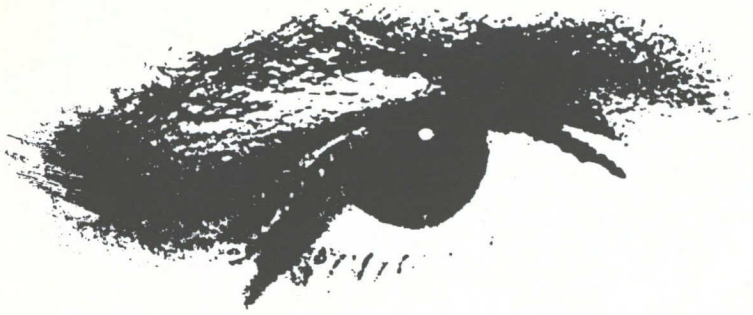
Fashioning the future



TECHNICAL SKILLS:

SECURING THE FUTURE

apparel

Industry, Science and Technology Canada
Industrie, Sciences et Technologie Canada

Canada

TECHNICAL SKILLS:

SECURING THE FUTURE

**This report was prepared by
Coopers & Lybrand Consulting Group and
Gene Barbee and Associates for
Industry, Science and Technology Canada**

1990

PREFACE

Industry, Science and Technology Canada's mission is to promote international competitiveness and excellence in Canadian industry, science and technology. Because our work requires a knowledge-based organization, our stock-in-trade has become information - accurate, timely and accessible. Our main product is intelligence and our strength is based on the knowledge we are able to provide for our clients. For this reason, the information products we generate in our work represent the tangible, value-added contributions we are making as a department.

This report is part of research which was conducted under the Fashion Apparel Sector Campaign Phase II. The overall objective of this initiative was to formulate a joint government/industry action plan to foster the development of the Canadian apparel industry in order to improve its international competitiveness.

We encourage and welcome your feedback which can be provided by completing the enclosed User Feedback form.

PRÉFACE

Industrie, Sciences et Technologie Canada a pour mandat d'encourager la compétitivité internationale ainsi que l'excellence de l'industrie, des sciences et de la technologie canadiennes. Étant donné la nature de ce travail, l'organisation doit donc être fondée sur des connaissances en ces matières. Des renseignements qui sont précis, pertinents et accessibles, constituent les valeurs commerciales du Ministère. En effet, les renseignements constituent le produit principal d'ISTC.

Ce rapport est une partie des recherches qui ont été complétées dans le contexte de la Campagne sectorielle vêtement mode Phase II. Le principal objectif de cette initiative est de formuler avec le gouvernement et l'industrie, un plan d'action pour promouvoir la compétitivité internationale de l'industrie canadienne du vêtement.

Toute réaction à ce document est souhaitée et appréciée. Faites les commentaires sur le formulaire qui suit.

Aussi disponible en français:

Direction du vêtement et de la chaussure
Industrie, Sciences et Technologie Canada
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INTRODUCTION

This document is an abridged version of a study of the technical skill needs of the apparel industry conducted in 1990 by Coopers & Lybrand Consulting Group in conjunction with Gene Barbee and Associates. The deletions consist primarily of supplementary information used to guide the Fashion Apparel Sector Campaign Management and Technical Skills Committee in preparing recommendations to Industry, Science and Technology Canada. However, every effort has been made to retain the essence and thrust of the findings. We believe that we have successfully captured all of the major issues raised in the paper.

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1. EXECUTIVE SUMMARY

Industry, Science and Technology Canada (ISTC) and the apparel industry formed a Management and Technical Skills Committee to review issues facing the apparel sector. Among these issues, the committee realized that the future of the sector relies on an increasing and continuous inflow of technically competent operators and skilled managers. To this end, ISTC and the committee issued two contracts to explore this issue and recommend strategies. This report deals with developing a sustainable inflow of technically skilled personnel for the Canadian apparel sector.

For this study, 'technically skilled personnel' are people who are trained or have significant experience in the apparel sector areas detailed in Appendix I. It is assumed that 'technically skilled personnel' are capable of some knowledge to support the application of technology.

Scope and Approach

The study was conducted in three phases:

- developing an understanding of the industry and why it has a personnel shortage;
- determining what shortages and resources may be suitable and required; and
- direction setting.

Facts, feelings and ideas were solicited from four groups:

- Canadian apparel manufacturers;
- Canadian and international apparel manufacturers' associations;
- Canadian and international apparel schools; and
- Canadian students in apparel and apparel-related programs.

The 41 manufacturing companies interviewed and the nine firms on the steering committee, representing more than 60% of the target Canadian apparel companies, were polled for a range of information including:

- future use of advanced manufacturing technologies (AMT);
- a need for AMT staff;
- pay scales; and
- sources of employees.

Eleven Canadian and international associations were surveyed on how they have addressed the issue of the availability of technically skilled personnel, their successes and failures, their recommendations for the Canadian sector and their perspective on future demand. Representatives from Canadian and American apparel educational institutions were interviewed to determine their experience, strategy and success with their apparel programs. Finally, apparel students from three Canadian schools were surveyed on their

perception of the industry's image, why they are interested in apparel and other related issues.

Information was also solicited from related groups, such as Employment and Immigration Canada on issues of training program funding and projected immigrant rates, Statistics Canada on wage and employment figures and ISTC on their role in addressing this issue.

The committee was guided by a joint industry-ISTC panel and sub-panel, which met numerous times to review current progress and findings.

Summary of Findings

The study indicated that the principal issues facing the apparel industry in attaining a sustainable supply of technically skilled personnel, in order of urgency, are:

1) the lack of educational and training resources to develop apparel-related advanced manufacturing technology skills in Canada's college apparel programs or the lack of sufficient employees for the industry.

2) the industry's perceived poor public image and the lack of accurate detailed information on the apparel sector.

3) the difference in wages between apparel and non-apparel manufacturers.

Recommendations

Based on these findings, the committee recommends:

1) immediately establishing a program to develop educational and training programs to support 2,000 graduates per year by 1995.

2) developing a limited public relations program by 1992 to promote the industry in high schools, colleges and immigration networks.

The rest of the report expands on these recommendations.

2. THE GROWING DEMAND FOR TECHNICALLY SKILLED PEOPLE

It is Predicted That the Use of Advanced Manufacturing Technologies Will Increase over the Next Five Years

The apparel industry predicts continued growth in the use of advanced manufacturing technologies (AMTs) on the shop floor. This increase is predicted for all technology categories, including computer-aided design (CAD), computer-aided manufacturing (CAM), and management and control technologies. (For more information, see Appendix II, Survey of Companies' Needs and Expectations.)

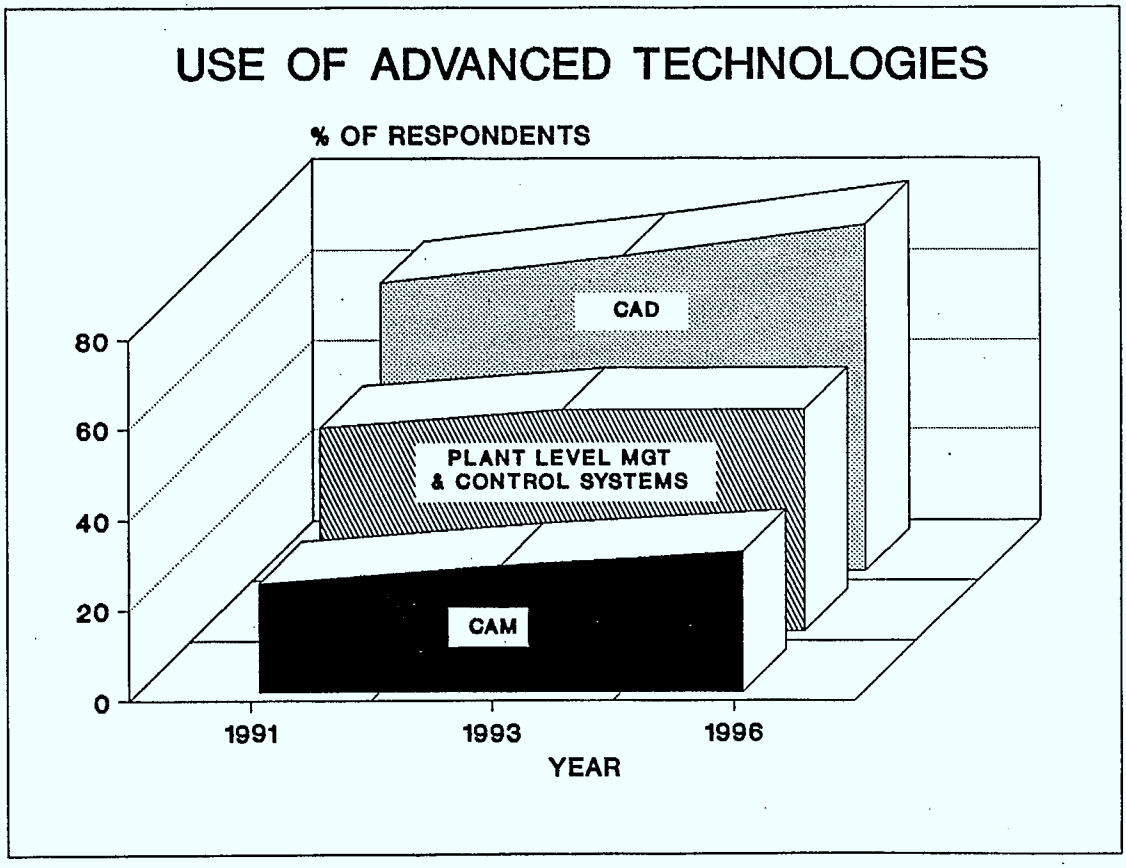


Figure 1

Increased Use of AMTs Will Mean a Continued Need for Technically Skilled Personnel

There are strong indications that the need for technically skilled operators of AMTs will continue to increase in the near future. Comments made during the interviews indicate that total employment is likely to decline. Hence, the increased demand for technically skilled personnel reflects anticipated productivity gains.

The increase in the demand for skilled personnel will be greatest for CAD and CAM jobs.

