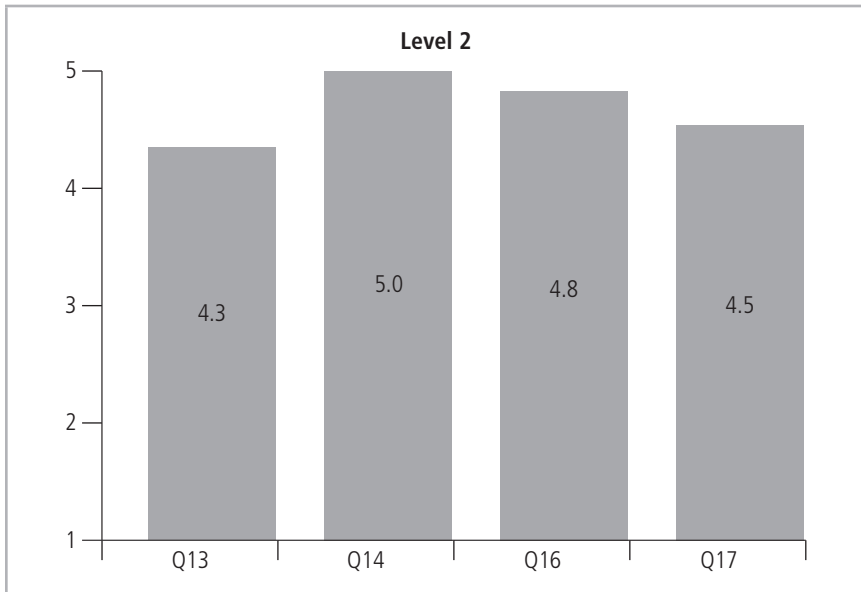
Learning improvement was measured several ways: (a) through the participant's demonstration of knowledge learned during weekly project report-out sessions, (b) at the end of the program using a self-assessment, and (c) through a facilitator assessment. The instructor ranked all participants with an average of 3.35 out of 4 on a Likert-type scale, with 1 being "unsatisfactory" and 4 being "a role model." A visual summary of the Level 2 (learning) responses from the end-of-course questionnaire can be found in Figure 8.5. The following Level 2 responses relate directly to the participants from the target organization:

- (Q14) To what extent did the program provide new information?
The program content provided me new information. The participants responded 5 out of 5 on a Likert-type scale.
- (Q16) To what extent did participants gain new knowledge and skills?
I learned new knowledge and skills from the reVIEW program. The participants responded 4.8 out of 5 on a Likert-type scale.
- (Q13) To what extent do participants know how to apply what they learned?
The exercises and examples helped me understand the material. The participants responded 4.3 out of 5 on a Likert-type scale.
- (Q17) To what extent are participants confident to apply what they learned?
I am confident that I can effectively apply the skills learned in the reVIEW program. The participants responded 4.5 out of 5 on a Likert-type scale.

Level 3

To what extent are the participants applying the skills learned in the reVIEW program on the job?

Application data was captured on both the questionnaire and the action plan form. To determine the extent to which the skills were actually being utilized, and to check progress of the action plan, an on-site follow-up interview was also conducted three months following the program completion.

FIGURE 8.5 End-of-Course Questionnaire Responses for Level 2 (Learning)

The interview included all the program participants, the HR manager, and the CEO of the organization. The follow-up questions included the following topics:

- skill usage and frequencies
- additional linkage to organizational business measures
- barriers and enablers to implementation
- progress with the action plan
- additional intangible benefits.

The projects captured on the A3s and action plans could focus on any observation, as long as they were consistent with the skills required in the program and related to the business improvement measures established between management and the instructor. The most difficult part of developing the action plan was for the participants to convert the measure to a monetary value. Several approaches were offered to the participants and a “converting data to money” handout with examples was provided. For the

