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**PUTTING TRAINING IN PERSPECTIVE:  
A LONGITUDINAL CASE-STUDY APPROACH**

C. DOUGHERTY

## **ABSTRACT**

Detailed education, employment and training histories have been constructed for a cohort of 440 male respondents from the National Longitudinal Survey of Youth. The data show that most respondents without college degrees have experienced at least one occupational break, defined as a change from one occupation to another sufficiently different in character that it does not make significant use of occupational skills acquired previously. The data also show that most of those in employment in 1992 had had no formal training for their current occupations and moreover thought that none was necessary. These findings imply that the comprehensive provision of entry-level training for those not college-bound, as advocated by those promoting vocational education in high schools or as practised in those countries with comprehensive apprenticeship systems, is unlikely to have a direct impact on the performance of the economy or even on employment. Instead training priorities should be directed towards the provision of training as the demand arises and to improving access to college-level vocational education for those who can benefit from it.

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## **PUTTING TRAINING IN PERSPECTIVE: A LONGITUDINAL CASE-STUDY APPROACH**

C. Dougherty

In most industrialized countries and many developing ones there is a consensus that an expansion of the provision of training would be desirable, particularly for new entrants to the labour force. The usual argument is that there is a need to upgrade the skills of the workforce to enable industry to switch to more sophisticated products and processes and escape the threat posed by lower-cost competitors. Sometimes it is also asserted that the training of labour force entrants can mitigate the problem of youth unemployment. Both arguments are used to justify supply-side initiatives promoting secondary vocational education, youth training or mass apprenticeship systems.

The object of this paper is to argue that such policies may be misguided, to judge by the experience of the United States, for two interlocking reasons. One is that formal training is not a necessary condition for employment in most subprofessional occupations. Certainly one can devise extended apprenticeships for nearly everything in sight, as the Germans do, and there is no question that for those in certain occupations the benefits are large. But for most subprofessional occupations extended initial training is not required, either before or on entering them.

The other reason is that, in the United States at least, the majority of those in subprofessional occupations make one or more radical changes of occupation after entering the labour force, each time leaving behind any occupational skills acquired previously.

Taken together, these two considerations indicate that blanket supply-side sub-professional training initiatives aimed at labour force

entrants are likely to have disappointingly little impact and that training policy should focus on the provision of training on an as-needed, rather than before-needed, basis.

## **1. Data and Method**

### **Data**

The present analysis uses data from the U.S. National Longitudinal Survey of Youth (NLSY). The core sample of the NLSY is nationally representative and consists of 3,003 males and 3,108 females born in the period January 1, 1957 - December 31, 1964. With annual sweeps, normally by personal interview, and detailed questions on employment, unemployment, education and training, it is an ideal vehicle for studying occupational mobility and its implications for training needs at the individual level. In particular, it enables one to discriminate between training episodes which have a lasting impact on career development and those whose benefits are lost when an individual shifts to an unrelated occupation.

At each interview the respondent is asked for information about up to five jobs since the last interview. Sometimes there have been more than five jobs, in which case information for some of them is lost. This is very rare, typically occurring only when the respondent has not been interviewed for several years and there is a backlog of data to record. The 1970 Census classification is the main occupational classification, but from 1983 onwards the CPS job (the job current at the interview, or most recent job if the respondent is not working) is coded a second time using the 1980 Census classification. Similarly the 1970 Census is the main industrial classification with the industry of the CPS job also being coded using the 1980 Census classification.

Service with each employer is recorded to the very day and any



gap is noted and the reason stated. Second jobs are recorded in the same way. Gaps between jobs are recorded to the day and the reasons recorded. If the respondent returns to work with a previous employer, the latter is identified if the gap does not span more than one interview. The main data limitation is the lack of detailed information about jobs of short duration. Unless it happens to be the CPS job, occupation and industry are not recorded for jobs lasting less than nine weeks or worked fewer than 10 hours per week (until 1985, 20 hours per week). Hours have always been recorded for such jobs, and from 1988 earnings also. If such jobs survive to the next interview, they may eventually be described after all.