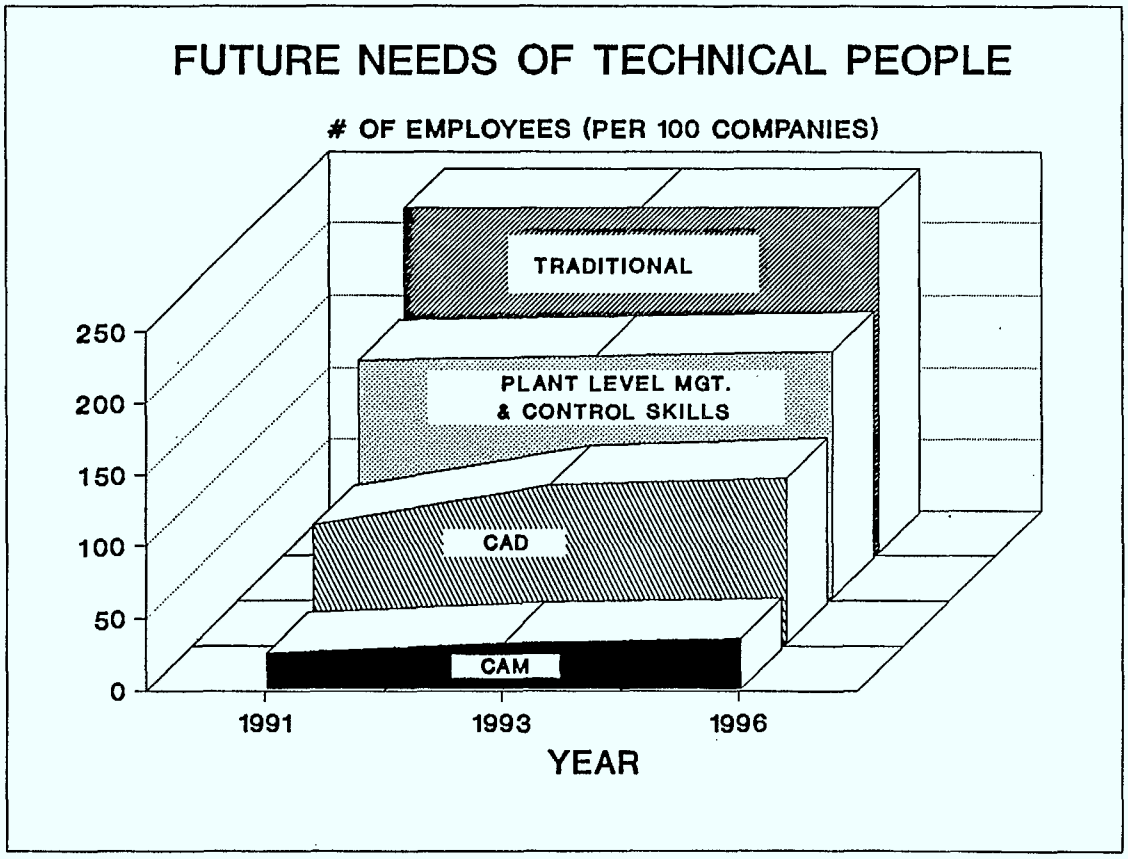


Figure 2

The Canadian apparel industry has identified AMTs for areas of significant productivity gains, specifically, pattern development, cutting, marking and grading and unit production systems. For this reason, these skills are becoming more in demand. However, this is not the case for plant-level management or control skills. There are no current technologies suitable for reducing sewing room personnel enough to drop a supervisor. This, along with shorter run sizes and quick response approaches, has led to the observation that management needs will not change. (For more details, see Appendix II, Survey of Companies' Needs and Expectations.)

3. THE PROBLEMS IN MEETING THE PERSONNEL DEMAND

Canada has a severe shortage of technically skilled personnel. Despite the range of job functions and regional idiosyncrasies, study participants identified five perceived barriers to attracting technically skilled people. These are also cited as key reasons for the shortage.

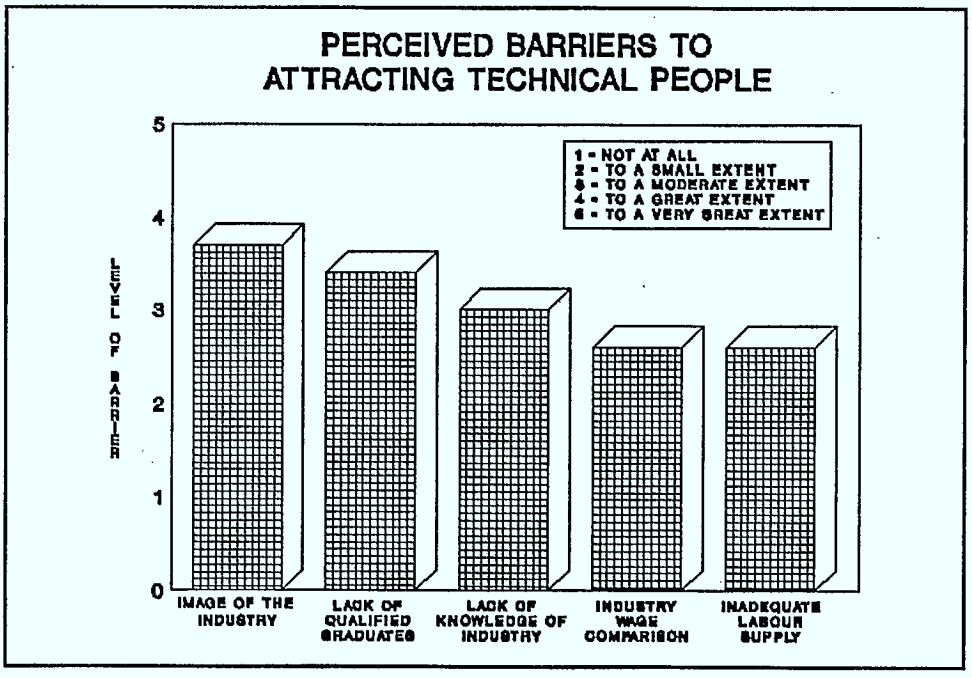


Figure 3

These five barriers can be consolidated into three major issues: the image of the industry, the inability to find enough adequately skilled personnel and the industry's lower than average wages. Although it is difficult to determine which of these three major issues is the cause and which is the effect, the interviews led to the conclusion that the inappropriate skills of the people seeking jobs was the most frustrating of the three.

Candidates who are interested in and committed to the industry were unemployable because they did not have apparel technology training.

During the interviews, participants acknowledged that they could do little to influence the industry's image. And programs geared to this would not be cost-effective compared with other programs. Participants agreed that their primary concern was adequately training candidates.

The Key Problem is Developing Adequately Trained Candidates, not Improving the Industry's Image or Wages

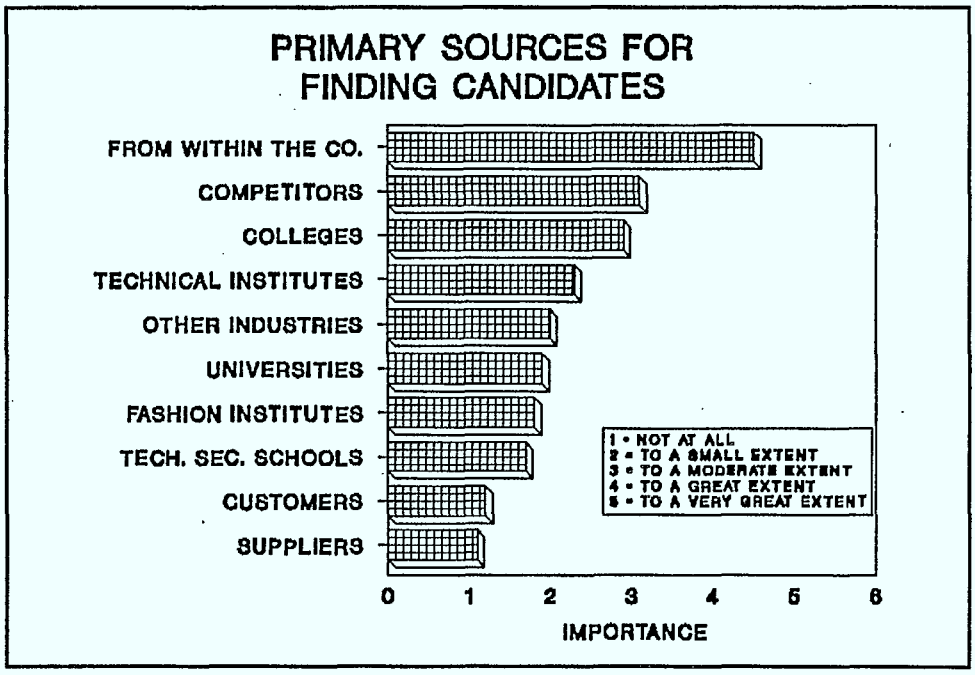


Figure 4

Companies in the industry primarily source technically skilled candidates from within their own company, then from their competitors, colleges, and last, other sources. This indicates that the key issue is developing adequately trained personnel from within the company, and from competitors and colleges. This is an important issue because the candidates are already committed to the industry. Improving the industry's image will not help attract the candidates needed to fill AMT skill-oriented positions.

This important point needs repeating: Canadian apparel companies source technically skilled people from their own companies and their competitors. Therefore, part of the solution must, at least in the short term, deal with training these candidates. As well as dealing with how companies source personnel, an internal development program uses

people who are already committed to the industry. This avoids dealing with the industry image problem.

Logically, using this approach alone will be inadequate. Measures also must be taken to improve the suitability of college graduates and improve the industry's image.

