

Measuring the Impact and ROI of Pulp and Paper Technology Training

Alabama Southern Community College and the National Science Foundation Advanced Technological Education Centers Program

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ROI INSTITUTE™

This study describes the impact of and return on investment in the Alabama Southern College Pulp and Paper Technology Training Program.

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Section 1

GENERAL INFORMATION

From almost any perspective, the need to show the accountability of various projects and programs in organizations is growing, particularly for programs involving skill development for critical industries. When resources are allocated to specific projects, all key stakeholders need to see the value of those projects. Today, value is described in many different ways, including impact and ROI. This evaluation study captures six types of data, including the financial ROI, to measure the success of the Pulp and Paper Technology Training program offered by the Alabama Southern Community College, funded in part by the National Science Foundation (NSF).

THE PROGRAM

The National Network for Pulp and Paper Technology Training (NPT)² was created to provide the pulp and paper sector of the United States forest-product industry with a globally competitive, technologically advanced workforce and to give students and incumbent workers around the nation exciting and effective education and training. The program is delivered through a variety of partners across the U.S. These partners are educational providers, particularly at the community college level. Their efforts are evaluated through four nodes — Southeast, Midwest, Northeast, and Northwest. The national program's efforts are directed at the Alabama Southern Community College campus, which also serves as the Southeast node.

Although the program is designed to address a variety of issues and provide myriad services, such as developing skill standards and education centers, the most visible part of the process is training for new employees in the industry. Through certificate programs or two-year degree programs, the industry's workforce is being transformed. The most immediate concern is to address the success of the two year degree programs.

While funding for the program comes from a variety of sources, the NSF provides a significant amount. Through this funding, Alabama Southern has taken the lead to show the program's impact in the community, using the ROI Methodology. Alabama Southern initiated and coordinated this study, designed to show the success of the program among employers in the area.

PROGRAM OBJECTIVES

The goals of the (NPT)² program are outlined below.

1. Provide broad outreach to community colleges, mills, students, and employees for recruitment, retention, and placement
2. Develop and enhance the curriculum, including creation and use of national skill standards
3. Develop faculty for the pulp and paper industry
4. Articulate to universities from high schools through partner two-year colleges
5. Evaluate instruction materials and student learning
6. Recruit, retain, and place students through a pulp and paper education/training clearinghouse
7. Disseminate best practices in pulp and paper education and training
8. Implement an operator certification program as a component for sustainability

Although the above goals involve many different services and partners, this particular study focused on four objectives:

1. Attract students into the pulp and paper industry
2. Provide effective training to meet employer needs
3. Place students in appropriate jobs in the industry
4. Provide a career and job opportunities in the industry

These objectives were evaluated for Alabama Southern through a study of the top two employers in the area (in terms of the number of Alabama Southern graduates employed).

ALABAMA SOUTHERN COMMUNITY COLLEGE

The Pulp and Paper Technology Training program developed for the pulp and paper industry by Alabama Southern has proven to be an excellent one and serves as a model for others in the (NPT)² partnership. This study focuses directly on the success of the two-year programs for the pulp and paper industry and measures the success of these programs from the time of the NSF funding to the present (four years). The specific associate degree programs evaluated at Alabama Southern include:

1. The Electrical Technology and Industrial Maintenance Track for the associate degree in Industrial Engineering Technology
2. The Instrumentation and Electronics Track for the associate degree in Industrial Engineering Technology
3. The Paper and Chemical Technology associate degree

Descriptions of these degree programs are attached as Appendices 1, 2, and 3, respectively. The number of graduates from these degree programs in the past four years (during NSF funding) is shown in Table 1-1.

Table 1-1 Program Graduates

Year	No. of Graduates
2005	17
2006	16
2007	13
2008	13

THE STUDY

ROI Perspectives

When a program's success is evaluated and ROI is calculated, the specific perspective becomes an important issue. The ROI Methodology (detailed in another section), measures success with six data categories:

1. Reaction to the program from several perspectives
2. Extent of learning, skills, and knowledge needed for success
3. Application of skills and knowledge on the job
4. Impact in the organization (the employer in this study)
5. Return on investment — the monetary benefits of the impact, compared to the cost of the program
6. Intangible benefits — the impact measures that are not converted to money

When it comes to the actual ROI calculation, the different perspectives become extremely important. For example, the financial return on investment can be calculated from the perspective of:

1. Employers investing in the program
2. The community college allocating resources to the program
3. Taxpayers of the state providing funding for the college
4. The NSF, which provided significant funding for the program
5. The pulp and paper industry, which ultimately reaps the benefits of the process

Essentially, the ROI can be developed for each perspective by isolating the benefits for each perspective, converting them to money and then comparing them to the costs for that particular perspective. For this study, the decision was made to calculate the ROI from the employer perspective. Because this program is designed to provide a globally competitive, technologically advanced workforce, the ROI should be viewed from the employers' perspective. At present, employers invest very little in the program. They invest principally through scholarships and miscellaneous time and travel costs. In the future, employers may need to assume more responsibility. As a result, an ROI calculation from the employer perspective will provide insight into the program's impact and provide data to make decisions about additional investments from the employer perspective. ROI from other perspectives could be accomplished with some additional analysis, but for now, this study is limited to the employer perspective.

Target Employers

In the communities served by Alabama Southern, several employers are involved in the program. Table 1-2 lists the employers and the number of graduates placed since NSF funding began. This study analyzed the impact of this program on Alabama River Pulp Companies (ARP) and Boise. Details on the employers are provided in Appendices 4 and 5.

Table 1-2 Employers and Graduates Placed

Employer	No. of Graduates
Alabama River Pulp	12
Boise	8
Weyerhaeuser	5
Georgia Pacific	1
Louisiana Pacific	1
Various chemical plants	4
Continuing education	5
Alabama Power Co.	1
Unaccounted for	22

Although limiting the study to two employers reduces the sample size, the perspective of the top two employers provided greater insight into the effectiveness of the program and the extent of the ROI. A third company was considered in the study; however, it was in the middle of a merger and was unable to provide data at the time. Additionally, the data from other employers was sketchy at best. On the positive side, a study of the top two employers can be encouraging to others to become more involved and to invest additional funds anytime in the (NPT)² program.

Study Objectives

Based on the resources available, the timing of the data collection and the necessity to conduct the study quickly, the study explores the success of Alabama Southern graduates working for the two top employers. This study evaluates all three degree programs and tracks the graduates' success on the job through interviews, monitoring records and data. Essentially, the study addresses the following questions:

1. What is the reaction to the programs from the different stakeholder perspectives (*e.g.*, graduates, managers of graduates, company officials, and Alabama Southern officials)?
2. How have the programs prepared graduates for success (*e.g.*, measuring learning)?
3. How successful are graduates in using the skills and knowledge obtained in the programs? This includes the barriers and enablers to success.
4. What specific impact has been achieved on a wide range of business measures connected directly to these programs? This includes isolating the effects of the program on the specific business measures.
5. What is the actual ROI? This compares the employers' monetary benefits from the degree programs to the employers' cost for the programs.
6. What are the various intangible benefits for the employer through this program?

Specific, credible answers to these questions will provide insight to the following key stakeholders:

1. Employers who currently invest will see the return on their investment and perhaps a need to invest more in the future.
2. Alabama Southern will have data that can be used to make the programs more successful through adjustment and fine-tuning.
3. The other partners in (NPT)² can see the value of this type of study and learn from its results.
4. The NSF can see the success of its funding and help make decisions on future funding streams for these and other similar programs.

Section 2

IMPACT STUDY METHODOLOGY

In the late 1950s, Donald Kirkpatrick published articles to describe the four steps of evaluation¹. These four steps later evolved into four levels. In the early 80s, Dr. Jack Phillips took the four levels a step further² by incorporating the theory of cost-benefit analysis into a four-level framework and adding a fifth level for return on investment (ROI). Along with this addition, Phillips expanded the Kirkpatrick approach to include systematic processes, standards, and implementation strategies. He also adjusted the methodology to address issues other than training, such as human resources, technology, quality, and public sector initiatives to name a few. Since that time, the ROI Methodology™ has been implemented by 3,000 organizations through the ROI Institute, cofounded by Jack and Patti Phillips. With more than 40 books authored or edited by the Phillipses and use in 50 countries, the process has become a premier tool for measuring the success of all types of programs.

The methodology served as a valuable evaluation tool for the pulp and paper technology training program because it:

- balances financial impact with an evaluation of the systems and processes that support the transfer of learning to the job;
- follows a set of consistent and conservative guiding principles that generate credible results;
- and offers a methodical, step-by-step process that is user-friendly.

A BALANCED SET OF MEASURES

The concepts of cost-benefit analysis and ROI have shown the value of programs, processes, and initiatives for centuries. Cost-benefit analysis is grounded in welfare economics and public finance, while ROI is grounded in business accounting and finance. Together, the two are the ultimate measures of profitability; alone, they are insufficient. While cost-benefit analysis and ROI report the financial success of programs, they lack a critical explanation for the financial impact. The Phillips ROI Methodology balances financial impact with an evaluation of the systems and processes that support the transfer of learning to tell a complete story of a program's success.

The ROI Methodology categorizes evaluation data into five levels, as shown in Table 2-1. When combined with intangible data, these five levels tell the complete story of a program's success.

¹ Kirkpatrick, D. L. (1975). Techniques for evaluating training programs. In D. L. Kirkpatrick (Ed.), Evaluating Training Programs (pp. 1-17). Madison, Wisconsin: ASTD.

² Phillips, J. J. (1983). Handbook of Training Evaluation and Measurement Methods. Houston, Texas: Gulf Publishing.

