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Union Membership and Apprenticeship Completion

by

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Alternation training – programs that situate learning by combining classroom and work place settings – have gained increasing prominence in the Canadian educational reform and policy literature. Apprenticeships represent perhaps the quintessential form of the ‘situated’ approach to learning and analyses of their organization and operation contributes not only to their greater effectiveness but also to our improved understanding of the broader concept of alternation. An important indicator of the effectiveness of apprenticeship systems in this country is the completion rate. Completion rates in apprenticeship training represent a barometer of the general ‘health’ of these systems and of their value to individual men and women who elect to pursue a career in the trades

Holmes & Singh (1994, 1995) studied completion probabilities for a sample of apprentices registered in the construction trades in British Columbia. Their findings indicated that age, education, prior experience, and type of indenture were associated with higher levels of completion. Indenture involving a union as sponsor was a significant factor in these predictions. While important in identifying sensitive predictors of completion, the Holmes & Singh work is limited in its focus on a single trade class and province.

In this paper we extend the Holmes & Singh work to include other regions of the country and the majority of apprenticed trades. Union membership is used to frame the analysis, which is based on data obtained from the 1994/95 National Apprenticed Trades Survey (NATS). The NATS gathered information from a weighted sample of approximately 32,000 former apprentices in all provinces. The analysis forms the basis for a discussion of future policy research on alternation training in general and on apprenticeships in particular.

METHOD

Objectives

Within a comparative framework of union or non-union membership, the immediate objectives of this study are:

1. To estimate completion rates for a national sample of construction apprentices, using selected individual difference and institutional variables as predictors.
2. To estimate completion rates for a national sample of all apprenticed trades, using selected individual difference and institutional variables as predictors.

Data

The data employed in this study were obtained from the 1994/95 National Apprenticed Trades Survey (NATS). The NATS was intended to contribute to anticipated reforms in the apprenticeship system as advocated by numerous agencies and concerned individuals. The National Apprentice Committee of the Canadian Labour Force Development Board (CLFDB) and the Canadian Council of Directors of Apprenticeship together with many employers and unions similarly were calling for more and better information on apprenticeships on a national scale. Provincial governments throughout the 1990's were developing policy papers on apprenticeship reform and data on a national scale were needed. Another motivation for the NATS was the inadequate reference to apprenticeships in the National Graduate Survey (NGS). The NATS complements the NGS series but contains a great deal more data on the entry and training experiences of the respondents.

In 1994 Statistics Canada began interviewing individuals who had 2 years earlier completed their apprenticeships or who would have completed them at that time had they not discontinued. The survey collected information from respondents on three phases of their apprenticeship experience – prior to registration, the period of apprentice training, and the transition to work as a journeyman (if they completed).

Table 1 profiles the weighted NATS sample by union membership and region. Overall union membership among respondents is 35% although it varies widely from region to region. Quebec has a very high level of membership (77%) while the Prairie provinces (Alberta, Saskatchewan, and Manitoba) average only 15%. In the remaining regions (B.C., Ontario, and Atlantic Canada) approximately one quarter of apprentices were members of a union.

Table 1 Profile of the NATS Sample: Union Membership by Region

Union Membership	Region					Total
	<i>B.C</i>	<i>Prairies</i>	<i>Ontario</i>	<i>Quebec</i>	<i>Atlantic</i>	
Union	26.8	15.3	22.1	76.7	25.5	11292
Non-Union	73.2	84.7	77.9	23.3	74.5	21276
Total Weighted cases	4923	7338	9503	7816	2988	32568

Variables

The variables selected for use in the analysis are shown in Table 2. We have selected variables from the NATS that were equivalent or similar to those employed by Holmes & Singh (1995) in their research. Holmes and Singh defined their indenture class variable as combinations of union, employer, and joint board sponsorship. However, their results indicated that the significant factor in all combinations of sponsorship was union membership. We therefore have defined union membership as a simple dichotomy. Age was defined to include those young enough to have moved directly from a school

vocational program to a registered apprenticeship as well as those who have been in the workforce for many years. Prior experience specifies the (perceived) degree of relevance of previous employment to the skills needed in the respondents chosen apprenticeship. This differs from Holmes & Singh’s time credit indicator that was established by a prior learning assessment panel. However, relevance as perceived by the respondent conveys the same meaning if not the objectivity of a Prior Learning Assessment (PLA) process. Educational level – which Holmes & Singh defined as ‘less than high school’ and ‘high school graduation’ – was extended to include post-secondary education. The latter category included those who had graduated from or enrolled for a period of time in a university, college or technical training institute, or a proprietary school. The Trades Classification variable differentiates the various construction trades in a manner similar to that used by Holmes & Singh: e.g. carpenter, plumber, electrician, mechanical, and finishing trades.