On-the-Job, College and Co-Op Programs Are Tied as Best Sources of Training

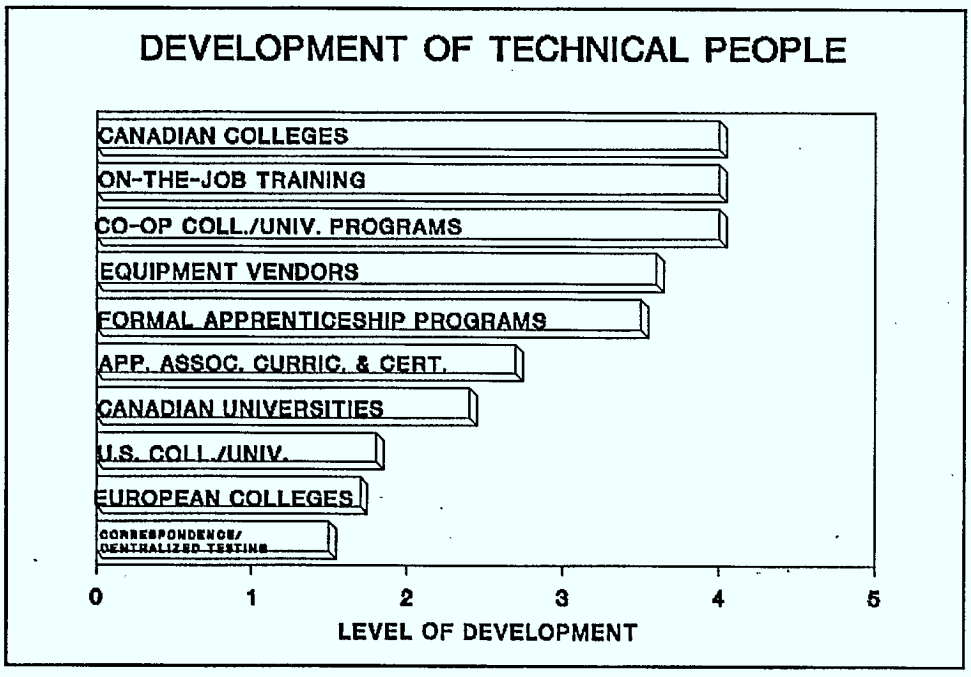


Figure 5

The question remains: would companies rather draw technically skilled personnel directly into their organization or develop them from within? Companies may now be forced to develop from within because of the lack of qualified candidates. In turn, the lack of qualified candidates may be caused by the industry's poor image and the wage issues discussed earlier. Participants indicated that they would prefer internally developed personnel, but the results are inconclusive.

Canadian Colleges Are Providing 155 Technically Skilled Graduates Per Year

George Brown College	73
Kwantlen College	28
Lasalle College	18
Marie Victorian College	0
Ryerson Polytechnical Institute	15
University of Manitoba	21
Total	155

Figure 6

Canadian apparel schools have more than 772 graduates per year, but only 20% are technically oriented. However, the demand for technically skilled personnel is likely to exceed 2,200 per year. (This number is based on the projected needs for CAD, CAM and plant-level skills for Canada's 732 medium- and large-sized apparel manufacturers.)

The key motivators for establishing education programs are (in order): student demand, faculty expertise and industry demand. (For more information, see Appendix V, Survey of Canadian Educational Establishments' Perceptions.)

The interviews highlighted a significant gap between the industry and schools. Industry did not understand the constraints, economics and conflicting messages that the schools must deal with. The schools did not understand the priorities of businesses (businesses and schools do not interact much) or their need for technically skilled personnel.

There are two key lessons to learn from this finding. First, industry is not the key driver. Colleges are setting their curricula based on government funding and student interest, not on industry needs.

The survey of student perspectives showed an overwhelming desire to know more about the industry — more than 93% wanted to know more. This is encouraging because it shows that students want to understand how apparel companies work and what education is required. However, it is worrisome because colleges are depending on 'uninformed' student interests to establish courses and programs.

Second, colleges are still relying on government support to finance programs. This must be dealt with before effective apparel programs can be established.

Significant progress in establishing college- and university-based apparel technical training may be possible merely through closer relationships and communications between businesses and schools.

Industry and Company Image is the Second Factor Contributing to the Low Number of Technically Skilled Candidates

Conflicting findings on the industry's image came from industry representatives and students. The industry felt that poor image was the key problem when trying to attract personnel (Figure 3), but students felt that image was the second most attractive feature of the industry (Figure 7).

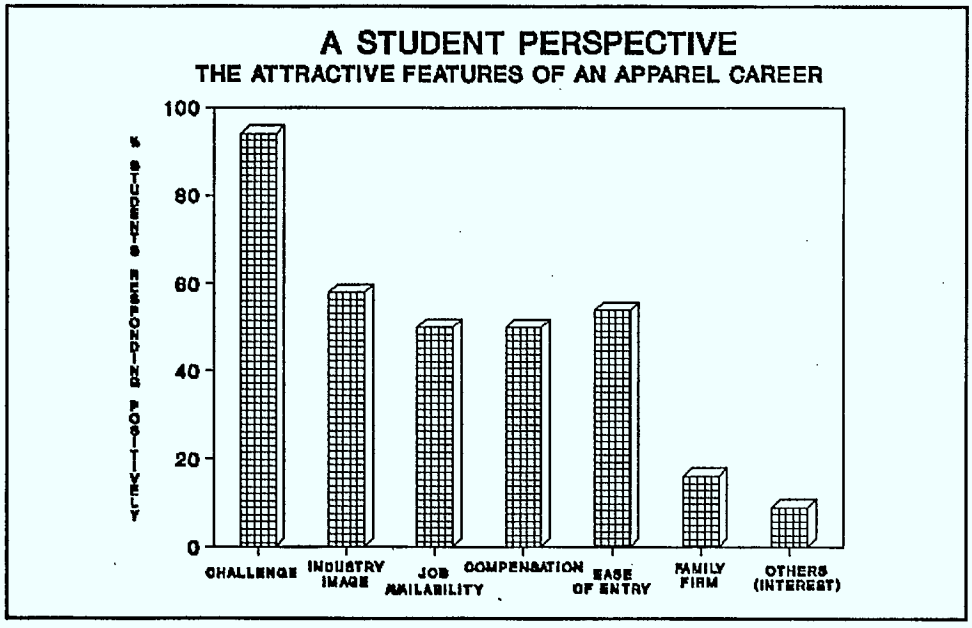


Figure 7

Obviously some work must be done to improve the industry's image and to deliver industry information to the students. However, students do not see this as a major issue.

Because of this finding, and because of where industry gets technical candidates (that is, internally and from their competitors), improving industry image is a secondary issue.

Study participants further endorsed improving industry image as a secondary issue through these perceptions:

- it would be too expensive to conduct an image improvement public relations program because the targetted public is too diverse;
- an image campaign would not correct underlying issues, such as low wages, high manual labour and a declining Canadian industry; and
- few apparel companies would be willing to contribute to a public relations campaign.

Wage Disparity between Apparel and other Manufacturing Sectors Was Perceived to be the Third Factor Contributing to a Low Number of Technical Candidates

The wage spread is so significant that it is unlikely that the apparel sector can ever effectively compete against other industries on wages.

Comparing survey participant pay scales with general industry averages shows a considerable spread when the participant has no experience. However, for employees with five years' experience, the wage rate could be expected to be as much as 55% higher outside the apparel sector.* The current rate of return of profitability in the Canadian apparel sector would not support wage rate adjustments up to the rates of the general manufacturing sector.

The apparel sector must compete for qualified employees on issues other than wages.

* Although these statistics are based on the study's small sample base, they are consistent with Statistics Canada reports that the average hourly rate in the non-apparel sector is $13.54 compared with $8.45 in the apparel sector – a 60% spread.

There is also a wage rate spread across Canada in the apparel sector. This may lead to personnel shortages in some areas.

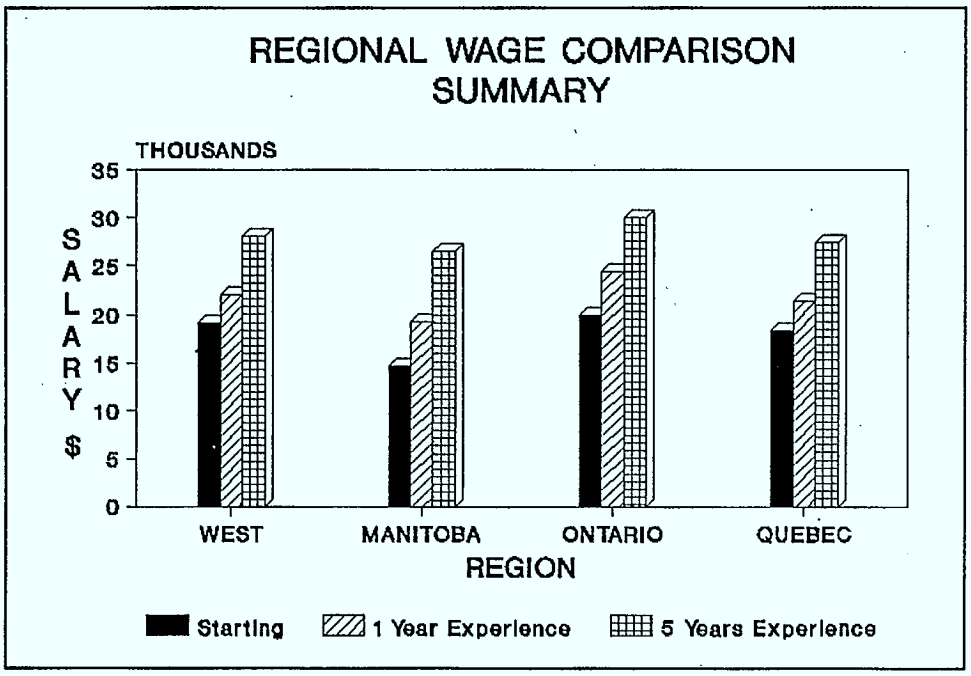


Figure 8

Although not as significant as the wage disparity between apparel and other sectors, regional disparity also affects the availability of technically skilled personnel. This effect is somewhat mitigated by regional cost of living indexes and other factors. The true effect of this spread is unknown.

4. TWO KEY RECOMMENDATIONS

Summary of Findings

The study indicates that the principal issues facing the apparel industry in attaining a sustainable supply of technically skilled personnel, in order of urgency, are:

1) the lack of educational and training resources to develop apparel-related advanced manufacturing technology skills in Canada's college apparel programs or the lack of sufficient employees for the industry;

2) the industry's poor public image and the lack of accurate detailed information on the apparel sector; and

3) the difference in wages between apparel and non-apparel manufacturers.

Recommendations

Based on these findings, the committee recommends:

1) immediately establishing a program to develop educational and training programs to support 2,000 graduates per year by 1995.