Until 1988 government-sponsored and private training data were recorded in separate sections of the survey instrument. The government-sponsored training section was extremely detailed and asked for the name of the programme, motive for enrolling, reasons for quitting if not completed, types of assistance received, effect on finding a job and on performance in a subsequent job, and much more, the duration being recorded to the day. The private section was comparatively succinct. If a training episode lasted less than one month, its existence was noted but no further questions were asked. Training lasting one month or more was classified into nine categories: business college, nurse's programme, apprenticeship, vocational/technical institute, barber/beauty school, flight school, correspondence course, and company training. Motives for training and sources of finance were also recorded. Hours per week were recorded but start and end dates were recorded only to the month.

In 1987 there was only a single question on training: had the respondent received any government-sponsored training since the previous interview? 1987 information was retrospectively recorded in

the 1988 interview. Since 1987 the government and private training sections have been merged and all training recorded, irrespective of duration. The nurse's program, barber/beauty school and flight school have been merged into the vo-tech category and seminars or training programs at work and outside of work by someone other than the employer, and vocational rehabilitation centre training, have been added. Start and end dates continue to be recorded to the month but the duration is recorded to the week. The type of training in terms of delivery (classroom training, etc) is recorded but for some reason the occupation trained for is not. Generally the occupation trained for is evident from the employment history but there are occasions when it is not. To some extent this gap is made good by a new question introduced in 1991 asking for the reason for undertaking the training, the categories being training associated with promotion or job advancement, training required by the introduction of new methods or processes, training that is part of a regular programme to maintain or upgrade employee skills, and training required by a new job.

### **Method - the case study approach**

The three specific issues addressed in this paper are:

1. After entering the labour force, how many respondents have experienced an occupational break, defined as a change from one occupation to another sufficiently different in character that it does not make significant use of occupational skills acquired previously?
2. How did the respondents obtain the skills required by their current occupation?
3. What use, if any, did they make of training undertaken before or on entering the labour force?

The correct identification of an occupational break is critical to all three issues. Previous studies of occupational change have used definitions based on changes in occupational coding. Shaw (1987) defines a change of occupation as a change at the 3-digit level. Much more cautiously, Lynch (1993) defines it as a change at the 1-digit level.

However the coding of occupation in the NLSY (and no doubt similar surveys) is not sufficiently accurate and consistent to permit genuine occupational change to be identified so easily. Even if the respondent is in stable employment with the same employer, it is common for the coded occupation to be different from one interview to the next, even using a 1-digit classification. Sometimes a change is attributable to the fact that jobs do not fit neatly into the classifications and interviewers' or coders' perceptions of the most appropriate classification differ. Examples of spurious 1-digit changes are particularly common in the construction industry and retail trade, with the following sequences, often reversed at a subsequent interview, while in employment with the same employer and with no significant change in earnings:

- craftsman occupation to construction labourer
- stock clerk or storekeeper to stockhandler
- salesman to counter clerk or cashier
- deliveryman or routeman to salesman
- messenger boy to deliveryman
- auto mechanic to garage worker or gas station attendant
- restaurant, cafe or bar manager to cook

Other sectors also provide many examples of reversible 1-digit switches while in apparently stable employment:

- real estate agent or broker to estimator/investigator

- upholsterer to sewer or stitcher
- foreman to checker, examiner or inspector, manufacturing
- computer specialist, nec to computer and peripheral equipment operator
- building manager or superintendent to janitor or sexton

Another cause of spurious 1-digit changes is temporary status inflation, as when a low-paid book-keeper temporarily becomes an accountant with no increase in earnings. Switches into and out of the managers and administrators, nec is the single most common aberration of this type, but it is common to find operatives promoted temporarily to craftsmen and craftsmen to technicians. Temporary status deflation also occurs. A further source of spurious changes are gross coding errors, as when a stock clerk in a grocery store temporarily becomes a stock and bond salesman or a photographic process worker becomes a photographer.