Table 2-1 The Evaluation Framework

Level	Measurement Focus
1. Reaction & Perceived Value	Measures reaction to the program and captures perceived value of the program
2. Learning and Confidence	Measures changes in knowledge and skills on the job.
3. Application & Implementation	Measures the use of knowledge and skills on the job
4. Impact	Measures changes in critical business measures
5. Return on Investment (ROI)	Compares the monetary value of impact to program costs

Level 1: Reaction and Perceived Value

This initial level of evaluation is the most commonly used. Data at this level are usually collected with an end-of-course questionnaire. With this feedback, instructors can improve facilitation, materials, and the overall learning process.

When used appropriately, the Level 1 reaction data can predict the actual use of newly obtained skills and knowledge. Level 1 evaluation answers important questions, including the following:

1. Is the program relevant to participants' jobs?
2. Is the program important to participants' success?
3. Do participants intend to use what they've learned in the program?
4. Did the program provide participants with new information?

Level 2: Learning and Confidence

Participant mastery of the knowledge and skills taught in a program is a critical level of evaluation. Learning measurement takes place during the program through a variety of techniques, such as tests, facilitator assessment, self-assessment, and observation. Learning data answer three critical questions:

1. Do participants acquire the appropriate knowledge and skills?
2. Do participants understand how the program works?
3. Are participants confident to apply their newly acquired knowledge and skills when they leave the classroom?

Level 3: Application and Implementation

As one executive stated, "It's not what the employees learn, it's what they do with what they learn." Learning for learning's sake might be good; however, when the learning is gained through another's investment, some behavior should change as a result. Organizations invest millions in training initiatives, yet there is still limited evidence as to what is gained through those initiatives. Measurement of application and implementation provides evidence that the learning transfers to the workplace.

Success in application and implementation is measured after participants have applied their new knowledge and skills on a routine basis. Data are collected through techniques such as surveys, questionnaires, interviews, focus groups, observations, action plans, and performance contracts. A critical component of application and implementation measurement is the determination of enablers supporting the transfer of learning and the barriers preventing it. Measurement at Level 3 provides the richest source of data of the five levels, because it addresses program success from a system perspective, answering the question, "Does our system

support the transfer of learning?” Five key questions are usually answered when measuring success at Level 3:

1. To what extent are participants applying their newly acquired knowledge and skills?
2. How frequently are participants applying their newly acquired knowledge and skills?
3. What success are participants having with the use of knowledge and skills?
4. What is supporting their success of knowledge and skills?
5. What is inhibiting success if they are not successful?

Level 4: Impact

Impact measurement tracks business success as the program improves critical measures linked to the organization, such as output, quality, cost, and time. Other measures of success, such as safety, employee satisfaction, and absenteeism, are also important in achieving organizational goals. Level 4 impact measures are defined as the consequence of applying the skills learned in the program. Measuring these consequences connects the program to business impact.

Level 5: ROI

The ultimate measure of financial success of a program, process, or initiative is ROI, which compares the monetary benefits to the costs of the program. To develop ROI, six steps of cost-benefit analysis are taken:

Step 1. Identify the business impact measures that have changed.

Step 2. Isolate the effects of the program on the impact data.

Step 3. Convert the impact measures to monetary value.

Step 4. Tabulate the fully loaded costs.

Step 5. Identify the intangible benefits (impact measures not converted to money).

Step 6. Compare the monetary benefits to the cost.

The first step in this series, identify impact measures, is part of the follow-up evaluation phase. Step 2 shows the amount of the business impact connected to the program. In Step 3, the impact measures are converted to monetary value. In Step 4, the fully loaded cost profile is developed. Step 5 identifies the intangible benefits. Finally, Step 6 compares the monetary benefits of the program (impact measures converted to monetary value) to the fully loaded costs of the program to calculate an ROI. Measurement at Level 6 answers a critical question: Do the monetary benefits of the program meet or exceed the costs?

When fully developed, the five levels of evaluation data (plus the intangible benefits) represent a chain of impact that occurs when participants are involved in a program and they react, learn, apply, and have an impact on the organization. Figure 2-2 depicts this chain of impact.

Not all programs are evaluated at all five levels; only certain ones require such a comprehensive evaluation. Expensive programs, programs that have a long life cycle, those with a very broad reach, comprehensive programs, and programs that instill significant change in the organization are potentially suited for evaluation at the ROI level. Other variables, such as the need for the program, the purpose of the evaluation, and the stakeholders' needs, drive the level to which a program is evaluated.

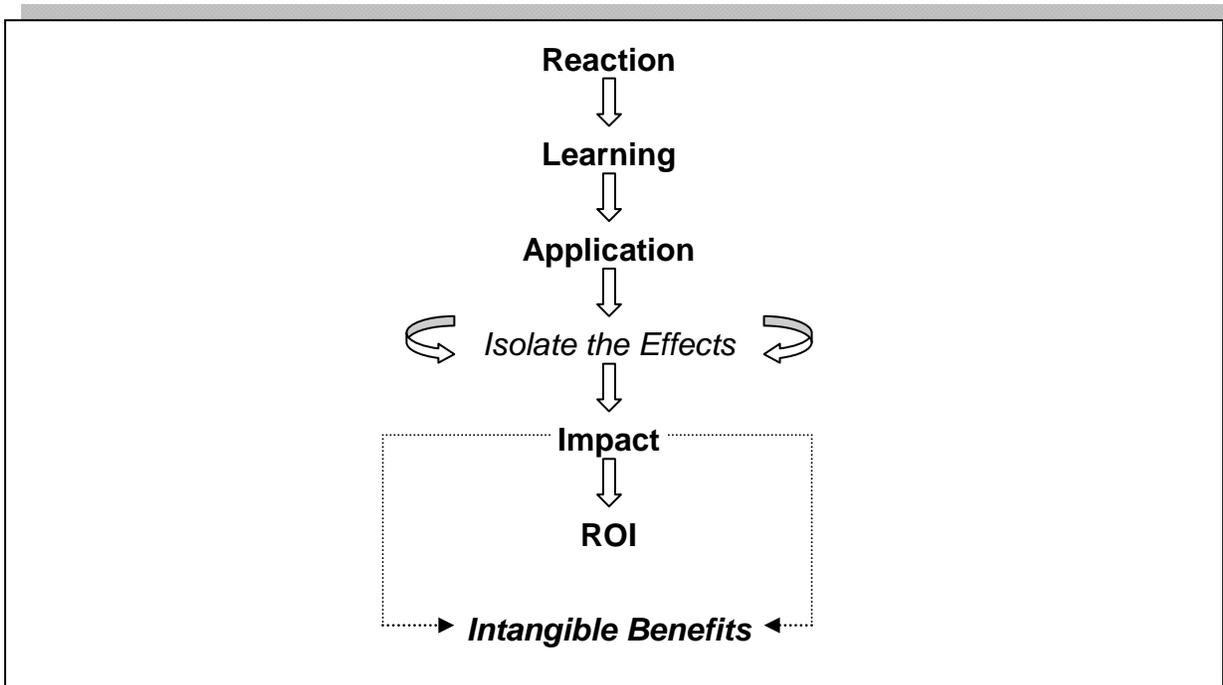


Figure 2-2 The chain of impact tells the complete story of program success.

THE ROI PROCESS MODEL

The ROI Methodology includes a step-by-step process to ensure that the appropriate data are analyzed and reported. Figure 2-3 represents the ROI process model, which begins with developing program objectives and planning the evaluation. Data are collected at two different time frames — during the program and after the program. Improvements in key impact measures are isolated to the program. When appropriate, these improvements are converted to monetary value and compared to the fully loaded costs of the program to develop the ROI. Two major processes are involved: data collection and data analysis. These two processes are addressed in the planning stage with a data collection and ROI analysis plan.

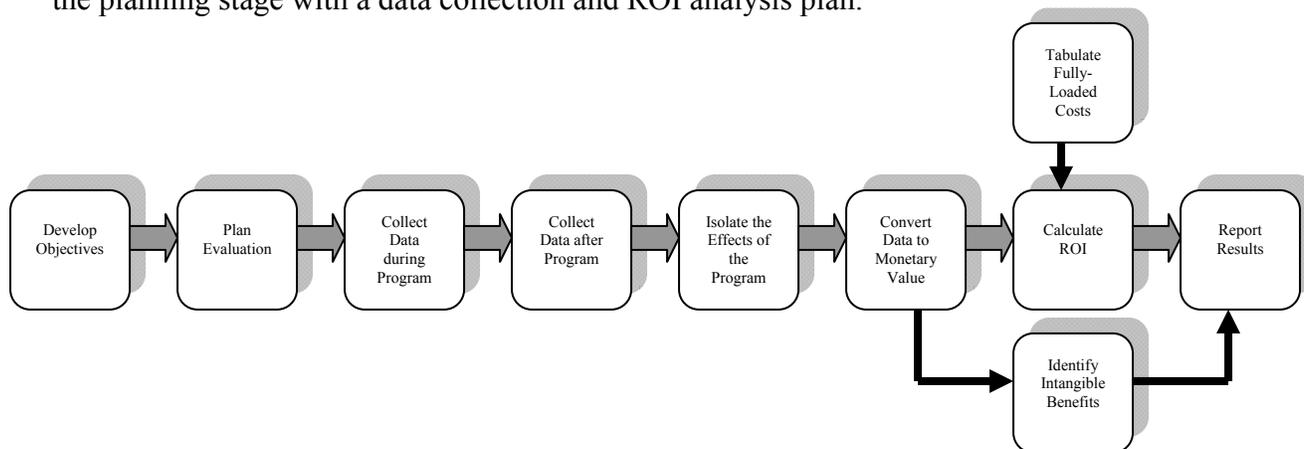


Figure 2-3 The ROI process model

DATA COLLECTION PLAN

The data collection process includes four primary elements: 1) defining the program objectives and measures to determine if the objectives have been achieved; 2) determining the data collection methods; 3) identifying the sources of data; and 4) determining the timing of data collection. A practical approach to data collection was taken for the initial stage evaluation.