2) developing a limited public relations program by 1992 to promote the industry in high schools, colleges and immigration networks.

5. A SIMPLE EDUCATION AND TRAINING PROGRAM

Overall Strategy

A logical three-phase program is needed to develop the necessary educational and training resources.

Phase I: Establish a Self-Teach Program

As Figure 4 indicates, the primary source of technically skilled personnel is through developing internal staff. Because this trend will continue until a Canadian apparel educational infrastructure is established, the first step must be creating a program to help internal staff development. We recommend establishing a self-teach program that would be readily available across Canada and in the workplace.

The apparel self-teach program must include a central library of course material (interactive videos, videotapes and traditional correspondence courses) available to apparel companies. Certificate programs made up of several courses must be developed to provide complete and structured training, as well as participant reward and classification.

Apparel self-teach programs are being successfully used by most major American apparel schools.

The benefits of a self-teach approach include:

- All the necessary course material has already been developed.
- This approach is inexpensive and easy to organize. An education advisory board could set course guidelines, as the American Apparel Manufacturer's Association did. No teaching staff or facilities are needed.
- The costs are low for participating companies. The administrative overheads are low. The advisory board could maintain a library of courses that could be loaned to a company as needed. Participating companies do not need to invest in training materials.
- The courses could be used as and when required by each company.
- As this study indicates, most technical candidates come from other positions in the sector. These people will need at least several, and in most cases many, courses to make them qualified. Most apparel companies do not have human resources personnel to develop and manage the training program. By developing course streams, or developing several courses into a certificate curriculum, the local apparel company does not have to develop and monitor training.

- Videotapes make the course easier to take and require fewer English skills. Interactive videos allow courses to be tailored to each company's requirements and use of manufacturing technology.

As the self-teach library grows and use becomes broader, a program of certificates for completing courses could be developed. The advisory panel could organize this.

A self-teach program could be sponsored by industry or government because of its low cost, and easy access and use by all participating companies. The investment per company would be low compared with the number of hours of courses available.

Phase II: Establish a Workshop Program

After the self-teach program is established, as early as one year after launching, locally held workshops will be needed. Self-teach courses provide important knowledge foundations, but students will progress beyond the available material. They must be able to question and interact with the instructor as well as apply the material directly to their particular situation.

The workshop program must include numerous apparel-related programs that could run in almost any location — local hotels, schools and community centres — or in a sponsor company if particular equipment is required. Course formats could include several full days, a series of evenings or one-day sessions over several weeks.

The program should be flexible, local and inexpensive when shared by several companies.

The benefits of a workshop approach include:

- The necessary workshop programs are already developed and available.
- The program would start after the self-teach program was established and successful, and had enough students.
- Courses can be tailored to the products and issues of participants, making the program more useful to participants.
- Courses can also be delivered in locations outside of the major centres — Montreal, Toronto, Winnipeg and Vancouver — where live courses are rare.
- The cost per participant will be low because of cost-sharing among several companies.

The workshop program would be more complicated to organize and more costly per student than self-teach courses. Because of the complexity, we recommend that the Permanent Apparel Education Office develop, organize and maintain the program. They would develop curricula and organize and promote the workshops in local regions. Course and instructor evaluations would be used to monitor program effectiveness and improve the program over time.

Schools identified as sources of suitable courses are described in Appendix VIII.

Phase III: Establish a 'Hub and Spoke' System

The third phase is a logical extension of the last two. It will develop a way to finish off the education of people developed from within companies. At a central school or hub, students who had completed the required self-teach and workshop programs would participate in either a one-semester or two-term co-op program to receive a technically related diploma.

This program will allow for concentrated training and exposure to courses and facilities unavailable through the self-teach and workshop programs.

The benefits of a hub and spoke program include:

- Much of the needed infrastructure and all of the courses are available in Canada.
- It would start after the self-teach and workshop programs are established and there are enough candidate students.
- It can take advantage of available time at existing apparel schools.

Per student, the hub and spoke program would be more complicated to organize and more costly to run than the other two phases. Again, we recommend that the Permanent Apparel Education Office develop, organize and maintain the program.

Through cooperation among businesses, schools, apparel associations and government, this phase is possible. Each party has a role in developing this program.

Associations will help promote, coordinate and manage the program with the Permanent Apparel Education Office.

Business will provide and sponsor students, as well as advise the colleges on appropriate programs.

Government will sponsor the program.

Schools will provide the facilities and instructors and will administer the hub part of the program. They will also help promote, coordinate and manage the program with industry and apparel associations.

Australia's Textile Clothing and Footwear Industry Training Council is similar to the training and education infrastructure being proposed for Canada.

Australia's textile clothing and footwear industry sectors have formed an umbrella support group similar to Canada's Canadian Apparel Manufacturer's Institute (CAMI). This support group, the Textile Clothing and Footwear (TCF) Council of Australia, is described in Appendix IV.

Training has become a large part of the TCF council's work. A separate training council was established to work with businesses and technical schools to help meet the growing training requirements of TCF industries.

The training council maintains a national office with two full-time staff (director and assistant). It also has regional offices in each of Australia's six states. The council's board of directors is made up of representatives from:

- union (3);
- government (1);
- industry (3 from each sector); and
- TCF Industry Council (2).

Training in Australia's TCF industries is moving toward in-house applications. The training council is emphasising industry as the driving force to providing various internal training programs. The council also works with the technical and further education schools in Australia to ensure that technically skilled employees are available to the clothing industry.

The national and regional training council offices operate independently of the national office. However, national policy-making and direction-setting functions are passed along to all regions.

The training council relies on federal and state governments for revenue, and works closely with government to help implement national training strategies.

Phase I - Self-Teach Program (Chart)

A	**DEVELOPMENT**
1	Identify specific subsector, functional and regional training requirements. Develop target curricula streams (for example, CAD/CAM, operator training).
2	Identify self-teach apparel and non-apparel courses in Canada and internationally.
3	Establish workshop evaluation criteria and standards.
4	Establish workshop evaluation committees. Complete evaluations.
5	Develop curricula, certificate streams, and promotional materials.
B	**LAUNCH**
6	Develop a course library and administration and lending procedures.
7	Test the program.
8	Release self-teach program across Canada.
C	**MAINTENANCE AND IMPROVEMENTS**
9	Monitor course subscription and evaluation. Record course graduates.
10	Monitor new available courses.
11	Modify courses as necessary.

Phase II - Workshop Program (Chart)

A	**DEVELOPMENT**
1	Identify specific subsector, functional and regional training requirements. Develop target curricula streams (for example, CAD/CAM, operator training).
2	Identify workshop apparel and non-apparel courses in Canada and internationally.
3	Establish workshop evaluation criteria and standards.
4	Establish course evaluation committees. Complete evaluations.
5	Develop curricula, certificate streams, and promotional materials.
B	**LAUNCH**
6	Develop list of workshop programs.
7	Select regional locations for workshops.
8	Provide workshops to each apparel region across Canada.
C	**MAINTENANCE AND IMPROVEMENTS**
9	Monitor workshop subscription and evaluation. Record course graduates.
10	Monitor new available courses.
11	Modify workshop programs as necessary.

Phase III - Hub and Spoke Program (Chart)

A	**DEVELOPMENT**
1	Identify and select regional hubs (college level).
2	Evaluate similar hub and spoke programs in apparel and non-apparel industries.
3	Determine curriculum of course(s): - duration; - topics; - costs; and - teachers.
B	**LAUNCH**
4	Initiate operations of regional hubs.
C	**MAINTENANCE AND IMPROVEMENTS**
5	Establish a hub and spoke certification system.
6	Monitor performance of regional hubs and graduates in the industry.
7	Evaluate the necessity of a dedicated national apparel centre of excellence based on: - results generated from the hub and spoke program; - development costs; - available funding; and - trends in Canadian and global apparel manufacturing.

6. THE PUBLIC RELATIONS PROGRAM

Various public relations programs have been implemented in the United States to promote the apparel industry with targeted groups of future personnel.

This study indicates that principal targets are highschools, technical colleges and new immigrants. All three targets have established career guidance and counselling systems to distribute material and emphasise the industry.

Our recommendations for developing a public relations program to attract future personnel are based on existing models in the United States. We recommend:

1. developing and distributing promotional material in videos and brochures to target groups; and

2. developing and conducting a series of plant tours for career counsellors and target groups.

Phase I - Developing Promotional Material

The Education Committee of the American Apparel Manufacturer's Association (AAMA), representing manufacturers, and the American Apparel Education Foundation, representing schools, have developed and distributed promotional videos and brochures. The promotional material targets highschool and technical college students.

Brochures include *Career Opportunities in the Apparel Industry* and *Apparel College Directory*. *Career Opportunities in the Apparel Industry* provides job descriptions of various positions in the apparel industry. The brochure also lists 11 schools in the United States and Canada that offer apparel programs.

The *Apparel College Directory* gives detailed information on schools offering apparel programs. Information provided on each school includes: contact person, fee schedule, program name, academic degree, entrance date and a general outline of the program.

A video entitled *Go For Apparel* highlights the career opportunities and the high-tech nature of the apparel industry. It has been distributed to highschools and technical colleges for three years and has also been shown on public television.

Developing and distributing promotional material similar to that of the AAMA would put the Canadian apparel industry in a more favourable position. To reduce costs, American references in the promotional video could be edited out, thereby making it applicable to the Canadian apparel industry.

The apparel industry's image is difficult to change in the short term. The AAMA Education Committee realizes that image is a barrier to attracting personnel. AAMA can offer no documentation on the success or failure of their public relations efforts and do

not plan to expand the program. As in Canada, industry image combined with wage discrepancies are reasons for the low student numbers in apparel production programs.

Phase II - Plant Tour Program

During the interviews, several manufacturers stated that they conduct plant tours for highschool and college students with the hope that these students will apply for jobs after graduation. These manufacturing facilities are clean and rely heavily on new technologies and management systems. Plant tours improve the image of the host company and of the industry in general.

Developing a plant tour program aimed at career counsellors from highschools, technical colleges and immigration networks as well as students will have a good effect on apparel technical skills shortages.

The plant tour program, although less expensive and complex than the promotional material program, should be implemented after promotional material is distributed. Promotional material will generate an interest in the apparel industry among counsellors and students, thereby increasing the effectiveness of the plant tours.