To overcome these problems, even to become aware of them, there is no option but to make a comprehensive assessment of the employment and employment-related data for each individual separately. In the case of the present analysis this was partly automated by writing a series of SAS programmes which decoded the data for each respondent and reconstructed the narrative of each interview. The perspective provided by being able to read the entire employment history generally made it possible to judge whether occupational changes were genuine and moreover to be conservative in making this judgment. It also made it possible to identify and discount makeshift jobs taken while in school or full-time training, to distinguish between makeshift jobs temporarily retained on entering the labour force and permanent ones, to distinguish between main jobs and second jobs, and to sort out the problems posed by the coding of industry, also

subject to a high incidence of spurious 1-digit change. From the narratives a new data-base has been constructed relating education and training episodes contextually to the respondents' employment histories.

Treating each respondent as an individual case-study is a time-consuming process and the sample in the present analysis was restricted to the cohort of 440 males born from October 1, 1961 to September 30, 1962, these being the individuals most likely to graduate from high school in 1980, and it uses the data for the surveys up to 1992. 12 of the 25 living non-respondents in 1992 were successfully interviewed in 1993 and their retrospective data has been used to make good the 1992 gap. The effective response rate was therefore 97% of living respondents (10 were deceased by 1992).

Table 1 classifies the respondents by economic activity and educational qualifications at the time of the 1992 interview.

## **2. Labour Force Entry and Occupational Breaks**

One of the objectives of the present analysis is to document the fact that the majority of subprofessional workers experience at least one occupational break after entering the labour force. Not to overstate the case, both labour force entry and occupational break have been defined conservatively. To eliminate switches between temporary jobs, respondents in full-time education or institutional training are not considered to be in the labour force. Nor are those respondents in part-time education or training if their jobs are also part-time or if their jobs are full-time but temporary in nature. For good measure, changes of occupation during the first two years in the labour force have been ignored, to eliminate the possibility of including in the count the abandonment of a training-unrelated temporary job held during the

search for a permanent one.

Usually it is obvious when an occupational break has occurred. Often it comes after the involuntary loss of a job and a spell of unemployment, but sometimes it is voluntary and opportunistic. Typically it involves a change of industry as well as occupation. Sometimes, however, it is less clear-cut. With the aim of being conservative, when assessing whether one has taken place, the following changes have not been considered to be occupational breaks:

- promotions to supervisory or managerial roles
- switches between employers and industries on the part of those with established managerial qualifications
- switches among construction industry jobs
- switches among eating/drinking place jobs
- switches among labouring jobs

The treatment of construction industry jobs is perhaps over-conservative, but the frequency with which respondents migrate from being carpenters to plumbers or electricians, or vice versa, together with the modest earnings typically recorded and the absence of training episodes, suggests that such jobs have been at the low-skill end of the spectrum.

In general it has been assumed that changes in occupational coding while with the same employer do not amount to occupational breaks. For example, one respondent started as a lathe operator with an employer in the blast furnaces, steelworks, rolling or finishing mills industry, having completed a training course at a vo-tech institute. Subsequently he has been described variously as moulding/casting machine operator, miscellaneous machine operative, milliner (!), rolling machine operator, and more recently supervisor and finally manager. Such cases are not treated as containing occupational breaks. Another

example is provided by a respondent working for a small retail automobile supplies store who has successively been described as a salesman, a counter clerk and a deliveryman.

Table 2 divides those with jobs at the 1992 interview into those who have and those who have not experienced at least one occupational break after having been in the labour force for two years. It shows that the great majority of those without degrees have experienced at least one occupational break since entering the labour force. Even among those with degrees, a significant proportion has experienced occupational breaks. Given that so many have abandoned their initial occupations and hence the skills imparted by pre-employment or initial training, how have the respondents come by the skills required by their current ones?

### **3. Training for the 1992 Interview Occupation**

#### **Initial training for the 1992 occupation**

The answer is that most respondents in subprofessional occupations have received no formal training. Moreover, most believe that no formal training is necessary for their occupations. Table 3 shows the types of training for their current occupation received by the 341 respondents with well-defined training records in employment at the 1992 or 1993 interviews. Some respondents received more than one type of initial training and several columns sum to more than the totals.

The table shows that two thirds of the respondents received no initial formal training of any kind before or on entering the occupation in which they found themselves at the 1992 interview, and 79% received no formal non-academic training. Half of the respondents with training had acquired it via vocational degree courses. Of the other traditional sources of initial training, only vo-tech institutes made

a significant contribution. The figures for high school vocational education are biased downwards by the fact that adequate data were available for only two-thirds of the respondents, but the numbers are in any case negligible and in both cases the respondent went on to earn a degree in the same field.