Additional variables were added to our analysis: the CCDO-based classification of trade types, geographic region and gender. The CCDO (Canadian Classification Dictionary of Occupations) clusters trades at a more general level than the standard trades codes; however, they are adequate for the purposes of this preliminary analysis. Geographic regions were constructed because sample size becomes a problem at the provincial level. The 5 regions were B.C., The Prairies, Ontario, Quebec and Atlantic Canada. Gender was included as government and advocacy groups have for some time been promoting greater involvement by women in trades training.

Table 2: Variables Selected for the Analysis

NATS Variable	Description
Stat	Completion of Apprenticeship
Age	< 20, 21-24, 25-30, 31+
Gender	Male/Female
Educational Level	< HS, HS Grad, Post-secondary
Prior Experience	Relevant Work (To a great extent, To some extent, Not very much, Not at all)
Union Membership	Yes /No
CCDO-71	Service, Machining, Fabricating, Construction
Trade Classification	Carpenter, Plumber, Electrician, Mechanical, Finishing
Region	B.C., Alberta, Prairies, Ontario, Quebec, Atlantic

Analysis

The analysis comprises two parts: logistic regression is used first in predicting completion rates for the construction trades and secondly in a parallel analysis of all apprenticed trades included in the NATS. Crosstabulations of relevant variables are constructed for both analyses to show relationships in greater detail. In computing completion rates for the construction trades we used the Trade Classification variable. Region is expanded to include all regions and provinces of Canada. The second analysis

Table 3. Logistic Regression for “Holmes & Singh’ Model With Age, Gender, Education Level, Prior Experience, Union Membership, Region, and Construction Trade

Independent Variable	‘Holmes & Singh’ Model			
	B	S.E.	Sig	Exp(B)
Age			0.00	
20 & younger	-0.04	0.06	0.50	0.96
21-24	-0.11	0.06	0.06	0.89
25-30	0.22	0.07	0.00	1.25
31 +	-0.07			0.93
Gender	-1.14	0.40	0.00	0.32
Education			0.00	
< High School	-0.13	0.05	0.02	0.88
HS Graduate	-0.17	0.05	0.00	0.84
Post-Secondary	0.30			1.34
Prior Experience			0.10	
Not at all	-0.07	0.09	0.43	0.93
Not very much	-0.12	0.07	0.10	0.88
Some extent	0.09	0.08	0.21	1.10
To a Great Extent	0.10			1.10
Union Membership	0.17	0.13	0.19	1.18
Region			0.00	
B.C.	0.24	0.17	0.15	1.27
The Prairies	-0.18	0.14	0.21	0.84
Ontario	0.44	0.11	0.00	1.55
Quebec	-0.45	0.28	0.11	0.64
Atlantic	-0.05			0.95
Construction Trades			0.04	
Carpenters	0.34	0.13	0.01	1.40
Plumbers	-0.49	0.27	0.07	0.61
Electricians	0.03	0.26	0.92	1.03
Mechanical	0.00	0.12	0.99	1.00
Finishing	0.12			1.13
Interaction			0.01	
B.C. by Union	-0.10	0.19	0.60	0.90
Prairies by Union	-0.63	0.17	0.00	0.53
Ontario by Union	0.02	0.18	0.93	1.02
Quebec by Union	0.75	0.32	0.02	2.11
Atlantic by Union	-0.04			0.96
Interaction			0.01	
Carpenters by Union	-0.10	0.19	0.60	0.90
Plumbers by Union	-0.63	0.17	0.00	0.53
Electricians by Union	0.02	0.18	0.93	1.02
Mechanical by Union	0.75	0.32	0.02	2.11
Finishing by Union	-0.04			0.96
Constant	0.60	0.42	0.15	

Regression: -2LL= 4426.9, X²= 261.3, d.f.= 22, p< .00, n= 3325

of the aggregated trades replaces the Trades Classification variable with the CCDO variable in order to accommodate the expanded range of apprenticeships.