Program Objectives and Measures

Program objectives are derived from a formal needs assessment, as was the case in this project. The needs assessment identifies the gaps in performance. Gaps can come from excessive costs and inefficiencies, behavior, understanding, and even individual perceptions. Once these gaps or needs are identified, solutions are developed to solve the problems. To ensure that all stakeholders involved in the process understand the expected outcomes, clear objectives to address the problem are defined. The program is then evaluated against those objectives. Figure 2-4 depicts this connection between the needs, objectives, and evaluation.

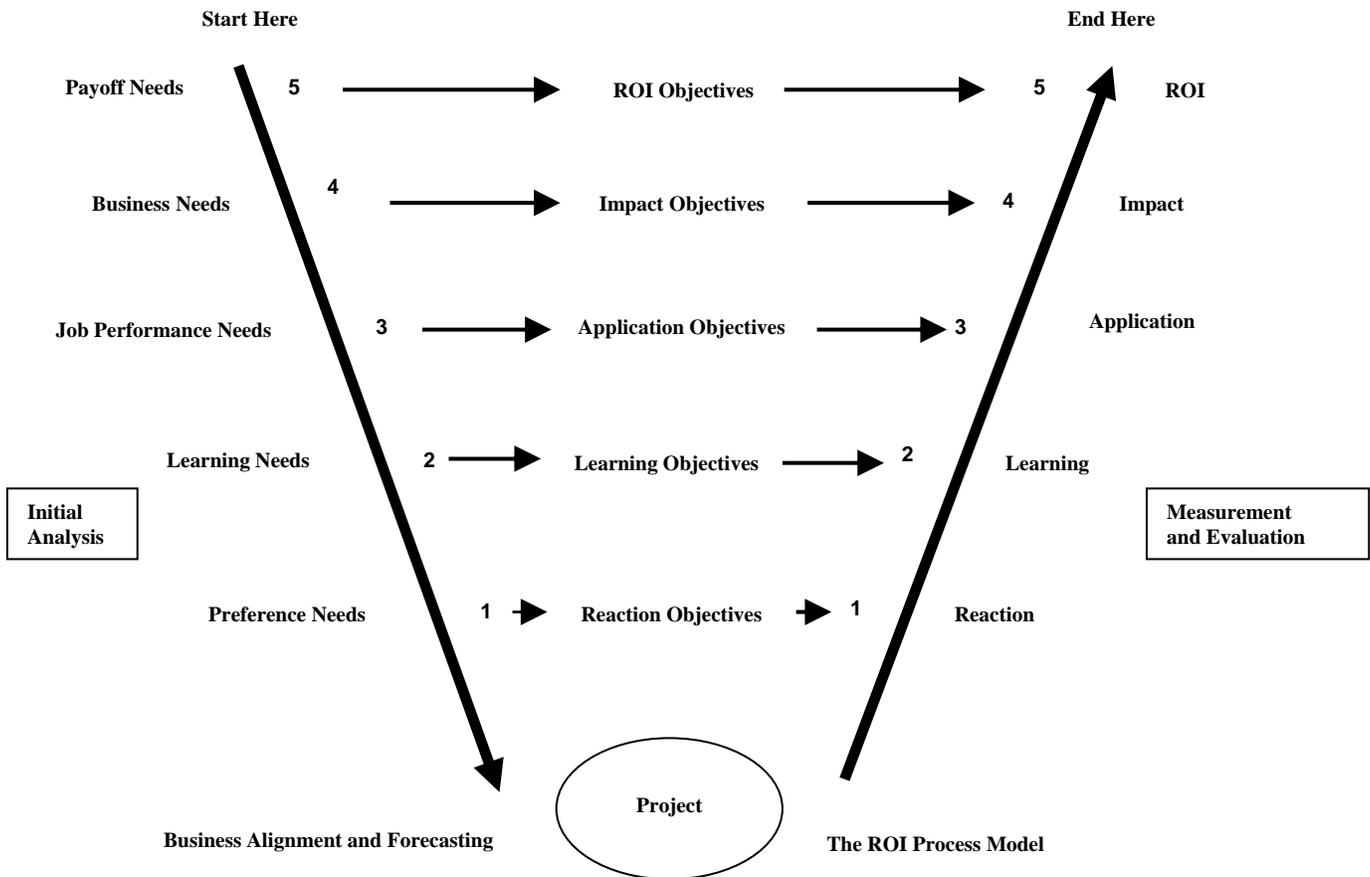


Figure 2-4 Linkage between needs assessment and evaluation

The NSF recognized the need to create the (NPT)² program for developing critical skills for the pulp and paper industry, with the objectives based on needs. One of the primary reasons for conducting an ROI study for the Pulp and Paper Technology Training program is to determine the impact of the program on the employers in the area as graduates acquire and use skills taught in the program. These measures were identified by participants through the evaluation process. Table 2-5 summarizes the objectives and measures of success that form the basis for evaluation. The results of this study not only provide some indication as to the

outcomes from the program on the employers, but also identify potential outcomes for NSF and Alabama Southern Community College.

Table 2-5 Objectives and measures that form the basis of the evaluation.

	Broad Program Objective(s)	Measures
Reaction Objectives	REACTION AND PLANNED ACTION	
	1. Students will perceive the program as: <ul style="list-style-type: none"> • Valuable to their career • Important to their job success • Practical • Relevant • Challenging • A good use of taxpayer dollars • A positive return on employer's investment • Appropriate for others in similar situations 	4 out of 5 on a 5 point scale
	2. Employers will perceive the program to be: <ul style="list-style-type: none"> • Important for recruiting talent • Necessary to meet talent shortage • A source of outstanding employees • As a valuable investment in the future 	Responses on interviews
Learning Objectives	LEARNING AND CONFIDENCE	
	1. Participants will satisfactorily complete all the requirements in the program.	Minimum of 2.5 GPA on a 4.0 scale
	2. Participants will: <ul style="list-style-type: none"> • learn the skills/knowledge required for the job • be confident to use those skills/knowledge • be fully qualified to perform the job 	4 out of 5 on a 5-point scale
	3. Employers will understand how the program works	Responses on interview
Application Objectives	APPLICATION AND IMPLEMENTATION	
	1. Students will be offered a job in the pulp and paper industry.	4 out of 5 on a 5 point scale
	2. Participants will use, on-the-job, the acquired knowledge and skills	
	3. Three participants will frequently use knowledge/skills on the job.	
	4. Students will excel in their use of skills.	
	5. Employers will use the program to address talent shortages.	Comments on interviews
	6. Employers will support the program.	
Impact Objectives	BUSINESS IMPACT	
	1. The program will generate graduates who achieve improvements in: <ul style="list-style-type: none"> Productivity Quality of work Time to proficiency Efficiency Lower turnover Improved work habits Safety performance Promotions Job satisfaction 	Work output per hour Number of discrepancies/errors Days Cost savings Involuntary turnover rates Absenteeism rate First aid treatment cases Time to next promotion 4 out of 5 on a 5-point scale
ROI	10%	

Data Collection Methods

Data were collected for this study using seven scenarios: 1) official grades from the college are monitored; 2) post program follow-up graduate questionnaire is administered; 3) post-program follow-up manager questionnaire is administered; 4) program graduates interviewed; 5) company managers are interviewed; 6) company officials are interviewed; and 7) company records were examined. Table 2-6 presents the methods.

Because of the small sample size, one-on-one interviews were conducted with each of the graduates who were available for interviews. Additionally, each graduate was given step-by-step instructions on completing the required questionnaire. Some of the managers who knew the job success of the graduates were interviewed and completed a questionnaire. For each of the two companies, one of more officials provided insight and input in an extensive interview. The company records were an actual source of data obtained through the interview process or later provided by the managers.

The timing of the follow-ups was not necessarily ideal. Because of the decision to complete this study made in mid-2008, data collection from graduates is limited to a one-time review to reflect the four years since the NSF funding had begun. Routine annual data collections from the employers and the program were not available. Additionally, the reaction data from participants during the program were not available. To partially resolve this situation, reaction and learning data were captured in the follow-up questionnaires.

Table 2-6 Data Collection Methods

	Level 1 Reaction	Level 2 Learning	Level 3 Application	Barriers Enablers	Level 4 Impact	Costs
College Records		X				
Follow-up Participant Questionnaire	X	X	X	X	X	
Follow-up Manager Questionnaire	X	X	X	X	X	
Participant Interviews	X	X	X	X	X	
Manager Interviews	X		X	X	X	
Employer Interviews	X		X	X	X	
Company Records						X

Data Sources

The data source is critical to the credibility and validity of the study. It is important to identify who best knows about the measures being taken. The primary source of data for the program evaluation was the participants. However, company officials and the managers of participants also provided valuable information about the program's outcomes.

1. **Participants:** The program participants served as the principal source of data reaction and learning data. This is the normal process since participant reaction and learning is critical to success at other levels. The participants' most important data sets were for application and impact data. The participants provided information and the data was extremely valuable. Participants responded to questionnaires and interviews.
2. **Managers of Participants:** The managers of participants had objective insight into the success of these graduates. Generally, managers were asked to compare the success of

these graduates with other employees in similar jobs that were recruited or developed through some other source. The managers provided data in both questionnaires and interviews and became resourceful in explaining the graduates' success.