Table 4 classifies the duration of any non-academic training by highest educational qualification. Only 13% of the respondents received 200 or more hours of non-academic training. The figure is highest for high school diploma holders, but even for them it was only 19%.

In 1989 those respondents in the labour force were asked how much education and training was required by their current (or most recent) job. The answers to the training question are summarized in Table 5. 70% of the respondents stated that no formal training was required by their jobs, a figure which corresponds well to the figures in Tables 3 and 4.

### **In-service training for the 1992 occupation**

The proportion of respondents who have received in-service training for their 1992 occupation is likewise low. Nearly two thirds have received none at all. To allow for the fact that tenure of the 1992 occupation varies widely, Table 6 presents the data as hours per year. (Respondents entering their 1992 occupation in 1992 have been excluded.) As cross-section surveys repeatedly show, in-service training is disproportionately received by those with higher educational qualifications. This might imply that formal education and in-service training are complementary investments, but Table 7 prompts a different explanation. In-service training among degree-holders is disproportionately received by those who have entered occupations



where the processes or products are subject to rapid change: engineering, information technology, and financial services. This suggests that in-service training is to a large extent precipitated by a need to update obsolescent knowledge.

#### **4. What Was the Impact of Pre-Employment Training and First-Employment Initial Training?**

To complete the assessment of the loss of training investments caused by occupational breaks, it is necessary to evaluate the outcomes for training provided before or on entering the labour force.

In the case of pre-employment training, did it lead to a training-related job? In the case of training received at the beginning of employment, and pre-employment training which led to a related job, has the job lasted, or has the respondent experienced an occupational break? If there has been an occupational break, was it voluntary or was it caused by involuntary separation from an employer?

Table 8 summarizes initial training by highest educational qualification. One source of training, high school vocational education, has been omitted for reasons described below. The first four rows give data for vocational majors (defined as leading to a particular occupation or a narrow set of them; business and management have not been classified as vocational unless qualified further - for example, parks and recreation management or hotel and restaurant management). Some respondents had more than one type of initial training and for that reason some of the column totals exceed the number of respondents in the respective categories. The armed forces line refers to respondents who entered the armed forces before establishing

themselves in the labour market. The school line refers to those still in school at the time of the 1992 or most recent interview.

### **College-level vocational education**

Table 9 summarizes the outcome of different categories of college-level vocational education. The postgraduate category comprises two respondents with PhDs, nine with master's degrees, three with medical degrees and five with other professional qualifications. Of the 13 with vocational qualifications, eight have entered training-related jobs and are still in them, one very-recent graduate appears to be in a temporary job and the outcome is unclear in the other three cases. Only one has definitely not entered a training-related job.

Only two of the respondents with bachelor's degrees started college after spending two or more years in the labour force. Of the other 77, 39 graduated with vocational majors. Most have entered training-related jobs and have stayed in them. There are of course exceptions. One respondent who majored in banking and became a bank branch manager has recently quit and returned to college majoring in landscape architecture. Another majoring in physical education supported himself by working as a construction labourer. After graduating he got a part-time job as a coach but also continued his construction labourer job. Eventually he settled for the latter, dropped the coach job and took a three-month course at a vo-tech institute, paid for by himself, to upgrade his skills.

Almost half of the respondents with associate of arts degrees started their courses after spending two or more years in the labour force. Of the 19 who embarked on them before or at the same time as entering the labour force, nine had vocational majors and a further five may have had. One of those with vocational majors entered the armed

forces soon after graduating. The other eight all went into training-related jobs and six, perhaps seven, are still in them.

The incomplete college category comprises those respondents who completed at least one year of college with credit in a vocational major. The majority had in fact completed two years, but the nevertheless the impact on subsequent employment was minimal, the only respondent entering a training-related occupation being one who claimed that he had completed his course, albeit without receiving a degree. Of the nine whose reasons for quitting were recorded, only three cited financial reasons, and so a lack of motivation may have been the dominant factor for the failure to enter a training-related occupation.