APPENDIX I

PROJECT SCOPE AND APPROACH

APPENDIX I

Project Scope and Approach

Project Scope

This project addresses the technical skills needs of medium- to large-sized Canadian apparel manufacturers. Small firms with less than $10 million in annual sale were not included because the Steering Committee felt that these companies usually do not have advanced manufacturing technologies. Hence, their need for employees skilled to operate advanced manufacturing technologies is low.

The Steering Committee included the following job functions in the study:

Traditional
- Pattern Makers
- Designers
- Mechanics
- Industrial Engineers
- Other ( )

Computer-Aided Design (CAD)
- Pattern Development
- Marking and Grading
- Fashion Design
- Others ( )

Computer-Aided Manufacturing (CAM)
- Computerized Cutters
- Ultrasonic Welding
- Unit Production Systems

CAD/CAM Support
- Electronics Technicians

Plant-Level Management and Control Skills
- Layout and Process (Manufacturing) Engineering
- Quality Assurance
- Line Management
- Manufacturing and Cost Accounting
- Financial Control Systems
- Bar Coding
- Shop Floor (Real Time) Data Collection
- Warehouse Automation

Approach

Telephone and personal interviews were used to poll the key parties associated with the problem and possible solutions. These surveys included industry, Canadian and international associations, Canadian and U.S. apparel schools and Canadian apparel students. In all cases, preliminary findings and survey results were fed back to the participants to solicit further comments and more observations.

Interim and preliminary findings were reviewed with the Committee and the scope and approach of the study was adjusted accordingly. Numerous key resources and programs changed or became available while this was in progress, such as Employment and Immigration Canada's Canadian Labour Force Development Board, which ahs been included in the process.

Preliminary findings and recommendations were delivered to the Steering Committee on February 15, 1991. The final report was prepared based on recommendations made.

Representation of Survey Population

Using a survey to gather accurate and representative information from a selected population is difficult. This careful selection of the population and the survey design are key to achieving meaningful results. Although every effort was made to survey a wide distribution of Canadian apparel manufacturers based on size (annual revenue), geography, and garments, some of the results may be slightly skewed. The reason for this is misinterpretation of questions and answers and the profile of each selected manufacturer.

Short-term Planning Horizon of Apparel Manufacturers

The transition from short-term thinking to a long-term strategic outlook has been, for many Canadian industries, a slow process. The short-term outlook of many Canadian apparel manufacturers is mostly because of the tariff policies on our imports. With new global trading agreements, the Canadian apparel industry is faced with competing against labour costs in lower-wage countries. During our interviews and surveys it became evident that the planning horizon of apparel manufacturers considered only three years. Manufacturers could not accurately forecast what technology and employee requirements they may need five years from now.

APPENDIX II

SURVEY OF COMPANIES' NEEDS AND EXPECTATIONS

APPLICATION OF ADVANCED TECHNOLOGIES

Computed Aided Design

TECHNOLOGY APPLICATION	CURRENT	% OF APPLICATION		
		1991	1993	1996
Computer Stitch	3	3	3	3
Fashion Design	27	27	40	51
Pattern Development	80	80	83	85
Marking and Grading	85	85	88	93

Fashion design applications of CAD will witness the biggest increase.

Computer Aided Manufacturing

TECHNOLOGY APPLICATION	CURRENT	% OF APPLICATION		
		1991	1993	1996
Computer Knitting	3	3	3	3
Ultrasonic Welding	15	15	15	15
Unit Production Systems	27	29	32	37
Computerized Cutters	27	27	37	40

With the costs of computerized cutters expected to lower, their application is expected to increase respectively.

Application of Advanced Technologies

TECHNOLOGY APPLICATION	CURRENT	% OF APPLICATION		
		1991	1993	1996
Warehouse Automation	5	7	7	7
Shopfloor Data Collection	2	7	15	29
Fabric Testing	46	49	51	54
Bar Coding	57	66	71	71
Manufacturing & Accounting Systems	100	100	100	100

The significant rise in shop floor real time data collection, bar coding, and fabric testing equipment can be attributed to apparel manufacturers shift to Just-In-Time production and quality improvements.

FUTURE NEEDS OF TECHNICAL PEOPLE

Traditional

POSITION	% OF PEOPLE		
	1991	1993	1996
Industrial Engineers	2	2.2	2.2
Pattern Makers	2.5	2	2
Designers	2.5	2.7	2.7
Mechanic	2.5	2.7	2.7

The number of pattern makers is reduced by 25% over the next 3 years as companies are introducing more computer-aided pattern making systems.

Computer Aided Design

POSITION	% OF PEOPLE		
	1991	1993	1996
Fashion Design	0.1	0.12	0.15
Pattern Development	1.1	1.4	1.4
Marketing and Grading	1.26	1.8	1.88

There is an increased demand for the number of CAD operators for all functional areas.

Computer Aided Manufacturing

POSITION	% OF PEOPLE		
	1991	1993	1996
Ultrasonic Welding	0.1	0.1	0.1
Computerized Cutters	0.3	0.46	0.49
Unit Production Systems	0.34	0.4	0.47

The increases in technical people required is due to the introduction of new computerized cutters (63%) and unit production systems (38%).

Plant Level Management & Control Skills

POSITION	% OF PEOPLE		
	1991	1993	1996
Warehouse Automation	0	0	0
Process Engineering	0	0	0
Manufacturing Control Systems	0	0	0
Data Collection	0.02	0.15	0.29
Fabric Testing	0.5	0.63	0.71
Quality Control	2	2	2
Line Management	9	9	9

The increases in data collection and fabric testing job roles indicates the increased importance on quality and real-time production response.

EXPERIENCED BASED SALARY PROJECTIONS

Traditional

POSITION	($) SALARY		
	Current (No Exp.)	1 Year Exp.	5 Years Exp.
Pattern Makers	17525	20264	26626
Sewing Machine Mechanic	18498	22437	28498
Industrial Engineer	20229	24404	32565
Designers	20783	24633	31060

The higher growth rates for designers and industrial engineers depicts the importance of two functions in an apparel manufacturing business.

Computer Aided Design

POSITION	($) SALARY		
	Current (No Exp.)	1 Year Exp.	5 Years Exp.
Marking & Grading	17324	20341	26347
Pattern Development	17679	20521	25392
Fashion Design	19710	23808	33451

The large increase in fashion design reflects the increasing reliance on designers with CAD experience.

Computer Aided Manufacturing

POSITION	($) SALARY		
	Current (No Exp.)	1 Year Exp.	5 Years Exp.
Computerized Cutters	17966	21392	32565
Unit Production System	18900	22230	24700

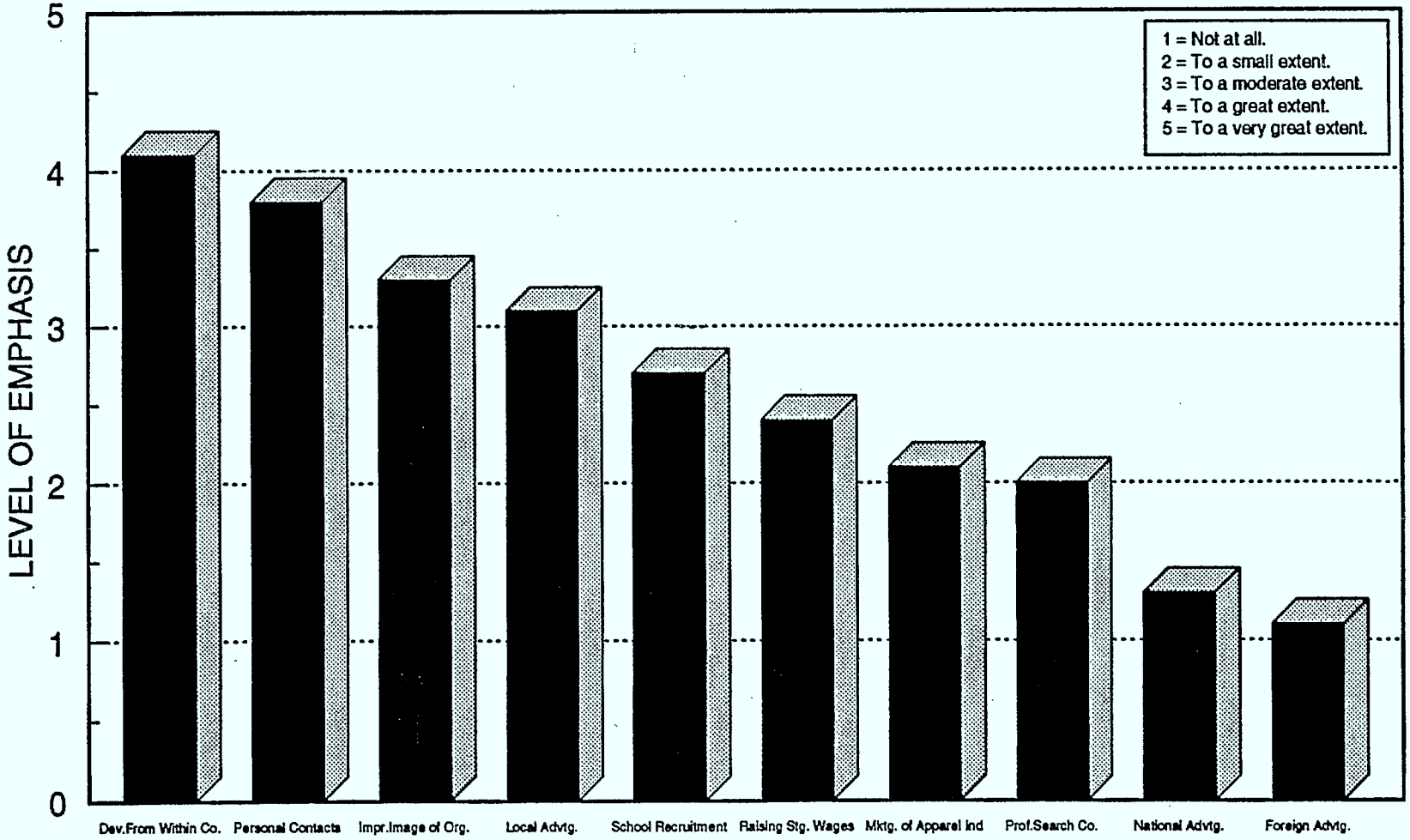
The higher salary for computerized cutters reveals that manufacturers are placing a greater emphasis on computerized cutters.