3. **Company Officials:** In addition to managers of graduates, one or more company officials, the employer, for each of the two companies provided data about the success of the program. This often involved not only antidotal data, but also records that indicated the success of graduates. These officials were prepared, professional, thorough, and willing to provide data, all during a busy and hectic schedule.
4. **Company Records:** Through the company officials, some company records were provided or examined to show the success of graduates in an attempt to compare the success with those who are recruited or developed through some other channels.
5. **College Records:** College records were necessary to show the actual numbers of individuals through the program and their grades as they completed various courses and graduated from the college.

Data Collection Timing

Table 2-7 represents the data collection plan for the program evaluation. This plan shows the objectives at each level, the measures, the method used to collect the data, the source, the timing, and the various responsibilities. The timing for collecting application and impact data was not ideal. The best time to collect application data is earlier in the program, just after the graduates' placements. For impact data, the first year of employment would be ideal. Although the timing was not exemplary for the data collection, the study did uncover important and significant data.

Sample Size

The sample size for this study was small, representing only 20 graduates out of a total of 59 (39%), since NSF funding for the program began. There were two factors that contributed to the small sample. First, the numbers of students and graduates were lower than what is ideal and what is needed. At the present time, recruiting has been improved, attracting more participants into the program. In the future, there will be a much larger numbers of graduates. On the other hand, the quality of the education is maintained with lower numbers. By design, the numbers should be low with only 20 new students allowed in each year. Employers see a tremendous need for additional students in the future, and that is being met with more focus and more successful recruiting.

Second, the inability to collect data from all of the graduates in the companies left us with reviewing only the top two employers. A third employer (third in terms of number of graduates) was contacted, but at the time was distracted by a merger. It was not a good time to interview those graduates and collect data. Also, the other companies with lower numbers of graduates were reluctant to provide the time to collect the data. On a positive note, having a smaller number allowed us to achieve a better data collection. Since the top two employers were examined, this data represents a sufficient sample size to understand the success of the program.

<p>2</p>	<p>LEARNING AND CONFIDENCE</p> <ol style="list-style-type: none"> 1. Participants will satisfactorily complete all the requirements in the program. 2. Participants will: <ul style="list-style-type: none"> • learn the skills/knowledge required for the job • be confident to use skills/knowledge on the job. • be fully qualified to perform the job 3. Employers will understand how the program works. 	<p>Minimum of 2.5 GPA on a 4.0 scale</p> <p>4 out of 5 on a 5-point scale</p> <p>Responses on interviews</p>	<p>Tests and lab demonstrations</p> <p>Questionnaire</p> <p>Interview</p> <p>Interview</p>	<p>School grade records</p> <p>Participants</p> <p>Participants</p> <p>Employer Representative</p>	<p>Fourth year into the program</p>	<p>Jack Phillips/Chip Shepherd</p>
<p>3</p>	<p>APPLICATION AND IMPLEMENTATION</p> <ol style="list-style-type: none"> 1. Students will be offered a job in the pulp and paper industry. 2. Participants will use, on-the-job, acquired knowledge and skills. 3. Participants will frequently use knowledge/skills on the job. 4. Students will excel in their use of skills. 5. Employers will use the program to address talent shortages. 6. Employers will support the program. 	<p>4 out of 5 on a 5-point scale</p> <p>Comments on interviews</p>	<p>Questionnaire</p> <p>Interviews</p> <p>Interviews</p>	<p>Participants</p> <p>Participants</p> <p>Supervisor / manager</p> <p>Employer representatives</p>	<p>Fourth year into the program</p>	<p>Jack Phillips/Chip Shepherd</p>

<p>4</p>	<p>BUSINESS IMPACT</p> <p>1. The program will generate graduates who achieve improvements in:</p> <ul style="list-style-type: none"> • Productivity • Quality of work • Time to proficiency • Efficiency • Lower turnover • Improved work habits • Safety performance • Promotions • Job satisfaction 	<p>Work output per hour Number of discrepancies/errors Days Cost savings Involuntary turnover rate Absenteeism rate First aid treatment cases Time to next promotion 4 out of 5 on a 5-point scale</p>	<p>Performance records and databases Questionnaires Interviews Interviews Interviews</p>	<p>Official company reports Participants Participants Supervisor /manager Employer representative</p>	<p>Fourth year into the program</p>	<p>Jack Phillips/Chip Shepherd</p>
<p>5</p>	<p>ROI 10%</p>	<p>Baseline Data:</p> <hr/> <p>Comments: Study will be limited to the top 2 or 3 employers.</p>				

DATA ANALYSIS PLAN

Data analysis includes five key steps: 1) isolating the effects of the program; 2) converting data to monetary value; 3) tabulating fully loaded costs; 4) identifying intangible benefits; and 5) comparing the monetary benefits to the costs. For purposes of this study, each step was carefully considered.

Isolating the Effects of the Program

Isolating the effects of the program from other influences is applied to impact data only, usually involving company data. This step of the ROI Methodology answers the question, “How do you know it was your program that influenced the measures and by how much?” Isolating the effects of the program takes into account all other variables that may have influenced improvement in specific measures of success. Ten possible techniques are considered when taking this step. The three most often used techniques are:

- Control groups
- Trend line analysis
- Expert Estimations

Based on dialogue with company officials and the program manager, the impact measures were identified and varied in scope from time savings on the job to job satisfaction. Although establishing a control group is not a feasible option for all the measures in this project, it is possible in some situations. The impact measures were available. Also, given the scope of the project and the variety of impact measures, it was determined that a conservative approach to participant estimations, manager estimations, and company officials’ estimations would be appropriate techniques to isolate the effects of the program.

Converting Data to Monetary Value

When moving from impact to ROI, converting data to monetary value is critical since it is here that the numerator for the ROI equation is developed. Ten techniques to convert data to monetary value are possible. For purposes of this study; however, the following six techniques were most feasible for this project:

1. Standard values
2. Historical costs
3. Expert input
4. External databases
5. Participant estimates
6. Manager estimates

The decision as to which technique is dependent on the measure influenced by the program.

Tabulating Fully Loaded Costs

To calculate an ROI, it is imperative to include the fully-loaded costs of the program. The costs categories included the development of the program, delivery costs (including facilities and equipment) participant and facilitator time and the evaluation costs. Typically, needs assessment costs are included in the fully-loaded cost profile.

Intangible Benefits

Intangible benefits are any benefits derived from the program that can't be converted to monetary value. Although every attempt is made to convert data to money, the process is stopped if it cannot be accomplished credibly with minimum resources. As reported in the *Results* section of this report, there are many intangible benefits to the program.

Calculating the Return on Investment (ROI)

ROI is the financial equation that compares net benefits (earnings) to the program costs (investment). It can be reported as a benefit cost ratio (BCR) by comparing the benefits to the employer and the costs. ROI and the BCR have been used for centuries to determine the value of programs, processes, and initiatives. They are financial values easily recognized by those managers and administrators with fiduciary responsibility for organizations. It is for these reasons that the ROI and BCR are the favored financial metrics used to measure financial success of programs. The BCR and ROI equations used in this study are:

$$\text{BCR} = \frac{\text{Program Benefits}}{\text{Program Costs}}$$

$$\text{ROI} = \frac{\text{Net Program Benefits}^*}{\text{Program Costs}} \times 100$$

*Net Program Benefits = Program Benefits – Program Costs

A 10 percent ROI target was established for the program. Because of the program's nature, the evaluation team believed this to be an acceptable financial return for the program's success. Table 2-8 represents the ROI analysis plan for this forecast study.

Table 2-8 ROI Analysis Plan

ROI Analysis Plan

Program: Pulp and Paper Technology Training

Responsibility: Jack Phillips and Chip Shepherd

Date: June 5, 2008

Data Items (Usually Level 4)	Methods for Isolating the Effects of the Program/ Process	Methods of Converting Data to Monetary Values	Cost Categories Employer Costs	Intangible Benefits	Communication Targets for Final Report	Other Influences/ Issues During Application	Comments
<ul style="list-style-type: none"> • Productivity • Quality of work • Time to proficiency • Efficiency • Lower turnover • Improved work habits • Safety performance • Promotions. 	<ul style="list-style-type: none"> • Control-group analysis • Estimates from management adjusted for error. 	Standard values and expert input from the company.	<u>Employer Costs:</u> <ol style="list-style-type: none"> 1. Scholarships 2. Additional support costs 3. Sponsor money 4. Staff time 5. Travel costs 6. Other costs <u>Additional Costs*:</u> <ol style="list-style-type: none"> 1. Cost of the formal education-beyond the tuition prorated 2. NSF cost-prorated 3. Evaluation costs 4. Other costs *If other ROI perspectives are pursued.	<ul style="list-style-type: none"> • Skills upgrade • Job development • Public image • Teamwork • Communications • Job satisfaction 	<ul style="list-style-type: none"> • Employers • Participants (Students) • Alabama Southern officials • (NPT)² officials • NSF Officials 	Must calculate the ROI from the employer perspective.	Because of the small number of participants in the study and the lack of focus on ROI early in the process, the study may be limited impact analysis.

STANDARDS FOR GUIDING THE ROI METHODOLOGY

The ROI Methodology used to evaluate the program adheres to Twelve Guiding Principles established to keep the process consistent and conservative. Decisions with regard to data collection and data analysis were made based on these guiding principles. Table 2-9 lists the principles used in this evaluation.

Table 2-9 Guiding Principles for the ROI Methodology

ROI Methodology Operating Standards	
1.	When a higher-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 sources.
4.	When analyzing data, choose the most conservative among 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 user/participant, it is assumed that little or no improvement has occurred.
7.	Estimates of improvements should be adjusted 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 a solution, project, or program 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.