RESULTS & DISCUSSION

The initial analysis was limited to cases in the construction trades. Here, we attempted to establish the pattern of significant relationships between completion and the set of individual difference and institutional variables suggested by Holmes & Singh extending their single-province analysis, however, to all regions and provinces.

The second analysis examined the same relationships but in the context of all apprenticed trades, differentiated by CCDO categories. The primary concern in both analyses was union membership and its relationship to completion.

Construction Trades (Holmes & Singh Model)

Table 3 (across) presents the logistic regression results for the construction trades. The results indicate a reasonable accurate overall fit to the data with this model ($X^2_{(22)} = 261.3, p < .00$). Completion rates were predicted from variables suggested by Holmes & Singh (1995) and from the additional variables of Region and Gender.

Although Holmes and Singh found time credit to be an important predictor, our comparable variable of prior (relevant) work experience was not significant. The other individual difference variables of age, and educational level that were a part of the Holmes & Singh analysis were significant although they followed a somewhat different pattern. Where Holmes & Singh found that younger apprentices were the more likely group to complete, in our analysis those in the 25-30 year age range had the highest completion probability (odds ratio^{*} = 1.25). The results for educational level were similar in direction to those of Holmes & Singh's who assessed the dichotomy of 'less than high' school and 'high school graduation'. In our analysis, the addition of the third 'post-secondary' category differentiated more sharply the effect of level of education. There is a significant effect for the individual difference variable of gender (not included in the Holmes & Singh study). However, the sample size is perhaps too small to be reliable. This reflects the very low participation rates of women in the so-called 'non-traditional' trades found in the construction industry.

There were significant main effects for the geographic and institutional variables of Region and Trade. Completion rates are much higher in Ontario than in the rest of Canada, with the possible exception of B.C. Quebec appears to have the lowest completion rates. Among the trades, carpenters have the highest and plumbers the lowest completion probabilities. Variations between regions and trades are, perhaps, to be expected. These differences acquire greater meaning in relation to union membership.

* EXP(B) – odds ratio – is an index of change in the criterion variable (attrition) given a one-unit change in a particular predictor variable (with the other predictors held constant).

Table 4. Completion Rates by Union Membership for Construction Trades

Age	<20		21-24		25-30		31+			
Union Membership	Yes	No	Yes	No	Yes	No	Yes	No		
Carpenter	57.1	61.0	50.7	56.2	45.2	56.2	37.9	44.6		
Plumber	78.6	78.1	79.3	71.4	77.8	70.3	55.6	69.7		
Electrician	75.0	69.4	60.5	64.1	73.6	80.7	62.7	50.4		
Mechanical	54.7	73.9	61.2	67.2	59.8	65.2	54.5	60.0		
Finishing	51.8	45.0	52.5	46.3	54.7	54.2	41.6	52.2		
Gender	Male				Female					
Union Membership	Yes		No		Yes		No			
Carpenter	47.5		56.5		16.7		45.2			
Plumber	59.5		67.4		62.5		60.0			
Electrician	57.8		58.1		100.0		7.7			
Mechanical	58.0		67.0		0.0		46.2			
Finishing	50.5		49.8		30.8		50.0			
Education	Less Than High School		High School graduates		Post Secondary					
Union Membership	Yes	No	Yes	No	Yes	No				
Carpenter	36.0	48.6	54.7	59.0	51.0	58.0				
Plumber	35.2	54.4	71.6	74.1	56.5	66.7				
Electrician	20.9	45.8	53.8	64.5	63.5	55.9				
Mechanical	48.9	59.2	65.8	69.9	55.4	65.9				
Finishing	42.3	43.3	57.3	51.2	52.6	55.6				
Prior Experience	To a Great Extent		To Some Extent		Not Very Much		Not at all			
Union Membership	Yes	No	Yes	No	Yes	No	Yes	No		
Carpenter	58.0	54.7	60.9	57.9	43.6	62.6	35.3	53.1		
Plumber	71.7	53.4	59.4	58.2	28.8	66.7	60.2	68.7		
Electrician	71.7	57.0	59.4	70.1	47.5	61.3	49.2	52.7		
Mechanical	54.1	64.3	63.8	56.3	68.6	68.9	54.7	67.9		
Finishing	47.2	46.1	50.0	54.1	49.5	42.6	52.4	52.3		
Region	B.C.		Prairies		Ontario		Quebec		Atlantic	
Union Membership	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No
Carpenter	42.9	56.5	48.9	53.0	59.5	70.8	45.8	41.9	57.6	48.3
Plumber	100	68.6	60.0	56.7	78.2	83.2	49.2	40.3	57.1	64.2
Electrician	0*	0*	70.2	65.3	58.3	81.4	54.8	43.2	85.7	79.2
Mechanical	76.1	63.4	53.9	53.8	76.1	80.6	47.4	50.0	73.6	74.5
Finishing	57.8	55.2	44.6	50.4	47.7	51.3	49.2	39.7	77.8	47.4