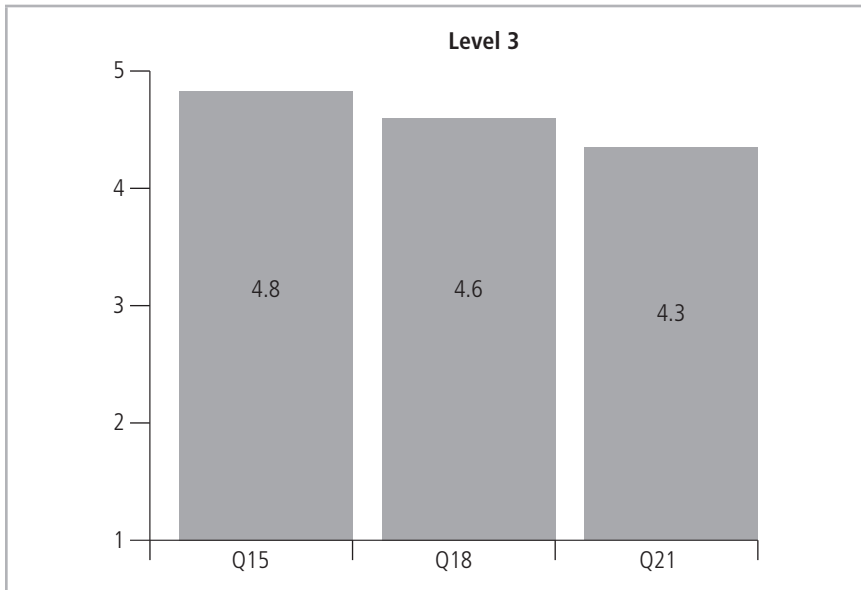
majority of the items converted, standard values were available and used. If a standard value was not available, the participants were encouraged to use expert input or to estimate using the conservative process defined by the Phillips ROI Methodology. It was important to require this value to be developed during the program, or at least have it developed soon after the program was completed, so that the follow-up could focus on the improvement. A visual summary of the Level 3 (application) responses from the end-of-course questionnaire can be found in Figure 8.6. The following Level 3 responses relate directly to the participants from the target organization:

- (Q18) How effectively are participants applying what they learned?
I will effectively apply what I have learned in this program. The participants responded 4.6 out of 5 on a Likert-type scale.
- To what extent do participants intend to use what they learned?
 - a. (Q15) I intend to use what I learned in this program immediately.
The participants responded 4.8 out of 5 on a Likert-type scale.
 - b. (Q21) The participants estimate that they will apply 75 percent of the new knowledge and skills learned from the reVIEW program on their job.
- How frequently are they applying what they learned?
The participants are all actively working on projects using the reVIEW techniques. Three projects are completed, three are near completion, and at least five other projects have been started.
- If they are applying what they learned, what is supporting them?
 - a. Senior-level management support is helping keep the program alive and working, not only at the long-term care facility, but also across the organization.
 - b. The project leaders are including all employees in the projects, which in turn has created buy-in.
- If they are not applying what they learned, why not?
The participants are applying the reVIEW tools as of the three-month follow-up.

Level 4

What is the business impact as a result of utilizing the skills learned in the reVIEW program?

FIGURE 8.6 End-of-Course Questionnaire Responses for Level 3 (Application)



During the follow-up, the participants were asked to provide five items:

1. The actual monthly change in the measure as indicated in part D of the action plan (see Figure 8.5). This is the value used to develop an annual improvement.
2. An estimate of the percentage of improvement resulting from the application of the skills required in the reVIEW training program. An isolation technique used to determine the effects of the program included an estimate directly from the participants. As they monitor the business measures and observe their improvement, the participants likely know the actual influences driving a specific measure, or at least the percentage improvement related to their actions detailed on the action plan. Understanding that other factors could have influenced the improvement, the reVIEW participants were asked to estimate the percentage of improvement resulting from the application of the skills required in the reVIEW training program (the action steps on the action plan). Each participant was

asked to be conservative with the estimate and express it as a percentage (see parts E and F on the action plan).

3. Participants' level of confidence in their allocation of the contribution of this program. Understanding that the value in item 2 is an estimate, the participants were asked to indicate the level of confidence in their allocation of the contribution of this program. This is included in part G on the action plan (100% for certainty and 0% for no confidence). This process reflects the degree of uncertainty in the value and frames an error range for the estimate.
4. Intangible measures observed or monitored during the three months that were directly linked to this program.
5. Additional comments including explanations.