Section 3

RESULTS

This section presents the results of the study from all sources. The principal source of data for Levels 1-4 was the graduates from Alabama Southern Community College’s Pulp and Paper Technology Training program. The principal data source for the ROI analysis was company officials. The results are presented by the different levels after a quick review of the objectives. The comments from the questionnaires are scattered throughout the report.

In a typical report, comments are usually balanced, with positive and negative results according to the percentage of comments in those two categories. However, in this study, the participants did not provide negative comments. Therefore, all comments are positive and many of them are scattered throughout the report.

RESPONSE RATES

The response rates were quite high. A total of 20 graduates in the two organizations served as the target population for the study. Twelve graduates were located at ARP and eight graduates were from Boise. Of these, six individuals were not available to provide data or were no longer employed with the organization, thus leaving 14 providing data on the questionnaires, which represents a response rate of 70 percent. Table 3-1 shows the response rate. Part of the high response rate was due to the fact that most of the individuals were interviewed and the questionnaire was explained to them during the interview. In addition, the officials of the company provided time for the employees to complete the questionnaire – often right after the interview was conducted.

Table 3-1 Post-Program Follow-Up Response Rates

	Post-Program Questionnaire			Interviews		
	Planned	Responded	Response Rate	Invited	Responded	Response Rate
Participants (ARP)	12	7	78%	6	4	67%
Participants (Boise)	8	7	88%	7	6	86%
Managers And Company Officials	7	7	100%	5	5	100%

The quality of the data from the graduates was extremely high. They were very thorough with comments and data, offering examples whenever they could, and were eager to provide data about the success of the program.

At ARP, one manager and two company officials were interviewed. At Boise, one manager and one company official were interviewed. All persons interviewed completed a questionnaire. The managers were generally the superintendants over the area in question and provided general comments about the success of the program. Because of the small numbers of managers and officials involved, separate tables of results for this group are not included. Additionally, various comments and input from officials are included in this section as well.

OBJECTIVES

Before proceeding with the results, it is helpful to review the objectives. The specific objectives, which became the focus of the project, are presented in Table 3-2. This table shows the progress with objectives from the perspective of participants. The participants indicated that the objectives were met with a rating of generally successful or completely successful, with the highest rating for “provide career/job opportunities in the industry.” The input and comments about the objectives from managers and officials were similar. They felt that the objectives have been completely successful.

The lowest rating among the graduates was the ability to attract students to the pulp and paper industry. Although Alabama Southern Community College was generally successful in meeting this objective, there is opportunity to improve. This objective focuses on the recruiting issues in the program. In the early phases of the NSF funded program, it was difficult to attract students to this career because of the perception that the industry has less than desired working conditions and poor safety performance. Company officials have agreed that the perception of the jobs in the industry have been one of the drawbacks, although some efforts are underway to improve this situation.

Table 3-2 Progress with Objectives from Program Graduates

Objective	No Success	Very Little Success	Limited Success	Generally Successful	Completely Successful
(N=14)	1	2	3	4	5
A. Attract students to the pulp and paper industry	0	1 (7%)	2 (14%)	8 (57%)	3 (21%)
B. Provide effective training to meet employer needs	0	0	1 (7%)	6 (43%)	7 (50%)
C. Place students in appropriate jobs in the industry	0	0	1 (7%)	10 (71%)	3 (21%)
D. Provide career/job opportunities in the industry	0	0	0	7 (50%)	7 (50%)

REACTION

The reaction for the program is a very critical issue. Unenthusiastic or adverse reaction always translates into problems for any type of program. This study has revealed high levels of positive reaction. Table 3-3 shows the reaction of the program from participants. The highest levels of ratings for reaction are: the program graduates perceived the program as valuable to their career, relevant to their work, important to their success, and they would recommend it to others.

The interviews and input from the two company's managers mirrored the reaction from participants. Company officials and managers see this program as extremely important and the highest rating is that it is a good use of taxpayers' funds.

“The program is designed to train and give a general idea of the industry as well as jobs in the industry.”

Table 3-3 Reaction from Program Graduates

Reaction	Not At All	Some	Moderate Amount	Significant Amount	Very Significant Amount
(N=14)	1	2	3	4	5
A. Valuable to your career	0	1 (7%)	0	4 (29%)	9 (64%)
B. Important to your success on the job	0	1 (7%)	2 (14%)	3 (21%)	8 (57%)
C. Practical	0	0	3 (21%)	8 (43%)	5 (36%)
D. Challenging	1 (7%)	0	1 (7%)	9 (64%)	3 (21%)
E. Relevant to my work	0	1 (7%)	2 (14%)	3 (21%)	8 (57%)
F. The program is a good use of taxpayer funds	0	0	1 (7%)	6 (43%)	7 (50%)
G. I will recommend this program to others	1 (7%)	0	0	4 (29%)	9 (64%)

On that issue, the participants were asked to indicate if this program was a good investment from the employer's perspective. All but one participant (93%) indicated that it was a good investment and various explanations are provided in the comments. The only participant who didn't recommend the program did qualify his comment:

“The only reason I would not recommend this program is because I don't know how long the pulp & paper industry will be around.”

LEARNING

For the program participant to be successful on the job, he/she must learn information that is job-related and relevant. From all indications, the learning from the program was on target. From the participants' perspective, Table 3-4 shows the amount of learning they acquired to become successful at their job. It is important for participants to have knowledge and skills

required for the job and the confidence to use those knowledge/ skills. As the table reveals, participants agreed they have learned what was required and felt confident and fully qualified. Although the ratings were high, the highest rating from participants is that they learned the skills/knowledge for the job.

“I know you can’t teach everything I need to know in 2-3 years, but I do use everything I learned.”

“I was able to see processes before actually going on the job.”

Table 3-4 Amount of Learning for the Job from Program Graduates

Learning	Not at all	Some	Moderate Amount	Significant Amount	Very Significant Amount
(N=14)	1	2	3	4	5
A. I learned the skills and knowledge required for the job	0	0	3 (21%)	5 (36%)	6 (43%)
B. I was confident to use my knowledge and skills on the job	0	0	4 (29%)	7 (50%)	3 (21%)
C. I was fully qualified to perform my job	0	1 (7%)	4 (29%)	5 (36%)	4 (29%)

School Grades

The grades for the program participants, expressed as a grade point average is 2.973 (out of a 4.0 maximum). For all graduates at Alabama Southern, the grade point average is 2.301. Thus, the program graduate grades were 29% higher, underscoring the fact that this program attracts the best students.

“We were able to come into the workforce and contribute immediately.”

“Mandatory internship helps prepare students for the work environment in the industry.”

The interviews confirmed that graduates felt they were qualified and they had confidence to do the job immediately. Some of the comments in this section reflect their feelings. The managers agreed that graduates were better prepared than any other candidates at the same job level. Additionally, company officials confirmed the graduates’ preparation for the job.

“I came in to the job with a basic understanding of pulp process...The internship helped a great deal by seeing things first-hand.”

Program Changes

In regards to what should be added to the program, a few offered suggestions and they are included in Table 3-5. No two individuals mentioned the same recommendation.

“Every class, from speech to calculus to blueprinting, was needed. Don’t drop anything!”

Regarding what should be deleted from the program, the responses were very rare, with only a couple of references to specific classes. It appears that the content of the program is on target as

“I had an understanding of the whole mill, not just one certain department.”

Table 3-5 Suggestions for Additions to Program

Suggested Additions to the Program

- More Industrial Equipment in the Classroom
 - Team Leadership Training
 - Digital Controllers
 - Better Understanding of Entry Level Jobs
 - Mandatory Internship
 - Basic Troubleshooting Class
 - More Mechanical Training
 - More Staff and Equipment
-
-

APPLICATION

A key metric at this level of evaluation involves determining how much participants are able to use what they have learned. These data not only ensure there is a match in terms of the skills needed and the skills acquired, but also that the environment in the workplace is supportive of the transfer of these skills to the job.

“I felt ready to take on many challenges from day one. Each day of each week, I rely on skills that I learned in your program.”

Participant Perspective

From the participants’ perspective, the skills learned in the program are being used in the workplace. Table 3-6 shows how participants have applied their skills. Most said they use their acquired skills frequently and most of all, effectively. The interviews with participants confirmed this perception as the participants often reported that they were able to use the skills immediately.

Other Perspectives

The managers and company officials also felt that the graduates were prepared and able to use what they learned quickly. In some situations, the use of a particular skill depended on the job they were in at the time; however, job rotations and new assignments allowed the graduates to use much of their skills

“All graduates working in the field keep our mill running efficiently.”

Table 3-6 Successful Application of Skills from Program Graduates

Application	Not at all	Some	Moderate Amount	Significant Amount	Very Significant Amount
(N=14)	1	2	3	4	5
A. To what extent did you apply the skills/ knowledge learned from the program?	0	3 (21%)	1 (7%)	5 (36%)	5 (36%)
B. How frequently did you apply the skills/ knowledge learned from the program?	0	2 (14%)	1 (17%)	6 (43%)	5 (36%)
C. What is your level of effectiveness with the use of skills/knowledge learned from the program?	0	1 (7%)	2 (14%)	3 (21%)	8 (57%)

Use of Skills/Knowledge

To ensure that what was taught in the program was used by graduates at the workplace, participants were asked to indicate the percent of total work time spent on tasks that required the skills and knowledge they learned in the program. For a good match, students should be using the skills they learned from the program more than 50 percent of the time on the job. Participants were provided an opportunity to check percentages in ten percent increments. The percentages are averaged using the mid-point of each block checked. The results showed that the students used their skills 52 percent of the time at work, exceeding the best practice match.

“Students are well-prepared to take on responsibilities of the job.”--Manager

“Applying good time management practices on the job has been routine.”

