A New Survey of Workplace

Skills, Technology, and Management Practices

(STAMP)

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Rationale

Wide research and policy interest in how work and employment are changing. Concerns over:

- **Growth in earnings inequality since late 1970s**
- **Employment prospects for less-skilled workers→"good jobs, bad jobs" debate**
- **Racial and ethnic labor market inequalities**
- **Welfare-to-work transitions**
- **Education**
  - **School quality**
  - **Student achievement—degrees attained, test scores**
  - **Improving school-to-work transitions**
- **Economic policy**
  - **International competitiveness**
  - **Education and training policy**
    - **Basic skills**
    - **Advanced knowledge, skills, and abilities**
    - **Specialized skills**
    - **Retraining displaced workers**
    - **Continuous learning**
- **Journalistic, management, and popular perceptions that change is**
  - **unprecedented, rapid**
  - **accelerating**
  - **ubiquitous**

Key Questions

Domains:

Skills
Information technology
Employee involvement

- **How many jobs require what levels of**
  - **various general academic and thinking skills**
  - **various computer skills**
  - **participation in employee involvement (EI) practices?**

→What is the skill profile of American jobs?

- **How are general skills, computers, and employee involvement related to one another?**

- **How do skills, computers, and EI impact**
  - **wages**
  - **other job characteristics and correlates, e.g.,**
    - **work intensity**
    - **promotions**
    - **downsizing, outsourcing**
    - **unionization**
    - **job satisfaction**

- **What are the *trends* in**
  - **levels of skill requirements, technology use, and EI practices**
  - **their interrelationships**
  - **their relationships to other outcomes**

Data Gap

- **Traditionally, existing measures of job skill content were limited**
  - **broad occupation (e.g., manager/professional, clerical, sales, skilled and unskilled blue collar, service)**
  - **mean occupational education**
  - **Dictionary of Occupational Titles**
  - **narrative case studies**
  - **speculation**
- **Few recent surveys focused on detailed measurement of job content**
  - **last full-scale survey—Quality of Employment Survey (1977)**
  - **special samples (e.g., Holzer 1996)**
  - **limited item set (e.g., General Social Surveys 1989, 1998, 2002)**
- **Periodic calls for better data**
  - **Kenneth Spenner (1983)**
  - **Arne Kalleberg (1986)**
  - **National Research Council (1998)**
  - **U. S. President's Information Technology Advisory Committee (1999)**
  - **Lawrence Katz (2000)**
  - **National Institute for Occupational Safety and Health (2002)**

Data Gap (continued)

Our conceptualization and measurement of skill are poor. Unidimensional, undefined concepts, nonmeasures, and indirect measures of skill have not served us well. Multidimensional and direct measures are required (Spenner 1983, p.825)

The evidence on information technology and inequality suggests that computers may be partly responsible for the relative increase in the demand for skilled, educated workers. However, thus far the measures of "skill" and "education" are fairly coarse….Time series data, even short time series, would be especially valuable in clarifying the role of technology in some of the organizational changes that are observed (National Research Council 1998)

The information revolution puts a premium on basic knowledge, not just information technology literacy, but basic skills in reading, writing, communication, and teamwork…We need more data and we need to understand the social, economic, and policy issues in much greater depth. The research that is required to develop this knowledge should be broad-based, long-term, and large-scale in its scope…(U. S. President's Information Technology Advisory Committee 1999)

Our understanding of how computer-based technologies are affecting the labor market has been hampered by the lack of large representative data sets that provide good measures of workplace technology, worker technology use, firm organizational practices, and worker characteristics (Katz 2000, p.237)

Since the demise of the Quality of Employment Surveys of the 1960s and 1970s, there has been no way of determining how the demands of work may be changing, and how these demands vary from one industry, occupation, or population to another… The most desirable (and ambitious) approach would be to develop a stand-alone nationally representative survey of the organization of work. Such a survey might be modeled after and expand upon the former QES (National Institute for Occupational Safety and Health 2002)

Bottom line:

If progress is to be made addressing the specific questions raised by recent debates on skills, technology, and management practices, these domains need to be defined and measured much better than previously

Survey of Skills, Technology, and Management Practices (STAMP)

- **RDD telephone survey (2005)**
- **Employed wage & salary workers age 18 and over—English and Spanish language versions**
- **N = 2,304**
- **About 166 job-specific questions, 28 minutes average length**
- **Refreshed panel—reinterviews after 3 years plus new subsample**
- **Models: cross-sectional, fixed effects, career growth, trend analyses**