* There is no case in the category.

Holmes & Singh's (1995) finding of a strong association between indenture classes (involving unions) and completion among construction trades apprentices did not find unqualified support in our analysis. The main effect of union membership was found to be non-significant. Nevertheless, the results of the Trades by Union Membership interaction term indicate that in the case of plumbers and mechanical apprenticeships, there is a positive effect associated with union membership. The Region by Union Membership term also is significant although this primarily attributable to a single level (Quebec) – which may be a special case because of its somewhat different accreditation procedures – and to the significant (negative) weight of the Prairies category.

Table 4 (across) details completion rates for each variable in relation to union membership. These results provide further insight into the nature of those effects found to be significant in the regression equation. Among the individual difference variables, it may be seen that completion rates are highest when union membership combines with greater amounts of previously acquired, relevant work experience although other individual difference variables appear to relate to completion independently of union membership, or at least in no obviously systematic manner. The exception is gender and although the sample size is very small, the pattern of results is suggestive of a positive union influence.

The pattern of regional completion rates differentiated by union membership is mixed, especially in the Prairies where completions vary widely across trades. The results for Quebec are more consistent with membership being associated with higher completion rates in all but one trade ((Mechanical). This application of the Holmes & Singh model to provinces other than B.C. suggests further regional sources of difference in calculating the basis for completion rates.

Overall, the pattern of relationships established by Holmes & Singh among B.C. construction trades apprentices found some support in our analysis of the NATS data. The influence of union membership among the construction trades appears, however, to be more complex in jurisdictions with differing norms and practices.

Table 5. Logistic Regression for ‘CCDO’ Model With Age, Gender, Education Level, Prior Experience, Union Membership, Region, and Trade Category

Independent Variable		‘CCDO’ Model			
		B	S.E.	Sig	Exp(B)
Age				0.00	
	<i>20 & younger</i>	0.02	0.04	0.56	1.02
	<i>21-24</i>	-0.15	0.04	0.00	0.86
	<i>25-30</i>	0.14	0.04	0.00	1.15
	<i>31 +</i>	-0.01			0.99
Gender		-0.04	0.14	0.78	0.96
Education				0.00	
	<i>< High School</i>	-0.10	0.03	0.00	0.91
	<i>HS Graduate</i>	-0.18	0.03	0.00	0.83
	<i>Post-Secondary</i>	0.28			1.32
Prior Experience				0.10	
	<i>Not at all</i>	-0.03	0.06	0.60	0.97
	<i>Not very much</i>	-0.06	0.05	0.20	0.94
	<i>Some extent</i>	0.00	0.05	0.92	1.00
	<i>To a Great Extent</i>	0.08			1.09
Union Membership		0.50	0.10	0.00	1.65
Region				0.00	
	<i>B.C.</i>	0.07	0.11	0.53	1.07
	<i>The Prairies</i>	-0.55	0.09	0.00	0.58
	<i>Ontario</i>	0.79	0.08	0.00	2.20
	<i>Quebec</i>	-0.21	0.16	0.17	0.81
	<i>Atlantic</i>	-0.10			0.91
Trades				0.00	
	<i>Service</i>	-0.12	0.13	0.35	0.89
	<i>Machining</i>	-0.13	0.12	0.26	0.88
	<i>Fabricating</i>	0.27	0.10	0.01	1.31
	<i>Construction</i>	-0.02			0.98
Interaction				0.04	
	<i>B.C. by Union</i>	-0.28	0.12	0.02	0.76
	<i>Prairies by Union</i>	0.00	0.11	0.99	1.00
	<i>Ontario by Union</i>	-0.20	0.13	0.13	0.82
	<i>Quebec by Union</i>	0.39	0.17	0.03	1.47
	<i>Atlantic by Union</i>	0.09			1.10
Interaction				0.03	
	<i>Service by Union</i>	0.15	0.14	0.31	1.16
	<i>Machining by Union</i>	0.04	0.13	0.74	1.04
	<i>Fabricating by Union</i>	-0.27	0.11	0.02	0.77
	<i>Construction by Union</i>	0.08			1.08
Constant		-0.84	0.16	0.00	