Criticality of Skills

Another way to determine how much the knowledge/skills obtained from the program helped the graduates at the workplace was by asking them the following question:

“We are quality mechanics as a result of training.”

“How critical is the content of the program to job success?” Participants were allowed to check a box in ten percent increments in answering this question. When the mid-point was averaged for all

participants, the results showed a 74 percent rating, indicating that skills and knowledge are critical to a graduate’s job success.

Barriers and Enablers

When the transfer of skills to the job is explored, it is important to understand the barriers and enablers to success. Barriers are those impediments that often inhibit or diminish the use of the skills, while the enablers are those factors which actually help or assist the individual in using the skills. The responses from the graduates indicated that there were almost no barriers and many enablers to their success in the workplace. Ten of the fourteen graduates (representing 71 percent of respondents) said that there were no barriers in the transfer of skills to the job. The

remaining four listed the following barriers: lack of opportunity, lack of support from coworkers, and lack of confidence in skills. Considering the nature of the program, scope, duration and adjustment to the demands of the job, the low rate of barriers is impressive.

Regarding the enablers, several were listed and shown in Table 3-7. The number one enabler was manager support, which is often the case when a program is successful. The second most often mentioned enabler was the confidence to apply skills and the third was the knowledge and opportunity to use the skills. It appears that there was a tremendous amount of support to make this program work as described by participants, managers and company officials during the interview process. This is a well-respected program that is supported by both ARP and Boise.

Table 3-7 Enablers to Program Success

<i>Enablers That Helped You Apply Skills Learned in the Program to the Workplace</i>	
Enabler	Percent identifying the Enabler
Management support	71%
Confidence to apply skills/knowledge	64%
Opportunity to use the skills	59%
Support from coworkers	50%
Sufficient knowledge and understanding	43%
Systems and processes within the company that support the use of skills/knowledge	35%

IMPACT

Among the levels of evaluation, impact data may be the most important for this type of program. Since the evaluation of this study is from the perspective of the employer, the actual consequences of the graduates applying what they learned (i.e., business impact) at their company becomes extremely important.

The impact data came from two major sources: the graduates and company officials/managers. The graduates from the program indicated the impact they saw with their employers when they used their skills and knowledge. At the same time, they indicated the extent to which the program influenced certain measures in the company. The other input, which came from the company officials and the managers, is the basis of the ROI calculation.

Impact from Graduates' Perspective

To encourage participants to reflect on the consequences of the use of their new skills, we asked them what specific improvements at their company were linked directly to the program. This was difficult for some, but we thought that a few of them would venture into analysis that could be converted to money. Unfortunately, that was a stretch. The good news is that almost everyone provided data identifying a measure or measures that were influenced by this program. To link the measures(s) directly to the program, a follow-up question asked for the percent of improvement influenced by the application of knowledge and skills in the program. Table 3-8 lists the measures improved and the estimated contribution of the program to each measure. This list is impressive as these individuals thought clearly of their accomplishments and the impact they had on their employer.

Table 3-8 Key Impact Items from Program Graduate

Impact	Contribution Factor
Reduced Downtime	80%
Troubleshooting	90%
Efficiency	60%
Use of Resources	70%
Productivity	60%
Better Trained Employees	50%
Faster Learning	95%
Job Retention	90%
Time Management	25%
Reduced Time from Coworkers	99%
Time Savings	60%
Improved Productivity	100%
Decreased Costs	80%

Impact Measures Influenced by the Program

To gain further insight into how the program is connected to the business, participants were asked to indicate how much the program influenced a certain set of measures. These measures and their results are listed in Table 3-9. The list includes both hard and soft data, all critical measures for the employer. These measures are the improvements that should be influenced by the program, if it is working the way it is designed. This list was developed by a combination of input from the employer representatives and college officials.

“Without this program I would not have been able to successfully take care of my family with pride.”

As Table 3-9 shows, the connection of this program to these measures was impressive.

The measures are broadly classified into two categories: tangible (easily converted to money) and intangible (not converted to money).

The number one tangible measure influenced by the program is the time to proficiency. In interviews,

this measure was echoed again and again by participants and company officials. Essentially, the results showed that upon entering the job, program graduates were as capable if not more so than those who had been on the job for a longer period of time.

The second tangible measure is efficiency, which appears in many forms with many examples. Essentially, the organization is much more efficient by employing a fast learner who can do more work. This measure helps companies avoid hiring extra people to do work or to train others. Not surprisingly, the third tangible benefit was safety. The program focuses significantly on safety; graduates from the program operate in an extremely safe manner. This was echoed in interviews from graduates as well as company officials and the managers.

“I have a position here that I thoroughly enjoy. It contributes to my desire to be a factor in the company’s overall prosperity.”

The fourth tangible measure is employee retention. The decision to stay with the employer is strongly connected to this program. Along with these four measures, Table 3-9

“I am proud to tell people I am an electrical and instrumentation maintenance person. Thanks for the opportunity.”

shows that participants perceive that all of the measures are to some extent connected to this program. The intangibles, discussed later, are also strongly influenced by this program

Table 3-9 Impact Measures Influenced by the Program

Business Measure	No Influence	Some Influence	Moderate Influence	Significant Influence	Very Significant Influence
(N=14)	1	2	3	4	5
<u>Tangibles</u>					
A. Work output /productivity	0	1(7%)	0	9(84%)	4(29%)
B. Quality	0	1(7%)	1(7%)	8(57%)	4(29%)
C. Cost control	1(7%)	0	2(14%)	6(43%)	5(36%)
D. Efficiency	0	0	1(7%)	7(50%)	6(43%)
E. Time to proficiency	0	0	1(7%)	5(36%)	8(57%)
F. Safety	1(7%)	1(7%)	1(7%)	4(29%)	7(50%)
G. Your promotions	4(29%)	0	2(14%)	3(21%)	5(36%)
H. Your decision to stay with your employer	2(14%)	0	1(7%)	4(29%)	7(50%)
I. Your absenteeism performance	2(14%)	1(7%)	0	4(29%)	7(50%)
<u>Intangibles</u>					
J. Your job satisfaction	0	1(7%)	0	7(50%)	6(43%)
K. Teamwork	0	1(7%)	0	5(36%)	8(57%)
L. Communications	0	1(7%)	1(7%)	5(36%)	7(50%)
M. Other (please specify)	0	0	0	0	0

Major Impacts from Managers' Perspective

Although the managers and company officials concurred with the program graduates that all of the measures listed in Table 3-9 are connected to the program, some of them were difficult to isolate to this particular program. Table 3-10 shows the measures improved as a result of the program as identified by managers. These are covered in more detail later in this section as the ROI is developed. Compared to the list in Table 3-9, three measures were excluded by managers: work group productivity, quality, and cost control. While the managers and graduates clearly indicated that there was a connection to these three measures along as the others, attempting to isolate improvements in these areas directly connecting to the program would be difficult. Consequently, management input identified a smaller set of measures that represents the impact that they see directly connected to the program. This set of measures has potential of being isolated to the program and converted to a monetary value which is necessary for calculating ROI.

Table 3-10 Key Impact Measures from Managers and Company Officers

Key Impact Measures	
• Time to Proficiency	• Absenteeism
• Employee Turnover	• Time for Qualification
• Safety Performance	• Time Savings of Others
• Employer Training Costs	• Promotions
• Efficiency	

RETURN ON INVESTMENT

For some, the ultimate accountability of any program is the monetary benefits compared to the cost of the program. This financial ROI is critical for decision-making from the employer perspective. Funding for all types of projects and programs in a company is often made on a feasible and credible return on investment. To move to this level of analysis requires that the impact measures be isolated to the program and then converted to monetary values. Next, the costs of the program are compared to yield a financial ROI calculation.

Method of Isolation

Although the methodology section describes several possible ways to isolate the effects of the program, we used three methods for this study. First, when possible, an experimental versus control group was applied. This is the best method to use if the groups are similar. In limited cases, there was an opportunity to compare the performance of graduates of the program to other employees who were hired for the same jobs through different channels. For the most part, the other employees in that category (the control group) either came through the organization with long service records with averages over 10 years. Some came with previous industry experience or from contractors employed by the various mills. In some cases, graduates from other programs were in this control group. The small size of this study diminishes the quality of this comparison; nevertheless, it does show the difference in the two groups.

The second method involved the company officials and managers isolating the effect of the graduates' performance directly at work. Finally, the third method included participants isolating program effects by indicating how much the program influenced particular measures. Although not as credible as desired, this approach does show the connection between the program in the measures.

Converting Data to Money

Some of the impact measures represent excellent opportunities to convert the data to monetary value, which translates into ROI. Others are more difficult to convert the money and are intangible. For others, the fact that detailed records were not available from the employer prohibited a more credible, complete analysis.

Three methods were used to convert data to money. First, there were standard values for certain data items that represented the unit of measure directly connected to the program. Next, in some cases, the actual value was calculated from the records in the organization. Finally,

experts provided some input in terms of the cost or value of a particular measure as it improved. In the remainder part of this section the individual measures are tackled and the monetary values are calculated. Although 20 graduates were being studied, all calculations are based on 14 graduates, the number who responded to the questionnaire (this reflects the use of Guiding Principle 6: no data, no improvement). Seven graduates responded for each company.

Time for Job Qualification

In many situations, the graduates from this program were able to perform specific jobs much faster than the norm. In the mill system, when a person can perform a job, he or she is basically certified to do that job. Until they are certified, there must be another person present to observe and/or help them perform the job. Because the program graduates can perform the job faster than most, the need for having another person present with them is eliminated for most of the time. Given this situation, it was estimated at Boise that the amount of time required for an extra employee is reduced by 30 percent. When the total number of days is considered each year, the result is the equivalent of 25 days per year. Assuming that any extra employees are performing other work when they are not shadowing or accompanying the graduates, companies can reap a cost saving of $25 \times \$200 = \$5,000$ per graduate. Assuming only two years of impact (instead of four) yields \$10,000 per graduate. For seven graduates, the cost savings due to reduced time to qualification is \$70,000 for each company.

