# **Workplace Research Model**



A model for guided research to improve education for engineering and industrial technicians.

South Carolina Advanced Technological Education (SC ATE) Center of Excellence

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### SC ATE Center of Excellence Workplace Research Model

### RATIONALE

Faculty, teachers and administrators can continue to improve the learning environment by better aligning it with workplace needs. The SC ATE Workplace Research Model provides a guide for interdisciplinary faculty, teacher and student teams to conduct workplace research and gain a better understanding of the technician's role in the workplace through Industry Site Visits. Using the Model, teams verify the workplace skills of the technician and document a comprehensive view of the technician in industry. The Model includes

- guidelines for faculty and industry
- directions for conducting the research, and
- forms for collecting and reporting data.

### BENEFITS

By conducting workplace research, faculty members, teachers and students become more enthused and motivated about designing and implementing integrated curricula and are better equipped to make learning relevant to the learner. They learn how problem-based instruction better meets the needs of students entering the technologydriven, constantly changing, workplace of today. The workplace research experience helps faculty, teachers and students become aware of the complexity of the work environment and the need to structure classroom activities that teach students how to accept change.

#### **KEEP IN MIND**

Industry Site Visits should be conducted in interdisciplinary teams of two or more faculty, teachers or students for the experience to be most meaningful, for reporting to be less burdensome, and for the information to be of greatest value.

Industry Site Visits should be done in blocks of time at one site, or at a few locations, to allow an in-depth analysis of a single technician's tasks and skill requirements.

Work with supervisors, principals and industry advisors to determine (a) procedures for approaching industry with your request; and (b) people with whom this research should be coordinated to reduce duplication of activities. For example, Tech Prep and School-to-Work coordinators should be consulted to ensure that the technical college is not overburdening certain industries already participating in other school-to-work initiatives.

Develop a list of possible industries to visit (first choices may not be available).

Prior to visiting an industry, share information about your institution and the purpose of the workplace research activity with your host.

### RESOURCES

Possible sources of help in identifying industries who employ engineering technicians include:

- (a) Engineering Technology faculty,
- (b) Engineering Technology advisory board members,
- (c) Continuing education, career center, or job placement personnel, and
- (d) Family members of students, teachers and colleagues

### **INDUSTRY SITE VISIT**

Go into the industry looking for information that will be helpful to educators who want to learn more about producing engineering technicians to meet the needs of the workforce.

Help industry contacts understand how necessary they are to the process.

Meet with company personnel such as supervisors, trainers, and human resource personnel to review the role of the engineering technician in the company.

Tour the plant to observe how the role of the engineering technician helps to fulfill the mission of the company.

Meet with engineering technicians to research information about the tasks they perform and the skills in the areas of mathematics, science, engineering technology, and communications/ professionalism necessary to enable them to successfully perform their jobs.

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### AFTER THE VISIT

- Use the Team/Individual Reaction Sheet to record your overall reactions and observations of the role of the technician in the company. Complete this sheet as soon as possible after the visit.
- Send a "Thank You" note to those who provided assistance for your visit

# Workplace Research Report



Date

Company Profile Sheet									
Company:									
Address:									
Type of company: (i.e. manufacturing,	steel fabrication, et	tc.)							
Employee Total:									
Described any Products Produced:									
What types of engineering technicians	does your compan	y use?							
1.									
2.									
3.									
4.									
5.									
How many engineering technicians do	es your company e	mploy?							
Company personnel involved with the	visit:								
Name		Position							
1.									
2.									
3.									
4.									
5.									
Please state a recommended compan	y contact person fo	r future communications.							
Name	Position	Phone							
		•							

May we contact you or your technicians in the future to assist us with curriculum development? (i.e. validating curriculum competencies, designing work-based problems, etc.)

Please attach any information on the company that might be helpful for future networking opportunities.

### **Technician Profile Sheet**

Technician Name:

Job Title/Position:

Years with Company

## **Background Information**

Education:

Previous Training: (i.e. on-the-job, courses, continuing ed.)

What plans do you have for additional training, including college?

What courses and/or training do you wish you'd had before this job?