Figure 8.7 shows a sample of an action plan that was completed for this study. The example focuses on project 2, which is phase one to reduce the delays created during a short-term rehab discharge. The A3 Problem Solving form from which this example is taken is located in Appendix 8.A.

The following Level 4 responses relate directly to the three projects from the target organization:

- To what extent does participants' application of what they learned improve the measures the program was intended to improve? To date, the completed projects have done the following:
 - a. **Project 1: Dressing Change Delays.** Reduced the combined nursing time spent looking for dressing supplies by 3.75 hours per day (24-hour day). This is time that is now spent providing resident care. This process has also reduced the amount of wasted medical supplies due to an inaccurate inventory.
 - b. **Project 2: Short-Term Rehab Discharge to Home.** Reduced the amount of time the social services department spends coordinating short-term rehab discharges by 25 percent. Phase one has also reduced the number of missed short-term rehab patients due to a delay in another patient's discharge by approximately 20 percent. If a short-term rehab patient is turned away for admission because the facility cannot guarantee the bed of someone being discharged, that bed will become unoccupied for an average of seven days once it is available. Missed short-term rehab admittance opportunities were costing the organization more than \$23,000 per year.

TABLE 8.7 Action Plan

Name: _____ Instructor Signature: _____ Follow-Up Date: <u>12-3-09</u>		
Objective: <u>Reduce delays in short-term discharge</u> Evaluation Period: <u>9-1-09</u> to <u>12-3-09</u>		
Improvement Measure: <u>Missed short-term admissions</u> Current Performance: <u>Once per month</u> Target Performance: <u>No misses</u>		
Action Steps		Analysis
<p>Steps</p> <p>Date</p> <p>1. Family input will be sought before rehab meeting.</p> <p>2. Nursing input will be provided during the rehab meeting.</p>	<p>A. What is the unit of measure? 1 missed short-term admit</p> <p>B. What is the value (cost) of one unit? \$388.17 per day</p> <p>C. How did you arrive at this value? Standard Value</p> <p>D. How much did the measure change during the evaluation period? (monthly value) 20% reduction</p>	
<p>Intangible Benefits: Employee and Patient Satisfaction</p>	<p>E. What factors influenced the change in performance? The reVIEW Program</p> <p>F. What percent of this change was actually caused by this program? 100%</p> <p>G. What level of confidence do you place on the above information? (100%=Certainty and 0%=No Confidence) 75%</p>	
Comments:		

- c. **Project 3: Chart-to-Go.** Reduced the average amount of time the CNAs were spending documenting ADLs by 45 percent. Documentation has become more accurate and the CMI has increased by 2.8 percent, thus increasing the reimbursement amount. The process is now entirely paperless and environmentally friendly.

- How do we know it was the program that improved these measures? Each of the three projects in the target organization used two isolation techniques. The following techniques were used: (a) participant estimates on all projects, (b) control group on project one, (c) expert estimates on project two, and (d) trend-line analysis on project three.

Level 5

What is the ROI associated with implementing the skills learned in the reVIEW program?

Calculating ROI requires two steps: (1) calculating monetary benefits by converting Level 4 data into a monetary value, and (2) determining the fully loaded cost of the program. When the ROI is calculated, the following standard formula should be used:

$$\text{ROI (\%)} = \frac{\text{Net Program Benefits}}{\text{Program Costs}} \times 100$$

ROI uses the net benefits divided by program costs. The net benefits are the program benefits minus the costs. This is the same basic formula used in evaluating other investments in which the ROI is traditionally reported as earnings divided by investment (Phillips, Phillips, Stone, and Burkett, 2007).

According to Phillips and Phillips (2007, p. 257), while results at the lower levels are important, converting the positive outcomes into monetary figures and weighing them against the cost of the program is more valuable from an executive viewpoint. This is the ultimate level in the five-level evaluation framework.