Measurement philosophy

- **individual-level data to model relationships**
- **objective, behaviorally concrete questions and response options**
- **intuitively meaningful scales**
  - **avoid vague quantifiers and numbered rating scales, where feasible**
- **detailed coverage of skills, technology, and EI domains, among others**
- **capture gradations across full range of population variability—avoid coarse scales, floor and ceiling effects**
- **cover content and use best approaches from diverse disciplines**
  - **sociology**
  - **labor economics**
  - **industrial relations**
  - **education**
  - **industrial & organizational psychology**
  - **human resource management**

Table 1. STAMP Survey Content

Skill and Task Requirements
- Cognitive skills
  - *Math, Reading, Writing, Documents*
  - *Problem-solving*
  - *Education and training requirements*
- Interpersonal job tasks
- Physical job tasks

Supervision, Autonomy, Authority
- Closeness of supervision, autonomy, repetitiveness
- Supervisory responsibilities over others
- Decision-making authority over organizational policies

Computer and Other Technology
- *Machinery and electronic equipment*
  - Mechanical and electronics knowledge
  - Stet-up, maintenance, and repair
  - Equipment and tool programming
- *Computers*
  - Frequency of use
  - Use of fourteen specific applications
  - Use of advanced program features, specific and new software
  - Training times
  - Complexity of computer skills required
  - Adequacy of respondents' computer skills
  - Computer experience of non-users in prior jobs

Employee Involvement
- Job rotation, cross-training, pay for skill
- Formal quality control program
- Teams activity levels, responsibilities, and decision making authority
- Bonus and stock compensation

Job Downgrading
- Downsizing, outsourcing, technological displacement
- Promotion opportunity
- Work load, pace, and stress
- Reductions in pay and retirement and health benefits
- Strike activity

Job Satisfaction

Table 2. Survey Items: Mathematics, Reading, Writing

Math

At your job, do you:

1. use math or numbers in any way (e.g., measure or weigh things, count things, work with money)
2. use addition or subtraction
3. use multiplication or division
4. do math using fractions, decimals, or percentages
5. use simple algebra to solve for unknown values
6. use more advanced algebra to solve complex equations
7. use geometry or trigonometry
8. use probability and statistics, such as correlations and regressions
9. use calculus or other advanced mathematics

Reading

As part of your job, do you read:

1. anything at work, even very short notes or instructions
2. anything at least one page long (e.g., notes, memos, reports, or letters)
3. anything at least 5 pages long
4. articles or reports in trade magazines, newsletters, or newspapers
5. articles in scholarly, scientific publications, or professional journals
6. instruction manuals or other reference materials
7. work-related books
8. bills or invoices

Writing

As part of your job, do you write:

1. anything at work, even very short notes or instructions only a few sentences long
2. anything at least one page long (e.g., notes, memos, reports, letters)
3. anything at least 5 pages long
4. articles or reports for magazines, newspapers, or newsletters
5. books or articles for scholarly, scientific, or professional journals
6. fill out bills or invoices

Table 3. Descriptives: Math, Reading, Writing, and Documents

	All	Hi WC	Lo WC	Hi BC	Lo BC	Service
Math (α=0.81)						
1. Any math	0.94	0.95	0.97	0.94	0.91	0.88
2. Add/subtract	0.86	0.93	0.90	0.87	0.78	0.73
3. Mult./divide	0.78	0.89	0.82	0.81	0.65	0.57
4. Fractions	0.68	0.82	0.68	0.70	0.58	0.40
More advanced	0.22	0.35	0.09	0.41	0.19	0.04
5. Algebra I	0.19	0.30	0.08	0.36	0.16	0.04
6. Geometry/trig	0.14	0.20	0.05	0.29	0.15	0.02
7. Statistics	0.11	0.22	0.05	0.10	0.06	0.02
8. Algebra II	0.09	0.14	0.03	0.16	0.08	0.02
9. Calculus	0.05	0.08	0.01	0.08	0.05	0.01
Mean Level	4.11	4.9	3.7	4.8	3.7	2.8
Reading (α=0.80)						
1. Any reading	0.96	0.99	0.97	0.91	0.91	0.95
2. One page	0.82	0.96	0.86	0.72	0.57	0.67
3. Five pages	0.54	0.81	0.47	0.46	0.26	0.32
4. News articles	0.42	0.64	0.37	0.27	0.21	0.24
5. Prof'l articles	0.38	0.65	0.26	0.24	0.15	0.23
6. Books	0.53	0.76	0.40	0.53	0.35	0.38
Mean Level	3.8	5.0	3.5	3.2	2.5	2.9
Writing (α=0.64)						
1. Any writing	0.91	0.99	0.93	0.83	0.80	0.83
2. One page	0.61	0.86	0.56	0.46	0.36	0.41
3. Five pages	0.24	0.47	0.13	0.12	0.07	0.09
4. News articles	0.09	0.20	0.04	0.01	0.04	0.03
5. Books/prof'l arts	0.03	0.07	0.00	0.00	0.00	0.02
Mean Level	1.9	2.7	1.7	1.4	1.3	1.4