Time Savings of Others

One of the more important aspects of the program is teaching students how to troubleshoot. This is a skill that is not easily developed on-the-job without some formal training. The Alabama Southern graduates' troubleshooting skills are far better than other employees in similar jobs. Boise indicated that for every hour of trouble shooting performed by an employee, the company can save a \$30 per hour direct charge for using an actual mechanic. As a result, management has estimated that the program graduates can provide 30% more troubleshooting, thus saving about five hours or \$150 per week, or \$7,500 per year per graduate. Assuming two years of value (instead of four) yields \$15,000 per graduate. For seven graduates, the amount is $\$15,000 \times 7 = \$105,000$.

Time to Proficiency

An important assumption in this program is that the two years of training provides a head start for the employee. Essentially, these graduates are able walk into the job with skills that can take years for others to develop. When asked about the number of years of work experience that can be reduced by graduating from the program, the number ranged from one year to ten years, with an average value of 4.5. One company, ARP, required a two-year graduate program from Alabama Southern Community College or equivalent or five years of experience for the job.

“Employees come in with a good general understanding of how a pulp mill operates and what is expected of them.” --Manager

Through this requirement, ARP recognizes that graduates have a five-year head start with this particular program. For the employer, this measure is important because the employee is fully competent early in the process, improving productivity and quality of work. Unfortunately, placing a monetary value on this measure is difficult. The question becomes this: What is the monetary value for reducing the time to become fully competent for each year? Utility analysis may be a possible approach to answering this question,

given certain assumptions. Estimates may be just as accurate. When pressed for a monetary value, managers offered numbers ranging from \$10,000 to \$40,000 for the 4.5 years. The lowest value is used in the analysis. The value for each graduate is \$10,000. Given that seven graduates responded in each company, each company saved $\$10,000 \times 7 = \$70,000$.

Turnover

Another likely area to examine is the retention of the graduates of this program. Essentially, the graduate understands the industry and the mill operation and appreciates the aspects of the different jobs. They also have the capability of moving around in the organization laterally as well as upwardly. Graduates of the program can visualize a career at the mill because they have an overall picture of the industry. With this in mind, we should expect a long tenure with the employee. The top two employers in this industry are experiencing a low turnover rate for a variety of reasons. The program graduate data show that there is almost no turnover among the graduates; one in 20 over a four-year period, which represents a value of 1.3 percent for the four years. Company officials stated that the turnover of others was in the 4 - 5 percent range for the same period. Although a differential with a comparison group is difficult to develop because of the relatively low turnover for the both groups, there is a difference of 2.7 – 3.7 percent. The 2.7 – 3.7 percent differential represents approximately 2-3 employees over the four-year period. To be conservative, only two turnover preventions are attributed to this program. The cost of a turnover, taken from a research data base (ERIC), suggests a cost of 75-100 percent of annual pay for highly skilled employees.³ The annual salary is \$50,000. The value is $\$50,000 \times 75\%$ (the most conservative value) $\times 2 = \$75,000$ or \$5,357 per graduate, based on 14 graduates. Seven graduates per company yields \$37,499.

Safety Performance

The participants in the Alabama Southern program have tremendous exposure to safety in their studies. Graduates understand how to operate equipment safely and can serve as a role model for others. As expected, the graduates in the top two employers had an excellent safety record. When compared to the comparison group of those individuals who were in similar jobs, the safety records of the graduates was much better. According to ARP, program graduates had 12 first aid treatments for injuries when compared to 18 in a similar group, for a difference of six (.5 per graduate). Assuming a cost of a first aid treatment accident of \$2,200 (fully loaded), taken from a safety manager yields \$2,200 or \$1,100 per graduate. For seven graduates, the total savings is $\$1,100 \times 7 = \$7,700$.

“New employees have a good understanding of safety and how pulp mills operate.” --Manager

³ Phillips, Jack J. and Connell, Adele O. (2003) Managing Employee Retention. Boston, MA: Elsevier

Absenteeism

The Alabama Southern graduates are taught to have excellent work habits as inappropriate work habits can translate into dysfunctional behaviors, such as unplanned absenteeism. Unfortunately, the absenteeism records of the graduates at the top two employers were not available to compare with a similar group. No monetary value was recorded.

Promotions

Without exception, managers and officials underscored that the graduates from this program have a good perception of “the big picture” of each organization. The graduates understand the different components and the complexities of the mill and how their particular function interacts with others in the company. Also, because of certain types of training, the graduates are much better communicators and team members. Consequently, they make the best candidates for promotion. As one official stated, “These graduates are in the pool for promotion to supervisor and assistant managers in the future.” In essence, this helps the company by having a capable, stable resource for this important job. It also prevents them from going outside to select a supervisor from another location. Although this outcome has value, it was not converted to money.

“New employees know what is expected of them. They are not surprised by the type of work they will be doing.” --Manager

Employer Training Costs

The reality is that if the employers did not have graduates from Alabama Southern, they would have to provide the training themselves. Most of them do provide training now because the need exceeds the supply from Alabama Southern. The Alabama Southern program helps employers avoid training investment to bring their employees to this level of skill. Avoidance of training costs is an alternative way to calculate ROI. Avoidance of training costs is clearly observed at Boise. The organization development and training manager boldly provided statistics to show what they saved in training costs, shown as

Figure 3-11. To prepare an individual to the skill level of an Alabama Southern graduate will take two years of training off-the-job. When based on wages alone, this amounts to \$74,380 to train one person. A scholarship for the same amount

“Good introduction to the pulp and paper industry. The class work plus the internship helped me to be prepared to handle the type of work in the industry.”

to produce the same level of training at Alabama Southern is roughly \$12,000. This is a tremendous of ROI from this measure alone. When additional costs of training are included, including the prorated development cost, the facilitator, classrooms, and other expenses, this training would easily cost \$150,000 per person. When the fully-loaded compensation costs,

“I feel the cooperation between my company and the school has provided me with a very satisfying career. I am proud.”

including benefits for the trainee are added, the number easily pushes \$200,000. From the employer’s perspective, this alone makes the positive ROI for utilizing the Alabama Southern program. From the view point of tax-payers in he community, this is helpful for a community college to provide training that employers may not be able to afford. Also, the company can invest that amount of money in other process and thus

continue to be profitable helping them to stay in the community. The training cost avoidance amount is not included in the total monetary benefits of the Alabama Southern program, described in the next section. These costs represent program costs reflected in the denominator of the equation. This alternative ROI, due to reduction in training investment, is an important outcome of the Alabama Southern program.

Table 3-11 (NPT)² Program Return on Investment, Boise, Inc.-Jackson, AL

	Units	Cost Per Unit	Total
<u>Cost per Employee for Scholarship Option</u>			
Staff Involvement in program, alliance meetings and recruiting	100 hours	\$50 per hour	\$5,000.00
Scholarships	8	\$12,000	\$96,000.00
Total Cost			\$101,000.00
Cost Per Employee			\$12,625.00
<u>Savings per Employee (Avoiding Internal Training Costs)</u>			
Cost of 2 years training per employee without (NPT) ² Program	4,160 hours	\$17.88 per week	\$74,380.80
<u>ROI Calculation</u>			
ROI = $\frac{\$74,380.80 - \$12,625}{\$12,625} = 489\%$			
Return on Investment in Program Per Employee			489%

Wage Differentials

One of the most impressive data in the study is the wage differentials between the program graduates versus those who did not participate in the program prior to joining a company. On average, a person without the training would make about \$17 per hour. With the two-year degree, the average wage is \$25 per hour. This differential of about 50 percent is significant, much more than most if not all of the other graduates in other fields. This reflects the demand for the graduates and the limited supply that is available now. Also, while this doesn't necessarily have an impact directly on the company, because they are actually paying more wages, the wage differential does add value to the community through additional taxes paid by the higher wage employees.

Summary of Monetary Benefits

When the majority of the business impact measures, discussed above, are converted to money and prorated to the two employers, the total monetary value of the program is developed. The summary is presented as Table 3-12. With the assumptions outlined earlier, the cost savings are developed to show the monetary benefits of this program from the employer's perspective. Although 20 graduates were involved in the program, only 14 provided data (seven from each

company). Consequently, the monetary impact of the program is based on the seven per company not the entire 20. Although there is some room for error, the monetary benefits reported are based on conservative analysis. Also, considering that there are other measures that could not be converted to money at the present time given the timing of this study, the monetary benefits are impressive.

Table 3-12 Monetary Summary Based on Seven Graduates Responding

Monetary Values	ARP	BOISE
Time for Job Qualification (Efficiency)	\$70,000	\$70,000
Time Savings of Others (Efficiency)	\$105,000	\$105,000
Time to Proficiency (Efficiency)	\$70,000	\$70,000
Turnover	\$37,499	\$37,499
Safety Performance	\$7,700	\$7,700
Absenteeism	N/A	N/A
Promotions	N/A	N/A
Total Monetary Benefits	\$290,199	\$290,199

Program Costs

The cost of the program from the employer's perspective is detailed in Table 3-13. These costs are supplied by company officials. Although ARP has more graduates placed, they have offered fewer scholarships than Boise and thus, had lower costs. These individual costs are needed to calculate the ROI from the perspective of both companies.