Regression model: $-2 LL=10817.7$, $\chi^2=474.4$, d.f.=22, $P<.00$, $n=12553$

All Trade Categories (CCDO Model)

Table 5 (across) summarizes the results of the logistic regression for the ‘CCDO’ model which attempted to broaden the scope of the previous analysis. Again, a reasonably accurate fit to the data was achieved with this model ($X^2_{(22)} = 474.4, p < .00$). With the inclusion of all trades or at least those captured by the CCDO categorization – approximately 80% of the NATS sample – a much stronger pattern of results emerged. The individual difference factors of age and education were significant predictors of completion. The pattern of influence for each was very similar to that found in our initial analysis of the construction trades as was the strength of relationships to completion with odds ratios of 1.15 for the 25-30 year old group and 1.32 for those who possessed some post-secondary experience. While the Prior Experience and Gender variables were non-significant, both require further examination. Prior work experience, when considered jointly with educational activity, defines the unique pathways constructed by individuals as they prepare for the world of work (Heinz, 1999). Gender differences in completion are perhaps a useful initial distinction that then requires a separate set of analyses to discover how men and women experience apprenticeships differently (Sweet, 1997). Region and trade – the two major directions in which we expanded the Holmes & Singh work – again were significant predictors of completion. Again, wide differences were found: Ontario and the Prairies region respectively produced odds ratios of 2.20 and .58. Similarly varied results were found for the Trade variable. The odds ratio for the Fabricating apprenticeship, for example, was 1.31 while those of the other trades were considerably lower.

When union membership is placed in the larger context of the CCDO model analysis, its influence is more obvious as may be seen in the significant beta (.50); and the effect of membership on completion may be further gauged in the odds ratio for this variable (1.65). The effects of union membership are not, however, straightforward. When placed in conjunction with other factors, membership sometimes enhances the likelihood of completion among apprentices and sometimes it does not. For example, it is instructive to compare the main effects of region and trade with the results of their interaction with union membership. While residence in Ontario is important to completion rates, this effect is much qualified by union membership as seen in the reduced odds ratio for the interaction term (.82). A much different outcome results from the interaction between membership and residence in Quebec (odds ratio = 1.47). Similarly qualified effects may be seen in the comparison of main effects and (Union) interactions for the Service and Fabricating trades: completions are enhanced in the former case and moderated in the latter.

Table 6. Completion Rate by Union Membership for All Trades (CCDO)

Age	<20		21-24		25-30		31+			
Union Membership	Yes	No	Yes	No	Yes	No	Yes	No		
Service	91.3	58.1	75.5	68.9	77.5	66.7	66.7	61.3		
Machining	74.0	71.0	70.8	64.5	73.2	65.6	67.0	64.7		
Fabricating	74.1	73.1	63.6	65.9	77.8	73.8	78.6	61.8		
Construction	55.3	70.5	57.0	64.0	57.4	65.0	47.5	58.6		
Gender	Male				Female					
Union Membership	Yes		No		Yes		No			
Service	69.4		58.1		85.1		66.6			
Machining	71.6		67.6		25.0		56.7			
Fabricating	71.0		68.2		83.3		43.2			
Construction	55.1		65.2		44.1		38.7			
Education	Less Than High School			High School graduates			Post Secondary			
Union Membership	Yes		No		Yes		No			
Service	66.7		61.4		90.4		64.7			
Machining	61.8		63.4		73.6		67.8			
Fabricating	64.1		61.6		78.3		71.2			
Construction	41.8		54.0		62.4		68.5			
Prior Experience	To a Great Extent		To Some Extent		Not Very Much		Not at all			
Union Membership	Yes	No	Yes	No	Yes	No	Yes	No		
Service	82.5	60.0	66.7	58.0	100	60.6	69.2	64.7		
Machining	65.4	63.0	81.0	64.6	58.6	76.1	70.3	66.1		
Fabricating	80.3	70.5	75.0	70.6	71.0	66.6	63.8	62.2		
Construction	58.8	59.4	62.2	61.0	51.7	66.7	53.3	64.2		
Region	B.C.		Prairies		Ontario		Quebec		Atlantic	
Union Membership	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No
Service	81.4	52.3	63.3	73.2	88.1	61.0	0*	0*	62.7	55.6
Machining	75.4	63.7	72.5	67.5	78.7	68.1	56.2	59.4	82.5	71.3
Fabricating	80.1	64.7	77.8	67.2	80.3	75.1	53.7	42.5	81.3	64.5
Construction	65.0	61.3	57.8	60.6	76.3	79.9	48.0	49.6	68.4	57.7