The following Level 5 responses relate directly to the three projects from the target organization:

- Do the monetary benefits of the improvement in business impact measures outweigh the cost of the program?
 - a. **Project 1.** Yes (590%). The benefit and cost information for this project is listed in Figure 8.8. The cost information is fully loaded to include all the expenses associated with the program. The benefit information is conservative and includes confidence adjustments for any potential error.
 - b. **Project 2.** Yes (154%). The benefit and cost information for this project is listed in Figure 8.9. The cost information is fully loaded

to include all the expenses associated with the program. The benefit information is conservative and includes confidence adjustments for any potential error.

- c. **Project 3.** Yes (31 %). The benefit and cost information for this project is listed in Figure 8.10. The cost information is fully loaded to include all the expenses associated with the program. The benefit information is conservative and includes confidence adjustments for any potential error.

BALANCED DATA

The three projects also include several intangible measures (resident satisfaction, employee satisfaction, teamwork, reduced waste, and environmentally friendly processes) that were considered important and helpful to the facility. Therefore, several types of data points are generated from this project:

- reaction, satisfaction, and planned action
- learning
- application and implementation
- business impact
- ROI
- intangible benefits.

Collectively, the six types of data provide a balanced viewpoint of the success of the reVIEW program.

COMMUNICATION STRATEGY

The results of this study were communicated to a variety of stakeholders. First, the senior leadership at Home Town Care was briefed in detail on each project by the project coordinators. The leadership team was impressed to the point of making the reVIEW program the primary quality initiative in their organization. They have also assigned a senior leader the responsibility of coordinating and tracking each project so as to create a database that documents a long-term care organization's transformation to a lean enterprise.

FIGURE 8.8 Cost Benefit Worksheet (Project 1)

Project 1 Dressing Change Delays			
Project 1 Cost			Actual Cost
Tuition = \$2,390 per student	# of students = 2		\$1,593.33
(Includes lodging, meals, instructor travel, room costs, supplies, and program admin. cost)	*Prorated over = 3		
Lost Wages (Provided by HR)			\$974.60
(Includes salary and benefits while in training and while working on the project)			
Evaluation Cost			\$617.18
(Includes researcher time, travel, and benefits pro-rated for all the projects in the study)			
Tuition = \$2,390 per student		Total Cost	\$3,679.77
Project 1 Benefit	Annual Benefit	Proj. Leader Confidence	Actual Benefit
Nursing time saved	\$33,833.80	75%	\$25,375.35
(adjusted for confidence by each nurse and then averaged)			
		Total Benefit	\$25,375.35
BCR = Program Benefits / Program Cost		BCR = 6.90	
ROI = Net Program Benefits / Program Cost × 100		ROI = 590%	
<p>Note: Numbers containing salary information are intentionally kept vague to retain anonymity and confidentiality.</p> <p>* Tuition is prorated over the number of projects that each participant estimates that they will conduct in a one-year period and adjusted for the confidence in their estimate.</p>			

FIGURE 8.9 Cost Benefit Worksheet (Project 2)

Project 2 Short-Term Rehab Discharge to Home			
Project 2 Costs			Actual Cost
Tuition = \$2,390 per student	# of students = 1		\$487.00
(Includes lodging, meals, instructor travel, room costs, supplies, and program admin. cost)	*Prorated over = 5		
Lost Wages (Provided by HR)			\$590.00
(Includes salary and benefits while in training and while working on the project)			
Project Implementation Cost			\$210.18
(Includes salaries and benefits of project participants and any material and equipment purchases)			
Evaluation Cost			\$617.18
(Includes researcher time, travel, and benefits prorated for all the projects in the study)			
		Total Cost	\$1,895.36
Project 2 Benefit	Annual Benefit	Proj. Leader Confidence	Actual Benefit
Social worker time saved (adjusted for confidence 75% by social worker)	\$1,360.17	90%	\$1,224.15
The annual missed opportunity due to delays ** (adjusted for confidence by the admissions coordinator)	\$23,476.52		
This project is preventing 20% of the missed opportunity (adjusted for confidence 85% by the admissions coordinator)	\$3,991.01	90%	\$3,591.91
		Total Benefit	\$4,816.06
BCR = Program Benefits / Program Cost		BCR = 2.54	
ROI = Net Program Benefits / Program Cost × 100		ROI = 154%	
Note: Numbers containing salary information are intentionally kept vague to retain anonymity and confidentiality.			
* Tuition is prorated over the number of projects that each participant estimates that they will conduct in a one-year period and adjusted for the confidence in their estimate.			
** Miss on average one referral per month - 90% conf. When a referral is missed the bed will be empty on average seven days - 80% conf. Reimbursement rate per day for short-term rehab = \$388.17 [(1 miss × 90% conf) × ((7 days × \$388.17) × 80% conf.)] × 12 to annualize = \$23,476.52 per year.			