Plant Level Management & Control Skills

Position	($) Salary		
	Current (No. Exp.)	1 Year Exp.	5 Years Exp.
Fabric Testing	17680	19126	24075
Quality Control	18960	20460	25486
Line Management	21164	22999	27992

The lower salaries for plant level management and control skills reflects that less emphasis is being placed on these functions.

APPROACHES BEING TAKEN TO ATTRACT TECHNICAL PEOPLE



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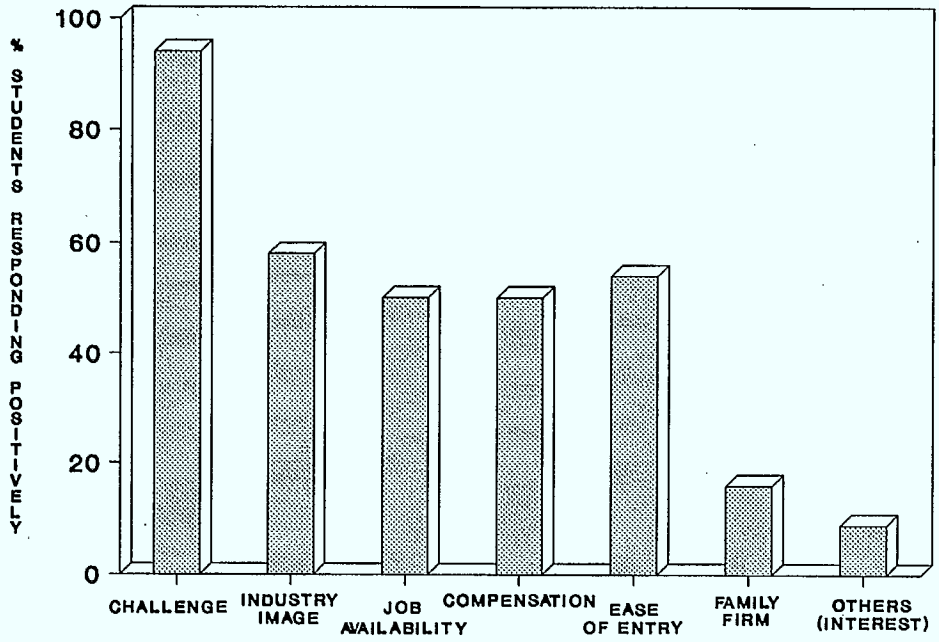
APPENDIX III