### **High school vocational education**

Two sources of data serve to identify respondents with vocational education in high school: self-reporting of curriculum at interview and school-sourced transcript data.

At each interview while in high school, and again at the interview immediately after graduation, respondents were asked to state whether they were in the college preparatory, general or vocational tracks. Those in the vocational track were then asked to name the occupation for which they were receiving training. However, the respondents' declarations should not necessarily be taken at face value, for previous studies have shown that high school graduates are sometimes unable to identify which track they are in (Bishop, 1993). About one third of the respondents gave different responses on the last two occasions they were asked. Some of these changes will have been genuine, but some will have been caused by the respondents' uncertainty.

In principle the transcripts, sought directly from the respondents' schools separately from the annual sweeps of the NLSY, should

provide independent and more objective information. A high school course classification was devised with 592 categories and the respondents' transcripts coded correspondingly, together with grades obtained and credits earned. However, only 274 of the respondents have useable transcripts. Some transcripts are completely missing. Some are incomplete because the respondent dropped out of school. Others are defective because the respondent changed school, because the school refused to release final year grades, or because the credit hours were not recorded. Respondents were classified as vocational students if they had three or more vocational credit hours within a given vocational program (the criterion used by Boesel et al, 1994).

The corroboratory evidence provided by the transcripts is undermined by the fact that it is possible and indeed common for a respondent to satisfy the vocational track criterion by accumulating three or more credits in an occupational field and yet not appear to intend to enter the corresponding occupation. 70 of the 274 respondents with complete transcripts satisfied the vocational track criterion but only 23 of them declared themselves to be in the vocational track the last time they were asked.

Accordingly the employment outcomes were analyzed with two criteria: the vocational content criterion alone (the weak criterion in Table 10), and together with a final vocational declaration (the strong criterion). Table 10 presents the employment outcomes, allowing the respondent up to two years to find a training-related job and ignoring a non-training related job if it was succeeded by a training-related one within that period. A few individuals entered the military soon after graduating and it is impossible to determine whether they ever made use of their vocational education. Some clearly never entered a training-related occupation, even with a generous definition of what

might be meant by the term. In some cases the recording of the transcript and the recording of the jobs were too vague for it to be possible to tell whether a match had been made.

Neglecting the military and unclear categories, only about a quarter of the respondents entered training-related jobs. If the unclear category is taken to be training-related, the proportion is still only one third. This is less than the 43% estimate of Campbell (1987) and the 38% estimate of Wirt et al 1989) but the numbers are small and the differences are not statistically significant. Of those entering a training-related occupation, only three (weak criterion) were still in it at the 1992 interview and two of these had earned degrees in the same field after leaving high school.

The low take-up of training-related jobs must be partly attributable to the fact that it is difficult for high school students to predict their educational and employment futures even a few years ahead. The present cohort was no exception in this respect. At the 1979 interview, the respondents were asked whether they expected to be in school in five years' time, and also whether they expected to be working (not mutually exclusive). 181 of the 440 said they expected to be in school, and 50% of them were right. 210 expected to be working, not in school. Of these, 26 named occupations too vague for matching purposes. Of the other 184, only 11% were working in the predicted occupation five years later. If one removes the timing element and counts as a correct prediction having ever worked in the stated occupation, the figure rises to 26%, but few have entered the occupation and stayed in it.

### **Vo-tech institute training**

39 of the respondents enrolled in vo-tech courses (post-secondary

technical institutes, business colleges, etc). 26 completed, 11 abandoned their training, and in the case of the other two the relevant data are missing. In the case of five of those who completed it was not clear whether their subsequent occupations were training-related. One respondent enlisted very soon after completing. Of the remaining 20 completers, 10 found employment in training-related occupations and two were already in such occupations.

The vo-tech outcomes are mixed, even for those who completed their training. Source of finance appears to have the expected influence. Source of finance has been recorded since 1982 and information is available for 25 of the respondents. The majority of those who paid for their own training (self or family) entered training-related occupations, while for those drawing on other sources of finance (friends, relatives, government grants or loans, or other source), the opposite was true, the effect being significant at the 5% level.