### Job Responsibilities

Technical:

Communication:

Equipment/Laboratory:

Problem Solving / Trouble Shooting:

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Technician Profile Sheet								
Interview Questions								
1.) Has this been a good career choice for you?								
Why, or why not?								
2.) What changes have taken place in the last five years which have								
changed your job? (Please comment specifically on the areas listed								
below as well as any other areas.)								
Computer/Equipment:								
Professionalism/Communications (oral, reports, etc.):								
Teams:								
Other:								
3.) What suggestions do you have that might help instructors to motivate								
students, to improve retention in this field, or overall to help students								
prepare for the 21st century workplace?								
General Discussion Notes: (Please use back of sheet if needed.)								

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### Skills Checklist\* Competency Level Required 0 = Never do / use 1 = Basic 2 = Intermediate 3 = Expert

#### **Mathematics**

Skill	0	1	2	3	Skill	0	1	2	3
Whole number & integer					Organize data into tables, charts, or				
operations					group				
Decimal number operations									
Percentages					Mathematical trouble shooting /				
Estimates					problem shooting				
Fraction operations					Probability				
Scientific notation					Exponents				
Engineering notation					Logarithms				
Ratio & proportions					Formulas				
Metrics (SI)					Geometry				
English measurement					Right angle trigonometry				
Square roots					Systems of Equations				
Statistics (mean, median, mode,					Linear Equations				
etc.)									
Data gathering					Quadratic Equations				
Data analysis					Calculus				
					Vectors				

Science									
Skill	0	1	2	3	Skill	0	1	2	3
Use appropriate physical units & unit					Identify & apply oscillations & conversion wave motions				
Identify & apply properties of fluids					Identify & apply optical instruments & properties				
Apply fiber optics									
Express quantities with correct precision					Draw graphs & calculate slope				
Identify & apply mechanical forces					Write procedural steps				
motion					Diagram & label equipment				
Identify & apply uses of energy					Perform simple measurements				
concepts (& momentum)					Identify experimental errors				
Identify & apply temperature & thermal properties					Keep records of work in notebook				
Identify & apply electrical					Apply scientific method				
magnetic properties									
Identify & apply simple circuits AC & DC									

\*Additional skills may be added in blank spaces.

Skills Checklist*										
Engineering Technology										
Skill	0	1	2	3	Skill	0	1	2	3	
Calculations					Linear measuring devices					
Use of codes (STD)					Electrical measuring devices					
Decision making					Thermal measuring devices					
Statistical tools/Statistical Process					Pressure measuring devices					
Control (SPC)					Optical measuring devices					
Adaptability					Sensor to make measurements					
Communications					Understand pneumatic/hydraulic					
Task behavior					equipment					
System / equipment utilization					PLC's					
Safety										
Problem solving										

Computer, Software, Equipment, and Other Technology*										
Skill	0	1	2	3	Program used					
Word Processing Programs										
E-mail										
Internet										
Programming										
Modems										
MathCad										
Equipment Control										
Excel										

\*Additional skills may be added in blank spaces

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Skills Checklist* Competency Level Required 0 = Never 1 = Basic 2 = Intermediate 3 = Expert									
Communications				Drofoosionalian					
Communications			2					2	
Write business letters	U	•	2	3	Come to work on time & regularly	U		2	3
Write memos					Follow assigned procedures &				
Write directions & procedures					meet				
while directions & procedures					deadlines				
Plan & prepare short reports					Interact with others displaying trust				
Plan & prepare long reports					cooperation & respect				
Create forms					Positively respond to diversity				
Plan & run meetings					Work on a team				
Give oral presentations					Practice active listening skills				
Give oral directions on procedures					Approach problems as learning				
					opportunities & challenges				
Read technical manuals									
Correctly interpret written materials					Understand & use chain of				
					command				
Use effective telephone skills					Exhibit emotional control				
Use research skills					Cope with change & innovation				
Produce graphics to support					Give & receive constructive   criticism   Know own strengths & weaknesses				
communications									
Provide communication					Show self confidence & self esteem				
between/among shifts									
					Motivate self & others				
					Display a customer service				
Understand international (global)					orientation (external/internal)				
business communications					Use conflict resolution skills				
Be able to read &/or speak in a					Display leadership skills				
foreign language									
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\*Additional skills may be added in blank spaces.

### Industry Site Visit Team/Individual Reaction Sheet

Team:

Individual or Members:

**Company Visited:** 

Date of Visit:

Reactions to your visit (including general impressions, lessons learned, etc.)