STUDENT PERCEPTION OF THE APPAREL INDUSTRY

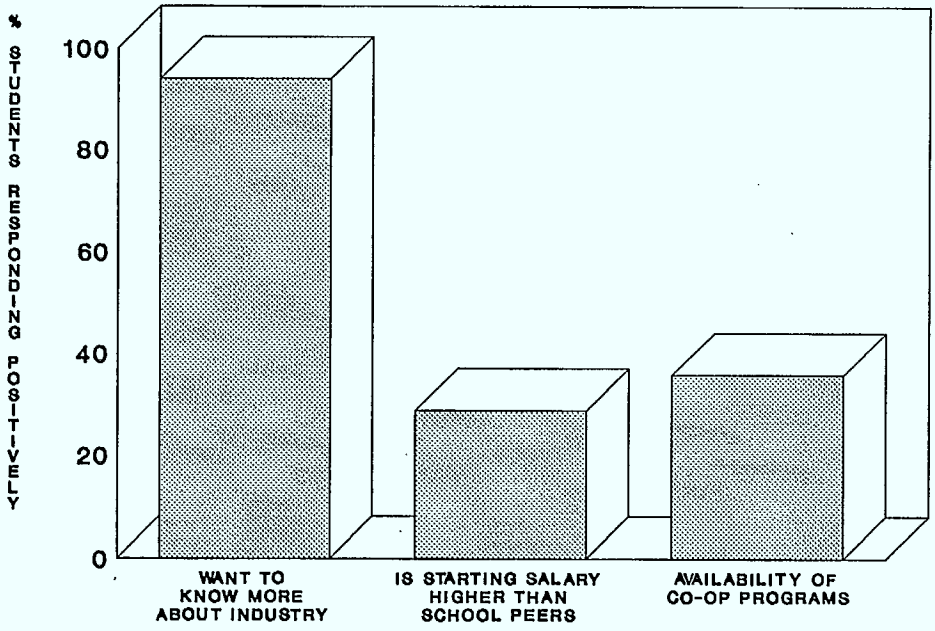
A STUDENT PERSPECTIVE

THE ATTRACTIVE FEATURES OF AN APPAREL CAREER

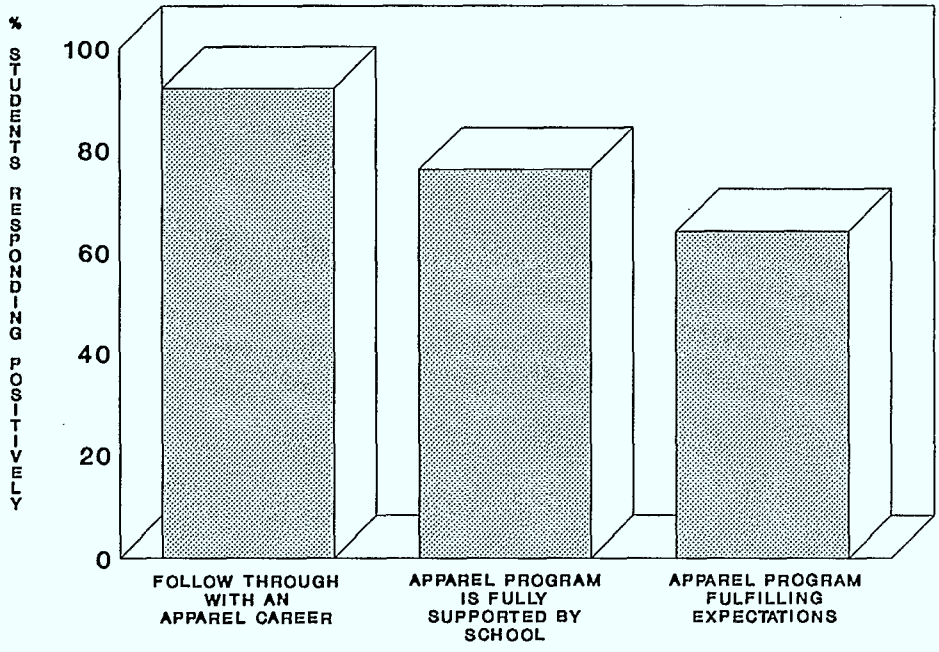


A STUDENT PERSPECTIVE

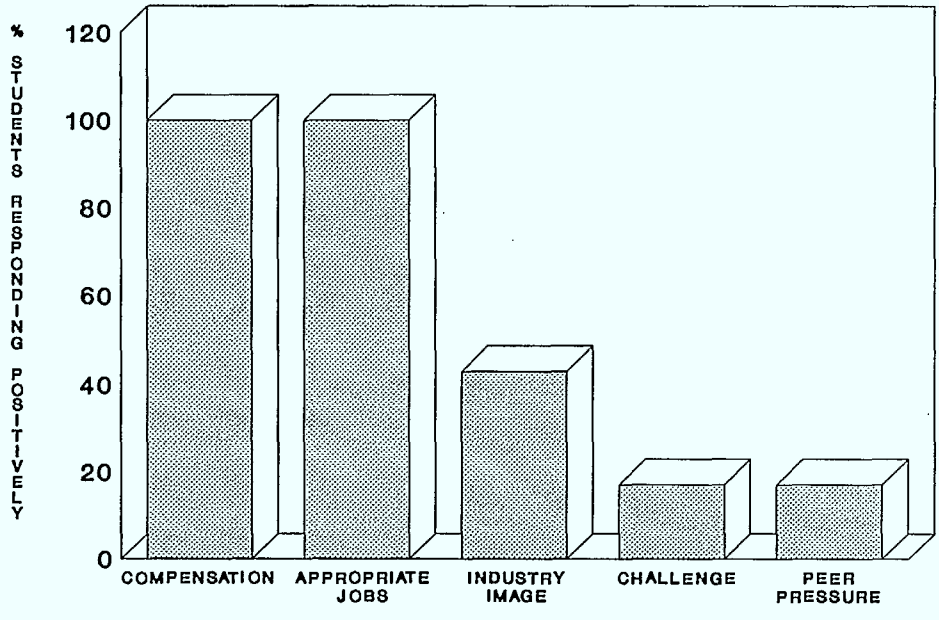
GETTING STARTED IN THE APPAREL INDUSTRY



STUDENT SATISFACTION WITH APPAREL PROGRAMS

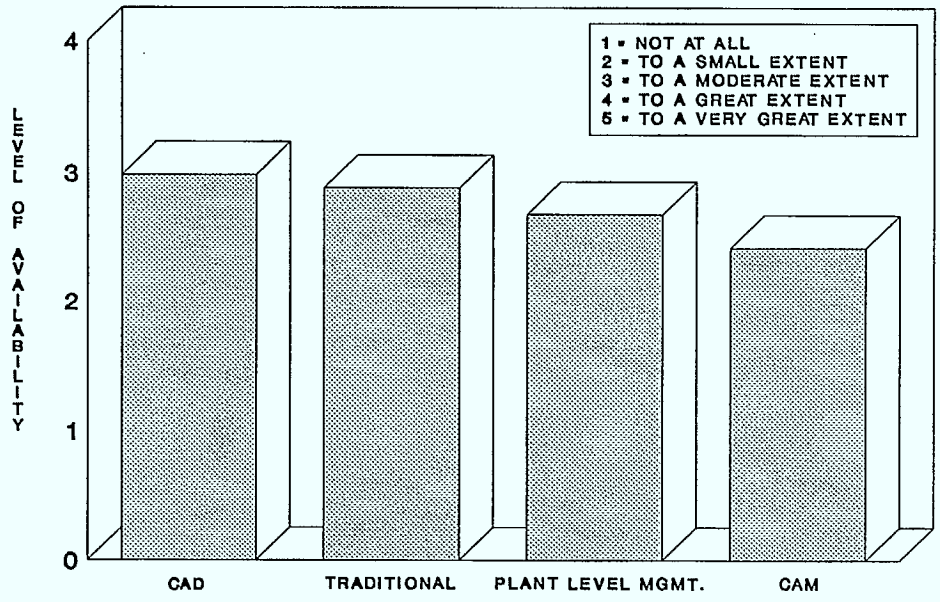


REASONS WHY 8% OF THE STUDENT POPULATION WON'T PURSUE AN APPAREL CAREER



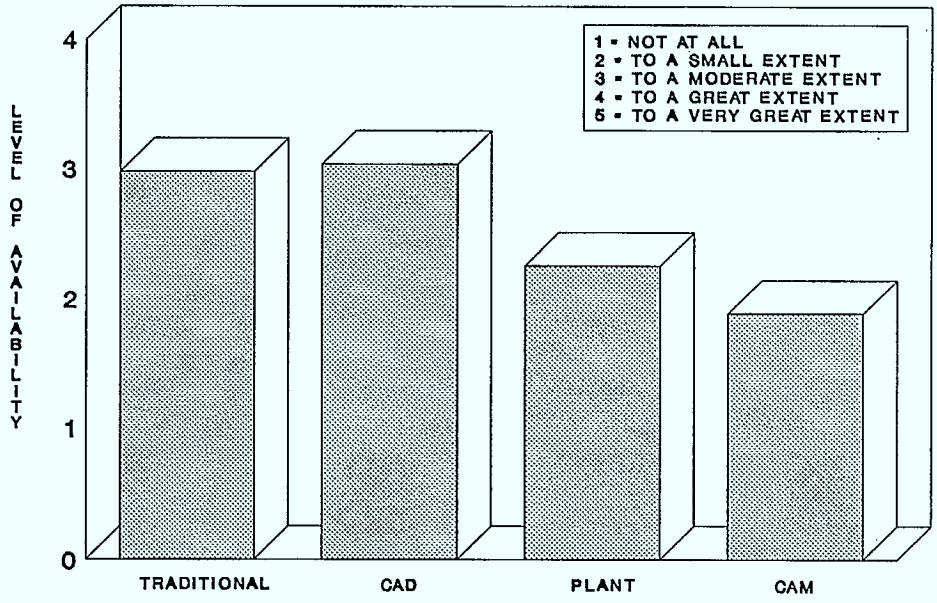
A STUDENT PERSPECTIVE

AVAILABILITY OF TECHNICAL JOBS IN THE APPAREL INDUSTRY



A STUDENT PERSPECTIVE

AVAILABILITY OF TECHNICAL PROGRAMS IN APPAREL SCHOOLS



A Student Perception of the Apparel Industry

Perception	% Responding Yes
Difficult to Find Job	9
Lack of Opportunity	2
Connections are Important	4
Fast-Paced	7
Innovative	2
Tough Industry	3
Competitive Industry	16
Production is Slave Labour	2
Hard Work	4
Growing Industry	2
Government is not Supportive	2
Challenging Industry	2
Need 'Incubator' Program	13
Low Paying Industry	3
Stressful	2
Dwindling Industry	2
Industry in Bad Shape	4
Long Hours	3
Same as other Businesses	2
Labour Intensive Industry	2

Note: This question was answered by 70 students from Kwantlen, Ryerson and the University of Manitoba.

APPENDIX IV

SUMMARY OF INTERNATIONAL APPAREL ASSOCIATIONS

INTERNATIONAL APPAREL ASSOCIATIONS

Association	Training Programs	Countries Education Programs	Skill Designations
The Japan All Apparel Federation	N/A	• Cultural Clothing Academy provides courses on CAD and CAM. • Plans to introduce a series of lectures to promote technical qualifications.	None

Association	Training Programs	Countries Education Programs	Skill Designations
The British Clothing and Allied Products Industry Training Board	• Developed "Engineering 2000" program at the Britain technical centre. • Developing production centered software for management information systems. • New vocational qualifications.	N/A	Between technologist and degree levels for traditional and CAD positions.

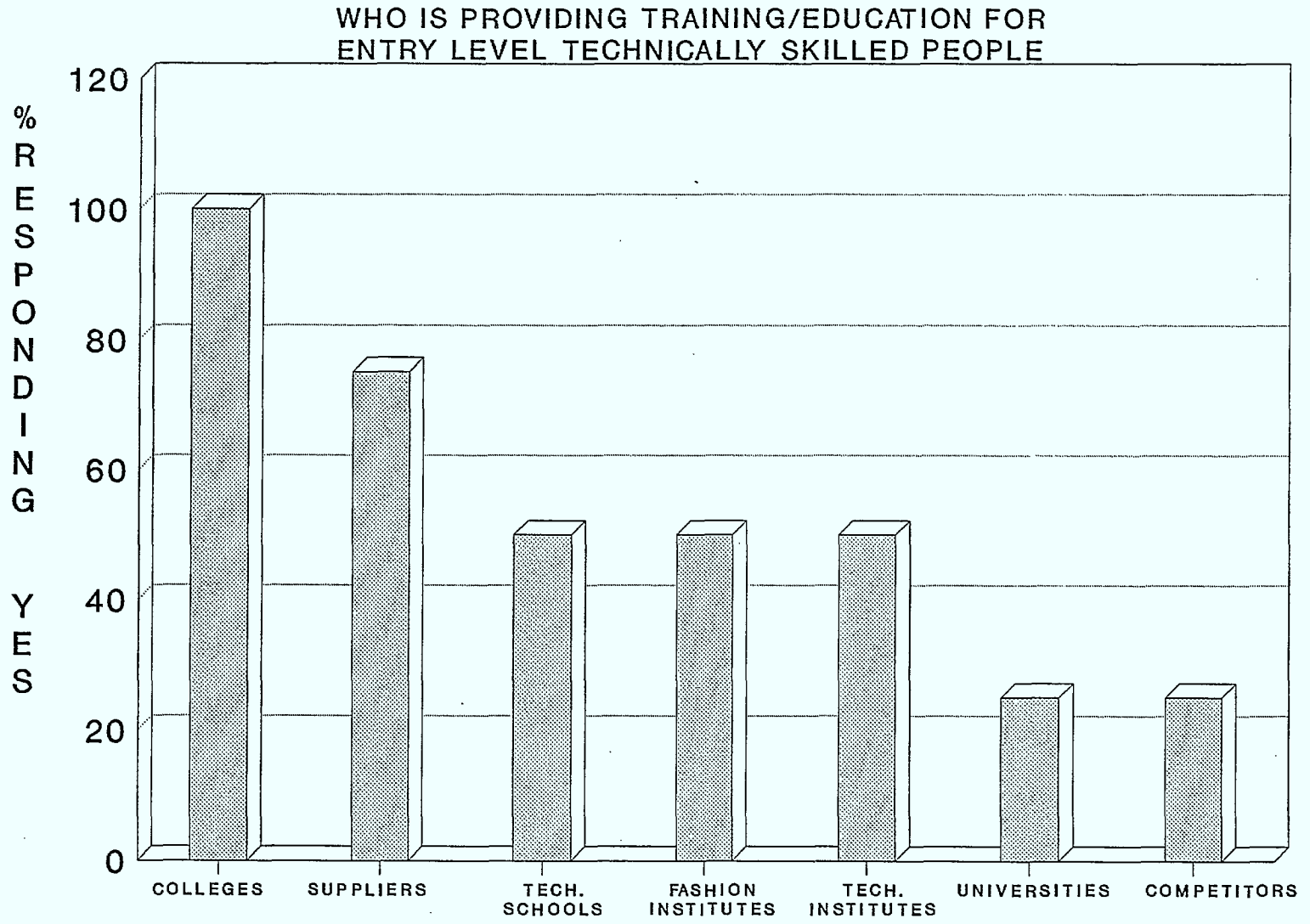
Association	Training Programs	Countries Education Programs	Skill Designations
Italy's Emalia Romagna Knitwear Federation	• 10 research and development centres have been developed to evaluate new technologies in the knitwear business and allow each business to have access to these emerging technologies. These centres were started with "seed" funding from the Italian Government.	N/A	N/A

Association	Training Programs	Countries Education Programs	Skill Designations
American Apparel Manufacturers Association	• Computer-integrated manufacturing centre.	Co-op	N/A

INTERNATIONAL APPAREL ASSOCIATIONS

Association	Training Programs	Countries Education Programs	Skill Designations
The Textile Clothing and Footwear (TCF) Council of Australia Ltd.	• Skill assessment procedures and related training programs are being developed in conjunction with industry, unions, and the Australian Textile Clothing & Footwear Training Council with government assistance. • The TCF Council and the TCF Training Council play an integral role in the coordination of employer representation and the membership of the Human Resources Director on the Board of Directors. • The Training Council is responsible for the development and delivery of training programs.	• The Textile and Clothing Industry is establishing nationally consistent curricula in the technical and further education colleges to develop a consistent education program across the entire country.	Apprenticeship programs for technical skill job functions.