The program costs are straight-forward with the costs of scholarships coming directly from the records and the time involved at a fully-loaded cost estimate of 50 dollars per hour for all of the time involved. This approach is conservative and probably overestimates the actual value. Travel costs were low as the employer representatives rarely have to travel to discuss this program.

Table 3-13 Program Costs for 20 Participants

Program Costs (20 Participants)	
Alabama River Pulp	
Scholarships	\$40,467
Time-Program Involvement	\$2,900
Alliance Meetings, Recruiting	
58 hours x \$50/hour	
Travel	\$300
Total	\$43,667
Boise	
Scholarships	\$96,000
Time-Program Involvement	\$5,000
Alliance Meetings, Recruiting	
100 hours x \$50/hour	
Travel	\$400
Total	\$101,400

ROI Calculation

Given the above monetary values per candidate basis and the cost from the companies on a per candidate basis, the ROI calculations can be developed. First the benefit cost-ratio is developed which is the monetary benefits divided by costs.

For ARP the calculation is:

$$\text{BCR} = \frac{\text{Benefits}}{\text{Costs}} = \frac{\$290,199}{\$43,667} = 6.65$$

For every one dollar invested, there are \$6.65 in benefits. ROI is net benefits divided by cost and in formula form equals:

$$\text{ROI} = \frac{\text{Benefit-costs}}{\text{Costs}} = \frac{\$290,119-43,667}{\$43,667} \times 100 = 565\%$$

For every one dollar invested, \$5.65 is returned after the costs are recovered.

For Boise the calculation is:

$$\text{BCR} = \frac{\text{Benefits}}{\text{Costs}} = \frac{\$290,199}{\$101,400} = 2.86$$

$$\text{ROI} = \frac{\text{Benefit-costs}}{\text{Costs}} = \frac{\$290,199 - 101,400}{\$101,400} \times 100 = 186\%$$

These numbers are impressive and represent a significant payoff for the employers involved in this program. Because of the conservative approach taken in the analysis, the ROI, from the perspective of the employer, is probably much higher.

INTANGIBLE BENEFITS

Perhaps the most important set of measure are the intangible benefits, connected directly to this program. The intangibles benefits were derived directly from the participants in two parts. First, Table 3-9 shows the impact measures influenced by the program from the graduate perspective. Some of these are intangible. By definition, any measure not converted to monetary value is listed as an intangible. Consequently, several of these are in that category. Also, on the questionnaire, participants provided other benefits derived directly from this program. These are listed as Table 3-14. When this list is reconciled with Table 3-9, a composite list of intangibles are presented as Table 3-15. These intangibles are impressive, they are only listed if one or more individuals have indicated that the measure is there. For the most part, several individuals listed intangibles as shown in Table 3-9.

“Good introduction into the pulp and paper industry. The class work plus internship helped me to prepare to handle that type of work in the industry.”

“Additional benefits from this program include...training for local people who want to remain in the community for their work careers.”--Manager

Table 3-14 Additional Benefits from Participants

Additional Benefits to the Program
<ul style="list-style-type: none">• “Teamwork. The program taught me that everyone must work together to get the best outcome.”• “Improved People Skills. I have to deal with numerous people on a regular basis.”• “I got my feet in the door earlier than others who have not been through the program,”• “Saved the company money on spending time training.”• “Safety, proficiency and Teamwork were valuable skills learned.”• “The feeling of having a college degree is pretty nice.”• “Troubleshooting skills means that we don’t have to depend on contract services.”• “Being able to be trained faster.”

Table 3-15 Intangible Benefits

Intangible Benefits	
<ul style="list-style-type: none">• Improved Productivity• Improved Quality• Reduced Absenteeism• Improved Promotions• Increased Job Satisfaction	<ul style="list-style-type: none">• Enhanced Teamwork• Improved Communications• Reduced Contract Services• Increased Pride• Increased Taxes Paid

WHAT MAKES THESE RESULTS CREDIBLE

With the results detailed in this section, it is helpful to reflect on what makes this study credible. Here are some major points affecting the credibility:

1. Data are collected at five different levels, plus intangibles, to provide six types of data. This provides a balanced-profile of success, including qualitative, quantitative, financial and non-financial data.
2. The sources are credible coming directly from the people involved in the program. Participants provided the most credible input for Levels 1–3, and the managers and executives were credible for the data they provided for Level 4 and 5.
3. The most conservative options are used when there are alternatives in the calculations.
4. The effect of the program is isolated from other variables when data are used in the analysis of impact or ROI.
5. When there is no data from particular population or source, it is assumed that no improvement has occurred. Consequently, there was no data available from six of the individuals and it is assumed that they had no business value in the calculations.
6. The cost for the programs from the employer perspective were fully-loaded

Although the sample sizes are small, this analysis did represent the success in the two largest employers of graduates.

Section 4

CONCLUSIONS AND RECOMMENDATIONS

With the results detailed, the next logical step is to examine a summary of the conclusions and the specific recommendations based on the study. From those recommendations comes the opportunity for process improvement — always the most important reason for evaluating a program.

CONCLUSIONS

The data from this study lead to several conclusions. Here is a brief summary:

1. There is a very positive reaction to the Pulp and Paper Technology Training from all stakeholder perspectives. The program is needed. It is timely, effective, and valuable to the graduates and their employers. It represents a good investment for both taxpayers and employers.
2. The program's content is on track to develop qualified individuals to work in the pulp and paper industry. The content is focused on critical job requirements, and the confidence of the graduates is very high as they come to work ready to apply what they learned.
3. Graduates are routinely and quickly applying much of what they learn in this program. They appear to be using the knowledge extensively, frequently, and with much success.
4. The impediments to success are minimal, while the enablers to success are plentiful. Managers and coworkers are showing great support for the program.
5. The program's impact on employers is significant because the new graduates are far ahead of their counterparts who come from other sources. They learn quickly; they are more efficient; they are prepared to advance more rapidly; they are more productive; they are less likely to leave the company; and they operate more safely. Generally, they excel beyond other employees in the same job categories.
6. The program develops a very impressive ROI for employers. This can vary significantly given different assumptions, but even in the most conservative approach, the ROI is very positive. The ROI can be attributed partly to the low cost of investment for employees and partly to the significant impact the graduates are having on the job. Combined, these factors provide an excellent return on investment.
7. The program produces many intangible benefits; including increased capability for the future in a more competitive industry (perhaps it helps the industry continue to operate in the U.S.). The image of the program and the partners has improved. Graduates feel deeper job satisfaction and enhanced pride in their work. They are better team players and communicators. The graduates have become ambassadors for the program.
8. The number of graduates is low compared to the program's capacity during the four-year period. Part of the reason is the difficulty in persuading high school graduates to enter this particular field.
9. Employers see the program as vital to the future, as their needs are mushrooming, partly due to the retirement of Baby Boomers and also due to growth and expansion.

10. Although the results of this study are impressive, the sample size is quite small — both by design and by necessity. However, there is no apparent difference between the graduates with these two employers and other employees. The top two employers did not necessarily have first choice of graduates, so there is no reason to believe that these results are skewed. At the same time, there is always concern over small sample sizes, and it is difficult to extrapolate that every employer will have the same results as reported in this study.
11. The small sample size and the timing of the data collection make it difficult to track as much absolute hard data as would be desired to show the business impact. Several assumptions were made based on input from management and limited access to company data. Nevertheless, these assumptions could be adjusted downward and still result in a positive ROI.

RECOMMENDATIONS

With these conclusions, the following recommendations are made.

1. From a technical and standards perspective, the program is excellent and little or no adjustment should be made. One possible exception would be to examine these items suggested for additions to the program and continue to work on the enablers to success.
2. The recently improved student recruiting process should be continued and perhaps enhanced. This excellent program reaps valuable benefits from the student perspective. Encouraging successful female graduates to assist in high school recruiting efforts is an example of a creative solution.
3. Scholarship programs should be expanded and made consistent and standardized as much as possible. The amounts awarded might be enhanced as a result of the tremendous payoff of the program. Scholarships should cover tuition and provide additional money for the school to organize and manage the process. Consequences should be attached to the scholarships, wherein the student repays the amount if he or she does not accept employment in the industry.
4. As the program grows, employers' needs are outpacing the supply of graduates. An evening program should be considered in order to meet demand, particularly in the electronics and instrumentation areas.
5. Employers should be made aware of results so they take a stronger interest in the program. Although employer support is high compared to other types of programs, employer involvement, participation, and interest is absolutely essential to success. A complete understanding of the study could help enhance support in the future.
6. There should be improved data tracking of participants as they graduate and are placed with a company. Specific, defined data sets should be captured from the employer as part of the agreement. The data involve application and impact during the first year of employment. Data collection should be routine and timely and not time-consuming. Additionally, employers should be encouraged to compare the performance of their program graduates with others in similar jobs, using data on safety, employee turnover, productivity, and other relevant measures.
7. The ROI from other perspectives should be considered in the future — at a minimum from the perspective of Alabama Southern Community College and the NSF.

8. Study results should be communicated to the (NPT)² partners in the other three nodes to consider similar adjustments and changes and to stimulate additional studies for those areas as well.
9. The results of this project need to be communicated to others within the National Science Foundation and even to the larger public community.

The study is an excellent example of the use of ROI in the public sector, as funds are invested for a specific cause and the results are clearly articulated. This study should be published in a future casebook.

Appendices

Appendix 1- Electrical Technology and Industrial Maintenance Track: Industrial Engineering Technology, Associate Degree

Appendix 2-Instrumentation & Electronics Track: Industrial Engineering Technology, Associate Degree

Appendix 2-Paper and Chemical Technology, Associate Degree

Appendix 3-Alabama River Pulp

Appendix 4-Boise

Appendix 5-Program Graduate Questionnaire

Appendix 6-Manager Questionnaire