### **Other types of training**

Only seven of the respondents entered the labour force by serving apprenticeships. Four of them were still in the same occupations at the 1992 interview, two had quit voluntarily and the other had abandoned the occupation after losing a job.

12 respondents underwent formal company training programs on entering the labour force. All but one had degrees and half were in financial service occupations, suggesting that such training tends to be a complementary investment. 9 of them were still in the occupation or a related one at the 1992 interview. It is possible that similar, but shorter, investments were made for a few respondents without degrees. In the period 1979 - 1986 21 respondents, 13 of them without degrees, received spells of training lasting less than one month and further

details are lacking.

15 entered the labour force after government training programs. Given that such programs are targeted at the disadvantaged (only three of the 15 had ASVAB scores above the bottom quartile), entering and staying in a training-related occupation is not necessarily an important outcome criterion (most have since experienced at least one occupational break).

## **5. Conclusions**

Table 2 shows that most respondents without degrees have experienced one or more occupational breaks since entering the labour force. This reflects the fact that few new entrants to the labour force are ready to make a lasting commitment to a particular occupation. They have inadequate knowledge of the kind or content of jobs available to them and they need time to experiment to find the kind of work that suits them. The respondents were asked at the initial interview, then aged 17, what they expected to be doing in five years' time. Most of them were doing something completely different.

Table 3 shows that most respondents with jobs at the 1992 interview entered their current occupations with no formal occupational training and Table 5 shows that most thought (for their 1989 occupation) that either no training was necessary or on-the-job training would suffice. Many of those individuals without a college degree and no training have entered unglamorous occupations. But some have reached skilled occupations with earnings to match, doubtless through the provision of on-the-job training, the importance of which is documented in the surveys reported by Lynton et al (1978), Lynton et al (1979) and Lynton and Seldin (1981).

By contrast, those respondents who have completed vocational degrees have mostly entered and remained in training-related occupations.

These findings imply that the comprehensive provision of entry-level training for those not college-bound, as advocated by those promoting vocational education in high schools or as practised in those countries with comprehensive apprenticeship systems, is unlikely to have a direct impact on the performance of the economy or even on employment. Instead training priorities should be directed towards the provision of training as the demand arises and to improving access to college-level vocational education for those who can benefit from it. There is a strong correlation between having high ability, as measured by the Armed Forces Qualification Test scores available for nearly all the respondents, and going to college, but it is imperfect. Many high-scoring respondents never went to college and their employment histories reflect this disadvantage. However, increasing the provision of places in college education by itself is not enough. To maintain the content and hence the benefits, the general standard of grade and high school education will have to be improved.



**TABLE 1**

## Economic Activity At 1992 Interview, by Highest Degree

	None	GED	HSD	AA	BS/BA	Higher	Total
Employed	42	18	153	30	70	17	330
Self-employed	2	5	14	1	4	1	27
Armed forces	-	1	8	1	2	-	12
Unemployed	3	2	9	-	1	-	15
Jail	4	5	2	-	-	-	11
Other OLF	9	2	8	3	-	-	22
Deceased	5	-	5	-	-	-	10
Other non-interview	4	-	7	-	2	-	13
Total	69	33	206	35	79	18	440

*Note:* GED = General Educational Development certificate;

HSD = High School Diploma;

AA = Associate of Arts degree;

BS/BA - Bachelor of Science/Bachelor of Arts;

Higher = Masters, PhD or professional qualification

**TABLE 2**

Numbers of Respondents with Occupational Breaks  
Two Or More Years After Entering the Labour Force

	None	GED	HSD	AA	BS/BA	Higher	Total
No	5	4	51	17	52	15	144
break	38	19	115	14	22	3	211
Break	1	-	1	-	-	-	2
Unclear	44	23	167	31	74	18	357
Total							
%break	86	83	69	45	30	17	59