Table 11. Descriptives: Computer and Other Technology Measures

	All	Hi WC	Lo WC	Hi BC	Lo BC	Service
Computers						
1. Special software	0.47	0.61	0.59	0.23	0.29	0.24
2. New software	0.16	0.24	0.16	0.11	0.12	0.06
3. Spreadsheet formula	0.12	0.21	0.11	0.02	0.06	0.03
4. SQL programming	0.03	0.08	0.01	0.01	0.01	0.01
5. Science/engineering	0.07	0.14	0.03	0.04	0.04	0.02
6. Programming	0.04	0.08	0.02	0.00	0.01	0.01
7. Applications (#)	4.02	6.06	4.68	1.68	1.91	1.41
8. Computer Skill Level[a]	4.21	5.91	5.06	1.95	2.43	1.77
Additive scale (α=0.71)		0.42	0.08	-0.87	-0.76	-0.94
Other technology						
1. Heavy Machinery	0.20	0.07	0.11	0.65	0.46	0.12
2. Mechanical Skill Level[b]	2.50	1.73	1.38	5.97	4.55	2.12
3. Electronics Skill	0.13	0.12	0.08	0.33	0.15	0.09

Note: Additive scale is the standardized sum of items used in calculating Cronbach's α (items 7 and 8); scale is in standard deviation units. Statistics in top panel, including scale, calculated from total sample.

a. Self-rated complexity of computer skills used on job (0=no computer use, 1=very basic, 10=very complex)

b. Self-rated complexity of mechanical skills used on job (0=very basic, 10=very complex)

Table 13. Descriptives: Employee Involvement Measures

	All	Hi WC	Lo WC	Hi BC	Lo BC	Servic
1. Job rotation	0.53	0.43	0.64	0.48	0.60	0.57
2. Pay for skill	0.10	0.06	0.11	0.08	0.16	0.16
3. TQM/QC	0.20	0.22	0.21	0.17	0.19	0.15
4. Team member[a]	0.26	0.27	0.21	0.28	0.25	0.26
Team functions:						
(α=0.69)						
5. Job assignment[a]	0.20	0.22	0.17	0.26	0.17	0.22
6. Task scheduling[a]	0.18	0.21	0.14	0.19	0.15	0.19
7. Worker scheduling[a]	0.09	0.07	0.08	0.14	0.10	0.13
8. Changing methods[a]	0.18	0.20	0.15	0.22	0.19	0.16
9. New equipment[a]	0.18	0.19	0.14	0.25	0.18	0.17
10. Selecting leader[a]	0.08	0.10	0.05	0.13	0.08	0.04
11. Quality[a]	0.17	0.19	0.13	0.19	0.18	0.13
12. Cost, productivity[a]	0.11	0.12	0.11	0.14	0.12	0.09
13. Cross-commun.[a]	0.20	0.22	0.17	0.21	0.19	0.17
14. Perf. review[a]	0.11	0.11	0.09	0.17	0.10	0.13
15. # team functions[a]	1.41	1.49	1.21	1.81	1.44	1.26
16. # team functions[b]	5.77	5.63	5.79	6.56	5.75	5.51

Note: Unless noted, all statistics based on full sample. Cronbach's α for team items calculated on sub-sample of team members only. Team functions (items 5-16) were dichotomized for this table such that 0=no involvement and 1=team either suggests and decides on its own.

a. Employees in self-reported management positions were ineligible for this item and coded as zero for calculations.

b. Statistics based on sub-sample belonging to teams.

Possible Extensions

- Future waves—social indicators for monitoring trends

- Linked data on employers
  - Workforce composition (occupation, race, gender, contingent workers)
  - Organizational structure, strategy, resources
  - Employment policies (promotion, training)
  - Perceived skills gaps, self-identified major personnel and other business problems
  - Technology
  - Employee involvement practices

- Linked test scores—e.g., NAAL
  - Improve interpretability of existing scores in terms of job-related criteria
  - Important adjustment in analyses, e.g., measuring under- and over-education

- International comparisons
  - complements IALS and related comparative test score projects