FIGURE 8.10 Cost Benefit Worksheet (Project 3)

Project 3 Chart-to-Go Program			
Project 3 Cost			Actual Cost
Tuition = \$2,390 per student	# of students = 2		\$1,195.00
(Includes lodging, meals, instructor travel, room costs, supplies, and program admin. cost)	*Prorated over = 4		
Lost Wages (Provided by HR)			\$3,961.30
(Includes salary and benefits while in training and while working on the project)			
Project Implementation Cost			\$31,486.85
(Includes salaries and benefits of project participants and any material and equipment purchases)			
Evaluation Cost			\$617.18
(Includes researcher time, travel, and benefits prorated for all the projects in the study)			
		Total Cost	\$37,260.33
Project 3 Benefit	Annual Benefit	Proj. Leader Confidence	Actual Benefit
** CNA time saved (adjusted for confidence by each CNA)	\$22,219.28	95%	\$21,108.32
*** Change in CMI (2.8% change)	\$45,990.00	60%	\$27,594.00
(((.7 × 4) × 365) × 45) = \$45,990 per year			
		Total Benefit	\$48,702.32
BCR = Program Benefits / Program Cost		BCR = 1.31	
ROI = Net Program Benefits / Program Cost × 100		ROI = 31%	
<p>Note: Numbers containing salary information are intentionally kept vague to retain anonymity and confidentiality.</p> <p>* Tuition is prorated over the number of projects that each participant estimates that they will conduct in a one-year period and adjusted for the confidence in their estimate.</p> <p>** CNAs were asked if they were spending more, less, or the same amount of time using the new Chart-to-Go system. The time was then adjusted for each CNA's confidence in the number, and then averaged.</p> <p>*** CMI number is based on two months of data and will be revisited at the three-, six-, and nine-month points. (CMI = \$.70 per day for each .01 change, CMI increased by .04 for the 45 residents on medical assistance).</p>			

The second communication strategy involved a presentation of this case study to the state healthcare industry partnership. The presentation was well received and has since led to other long-term care organizations investing in the reVIEW program for their organizations.

LESSONS LEARNED

It is critical to build the action planning process into the program. The process should not be seen as just a means to collect data, but rather as a mandatory part of the program to help manage project results. Providing participants with the knowledge to answer all the questions on the action plan requires a training session with specific directions on how and where to find the needed information. It is also important to appoint an internal point of contact to help answer any questions on action planning forms as they arise.

RESOURCES

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QUESTIONS FOR DISCUSSION

1. Is this an appropriate program for Level 5 evaluation? If so, why? If not, why not?
2. How would you critique the evaluation design and method of data collection?

3. What other strategies could have been used to isolate the impact of the reVIEW program?
4. Discuss the use of action planning as a data collection tool. Is action planning a credible source of data collection?
5. Were the estimates used in this study conservative enough?

ABOUT THE AUTHOR

John D. Piccolo, PhD, is the director of Continuing Education at Penn State DuBois. Continuing Education (CE) is the outreach unit of the campus, with the primary mission of helping individuals, organizations, and communities obtain a competitive workforce advantage through education and training. Prior to joining the university, John was a sales engineer for GKN Sinter Metals. He also worked as a project manager for Windfall Products, Inc., and as a production manager for Metaldyne Sintered Components. John spent seven years as a pilot in the United States Army, where he reached the rank of captain. He served as Aviation Company Operations Officer in Berlin, Germany, during the unification of East and West Germany, and he flew missions in support of Operation Desert Storm. He has a PhD in workforce education and development from Penn State University, a master's in public administration from Troy State University in Alabama, and a BS in business administration from Clarion University of Pennsylvania.