**TABLE 3****Initial Training, Type, by Highest Degree**

	None	GED	HSD	AA	BS/BA	Higher	Total
Postgraduate							
4-year college (completed)	-	-	-	-	-	8	8
2-year college (completed)	-	-	-	-	27	-	27
Incomplete college	-	-	-	18	-	-	18
High School vocational ed.	-	-	2	-	-	-	2
Vo-tech	-	-	-	1	1	-	2
Apprenticeship	1	1	15	2	-	-	19
Other formal company	1	-	9	-	-	-	10
Correspondence course	3	-	10	2	6	3	24
Other training	-	-	1	-	-	-	1
Less than one month	-	1	3	1	3	-	8
Government training	2	-	4	-	-	-	6
No training	-	-	-	-	-	-	-
Respondents in category	34	18	118	12	35	8	224
	41	20	160	32	70	19	341

**TABLE 4**

## Initial Non-academic Training, Hours, by Highest Degree

	None	GED	HSD	AA	BS/BA	Higher	Total
None	34	18	118	25	61	15	271
1-100 hours	3	-	9	1	4	1	18
101-200 hours	-	-	3	1	1	1	6
201+ hours	4	2	30	5	4	1	46
Total	41	20	160	32	70	18	341

**TABLE 5**

## Respondents' Estimates of Training Required for 1989 Occupation

	None	GED	HSD	AA	BS/BA	Higher	Total
Formal training programme	11	3	49	15	23	2	103
On-the-job training only	17	10	49	5	20	2	103
No training	20	8	63	11	26	6	134
Total	48	21	161	31	69	10	340

**TABLE 6**

## In-service Training Per Year, Hours, by Highest Degree

	None	GED	HSD	AA	BS/B A	Higher	Total
None	35	11	100	17	29	8	200
1-20 hours	3	4	20	5	23	2	57
21+ hours	1	3	25	10	15	5	59
Total	39	18	145	32	67	15	316

**TABLE 7**

## In-service Training Per Year, Hours, by Highest Degree

	AA		BS/BA	
	Eng/Tech	Other	Eng/Tech	Other
None	4	13	6	23
1-20 hours	1	4	5	18
21+ hours	5	5	6	9
Total	10	22	17	50

*Note:* Eng/Tech refers to those with degrees in engineering, information technology, and financial services.

**TABLE 8****Initial Vocational Training by Highest Degree**

	None	GED	HSD	AA	BS/BA	Higher	Total
Postgraduate	-	-	-	-	-	13	13
4-year college (completed)	-	-	-	-	39	-	39
2-year college (completed)	-	-	-	9	-	-	9
Incomplete college	-	1	14	-	-	-	15
Vo-tech	3	2	26	6	2	-	39
Apprenticeship	1	-	5	1	-	-	7
Other formal company	1	-	-	2	5	4	12
Other training	-	2	2	1	4	-	9
Government training	5	3	7	-	-	-	15
Less than one month	-	2	11	2	6	-	21
No training	55	17	133	9	27	4	245
Armed forces	1	6	17	5	3	-	32
School	3	-	7	-	-	-	10
Respondents in category	69	33	206	35	79	18	440



**TABLE 9**

## Employment Outcomes for College-level Vocational Education

	Incomplete	AA	BS/BA	Higher
Entered training-related job				
<i>Still in t-r job</i>	1	8	30	8
<i>Unclear whether still in t-r job</i>	1	6	26	8
<i>Quit voluntarily</i>	-	1	-	-
Did not enter training-related job	8	-	3	1
Unclear whether entered t-r job	2	-	4	3
Temporary job	-	-	-	1
Entered armed forces	3	1	2	-
Deceased before entering a job	1	-	-	-
Total	15	9	39	13

**TABLE 10**

## Employment Outcome of High School Vocational Education

	Criterion	
	Weak	Strong
Entered training-related job	14	5
<i>Still in t-r job</i>	3	2
<i>Quit voluntarily</i>	4	2
<i>Quit involuntarily</i>	7	1
Did not enter t-r job	46	14
Unclear	6	2
Entered military	4	2
Total	70	23

**TABLE 11**

## Vo-tech Institute Outcomes

	Complete	Incomplete	Unclear	Total
Training-related job	12	1	1	14
<i>Still in t-r job</i>	9	1	1	11
<i>Quit voluntarily</i>	2	-	-	2
<i>Quit involuntarily</i>	1	-	-	1
Not training-related	5	-	-	5
1	1	-	-	1
Unclear whether t-r	26	11	2	39
Armed forces				
Total				

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