* There is no case in the category.

The cross-tabulations presented in Table 6 (across) suggest the nature of the completion rate differences found by comparing Region and Trade factors in terms of union membership. Across regions, we find that completion rates are relatively high in B.C., Atlantic Canada, and Ontario. Completion patterns are more variable in other jurisdictions; and rates in Quebec are distinctly lower for union members. When we examine completion rates for the various trades, those in the service industries reflect the benefits of union membership with the exception of the prairies. Similar results obtain in the manufacturing sector as seen in the rates for machining and fabricating. Completions in the construction industry reveal a variable set of outcomes: rates favour union members only in B.C. and in the Atlantic region while they are slightly lower in the other regions. Overall, the pattern of completion for region and trade are sufficiently variable as to preclude any sweeping generalizations concerning union membership. More detailed study is needed to explore the effects of employment trends in volatile industries as found, for example, in the construction area; the impact of overall unionization levels in a given region (or province); and the potential influence of changing provincial labour legislation.

CONCLUSIONS AND IMPLICATIONS

This paper had two purposes. First, we sought to confirm and extend the relationship between completion rates and union membership in the construction trades, as established by Holmes & Singh (1995). Using variables suggested by this earlier study but employing a nationally-representative data base that allowed a broader geographic analysis, we found that age, prior education level, and trade category were significantly related to completion. These findings were consistent with those of Holmes & Singh. We were not, however, able to confirm the association between union membership and completion despite the fact that this was among the strongest relationship reported by Holmes & Singh.

Our second aim was to broaden the analysis to include all the major trades. We also were interested in variations in the link between completion and union membership across regions and provinces as well as in the contribution of gender to the prediction of completion. The results indicated several significant relationships between completion and the individual difference and institutional variables employed in the study. Of particular note was the strong relationship between union membership and completion. Using union membership and trade type (based on the CCDO classification) as a basis for comparison, patterns of completion were examined for each of the predictors. Here we found a generally positive effect for union membership across the various trades.

This study was a preliminary exploration of the NATS data file. The results of our analysis of completion rates – and the role of unions as potential sources of support for the apprenticeship experience – suggest at least two directions for further research, both of which derive from a concern with completion rates: the first deals with the transition from training to employment as a journeyman and the second examines the gendered nature of both phases.

While the focus of this analysis was largely on the apprenticeship training period, the eventual transition from apprentice status to that of journeyman and the establishment of a career in the workforce also represents an important part of the trades training sequence. The NATS file supplies information that details this transition, touching on matters of dollar returns to the investment in training, attachment to the trade, employment stability and continuity, and involvement in continuing education activities. Initial research by Akyeampong (1991) using the 1990 National Apprenticeship Survey suggested that monetary returns to non-completers did not significantly differ from those of completers. This relationship between completion and returns – as well as other benefits to training – requires particular attention. Union membership may well play as important a role in transitions as it does in the actual training phase of an apprenticeship.

Our analysis further suggests that an important aspect of research on the training and transition phases is the gendered nature of both experiences. Preliminary work with the NATS suggests that men and women differ in their perceptions of classroom and job-site training conditions and in the eventual returns to their investment in training. Sweet (1997) examined differences in women's choice of an apprenticed trade and the results of that research further support the need to extend the study of gender differences throughout the apprenticeship experience.

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