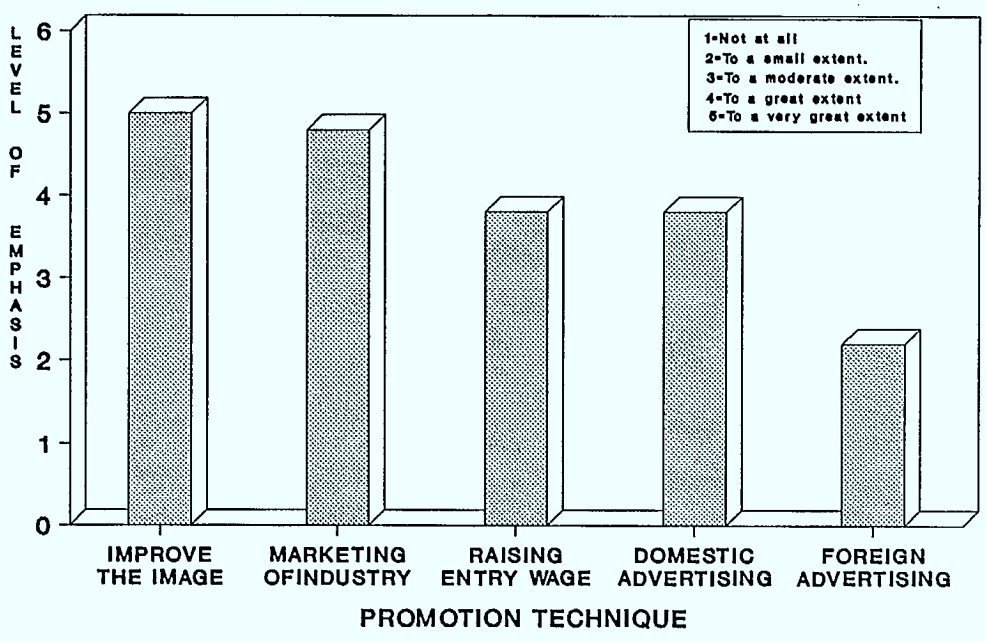
AN INTERNATIONAL APPAREL PERSPECTIVE



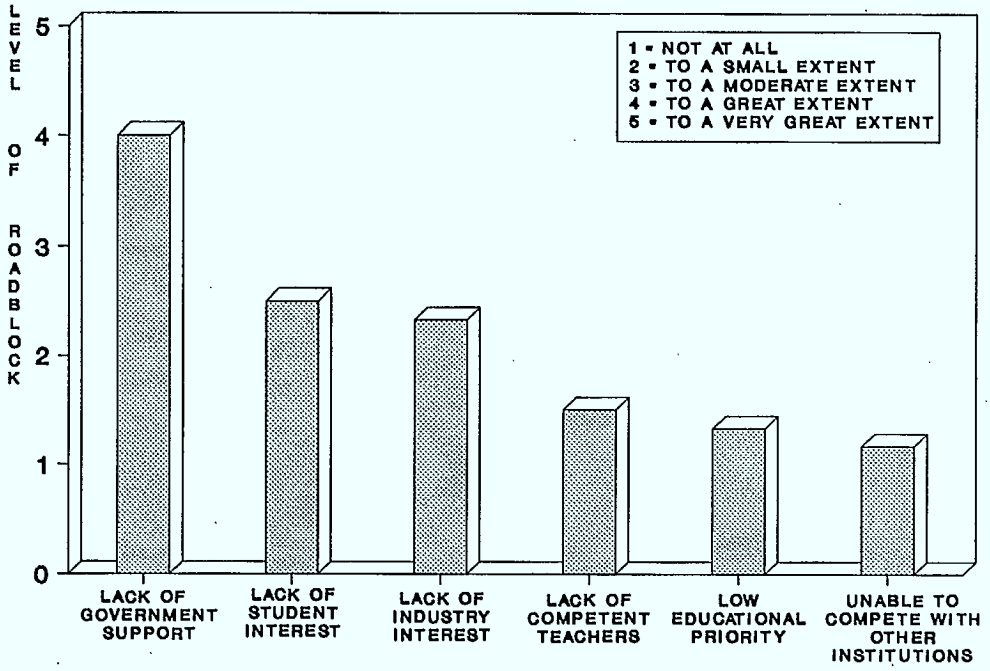
APPENDIX V

SURVEY OF CANADIAN EDUCATIONAL ESTABLISHMENTS' PERCEPTIONS

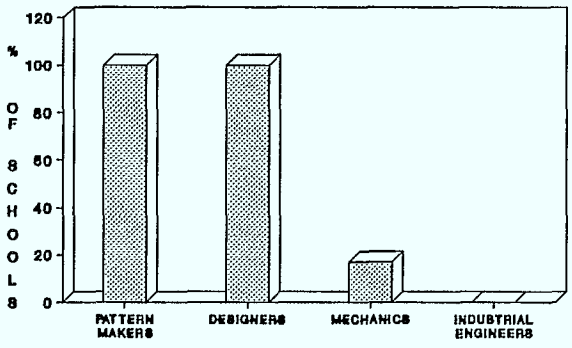
PROMOTING APPAREL EDUCATION PROGRAMS TO STUDENTS



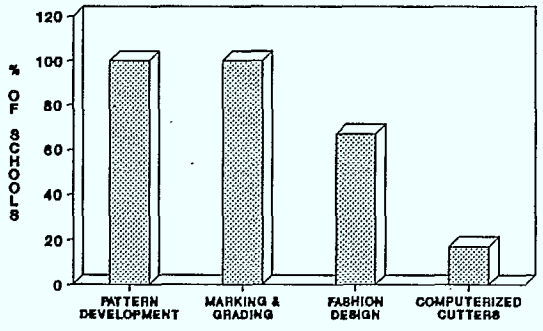
ROADBLOCKS TO A SUCCESSFUL TECHNICAL APPAREL PROGRAM



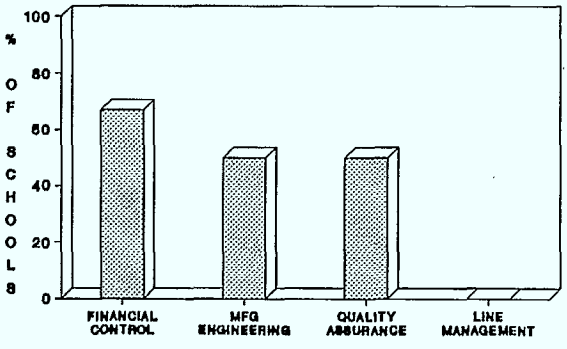
TECHNICAL SKILLS BEING OFFERED
TRADITIONAL



TECHNICAL SKILLS BEING OFFERED
COMPUTER-AIDED DESIGN/MANUFACTURING



TECHNICAL SKILLS BEING OFFERED
PLANT LEVEL MANAGEMENT



APPENDIX VI

SURVEY OF CANADIAN APPAREL ASSOCIATIONS

CANADIAN APPAREL ASSOCIATIONS

ASSOCIATION	SEMINARS/WORKSHOPS
Canadian Apparel Manufacturers Association (CAMI)	The institute is not addressing technical skill needs and has left this to provincial associations.
Apparel Manufacturers Institute of Quebec (AMIQ)	Technology Issues - Warehousing - Computer Integrated Manufacturing - CAD Equipment - Pressing - Maintenance - Engineering - Cut Planning - Spreading & Cutting - Bar Coding - Apparel Technology
Apparel Manufacturers Association of Ontario (AMAQ)	NIL
Needle Trade Management Association of Ontario (NTMA)	Human Resources sub-committee along with the Ontario Ministry of Skills Development to study the technical skills requirements resulting from apparel companies going to marketing and merchandising and dropping manufacturing.

CANADIAN APPAREL ASSOCIATIONS

Manitoba Fashion Institute (MFI)	Time study workshops have been conducted. The establishment of a marking and grading service bureau in the long range future may be able to provide training.
Alberta Apparel Manufacturers Association (AAMA)	Time study workshops have been conducted.
British Columbia Apparel Manufacturers Association (BCAMA)	NIL

CANADIAN APPAREL ASSOCIATIONS

GENERAL COMMENTS

Education Programs	Image of Industry	Recognized Skill Shortages
Courses need to be improved. Students are not trained to be useful in the industry. Pattern making is of minor importance at schools, but should be of prime importance. Schools concentrate on retail merchandising when apparel manufacturers are weak on marketing and merchandising. To address technical skills, high school programs should be developed. Red River Community College in Winnipeg should establish an apparel program.	Poor Image: Don't think we can improve the image. One association said the payoff was low on image video while another stated that a public relations video is necessary to sell the industry. An Alberta Apparel Industry Trade Publication with glossy look is being created to improve the image. The Human Resources Planning Committee will also address image. There is no image because the public is not aware of the industry. Mixed Image: Designer image is good but the rest of the industry has a poor image.	Traditional: 50% CAD: 50% CAM: 25%

APPENDIX VII

PROFILE OF KEY EDUCATIONAL INSTITUTIONS

A. PROFILE OF KEY AMERICAN EDUCATIONAL INSTITUTIONS

B. PROFILE OF KEY CANADIAN EDUCATIONAL INSTITUTIONS

APPENDIX VII A

PROFILE OF KEY AMERICAN EDUCATIONAL INSTITUTIONS

TECHNICAL PROGRAMS

US EDUCATIONAL INSTITUTIONS

SCHOOL	PROGRAMS	CERTIFICATE	DURATION
Auburn University	Apparel Design	Bachelor of Science	4 yrs.
	Apparel Production Management	Bachelor of Science	4 yrs.
Colorado State University	Apparel Design	Bachelor of Science	4 yrs.
	Apparel Production	Bachelor of Science	4 yrs.
Fashion Institute of Technology	Fashion Design	Associate in Applied Science	1 & 2 yrs.
	Apparel Production Management	Associate in Applied Science	1 & 2 yrs.
Fashion Institute of Design & Merchandising	Fashion Design	Associate of Arts (2) Designation Cert.	1 & 2 yrs.
	Apparel Manufacturing Management	Associate of Arts (2) Designation Cert.	1 & 2 yrs.
Florida International University	Fashion Design	Bachelor of Science	4 yrs.
North Carolina State University	Apparel Management	Bachelor of Science	4 yrs.
Philadelphia College of Textiles and Science	Fashion\Apparel Management	Bachelor of Science	4 yrs.
	Fashion Design	Bachelor of Science	4 yrs.
Southern College of Technology	Apparel Engineering	Associate of Science	3 yrs.

APPENDIX VII B

PROFILE OF KEY CANADIAN EDUCATIONAL INSTITUTIONS

TECHNICAL PROGRAMS
CANADIAN EDUCATIONAL INSTITUTIONS

SCHOOL	PROGRAM	CERTIFICATION	DURATION
George Browne College	Apparel Pattern Drafting	Certificate	34 weeks
	Industrial Sewing Machine Technician	Certificate	40 weeks
	Creative Fashion Design	Diploma	2 years
	Apparel Manufacturing Management	Diploma	2 years
LaSalle College	Fashion Design Fashion Production Management	Diploma and/or Certificate	1-3 years
Ryerson Polytechnical Institute	School of Fashion	Bachelor of Applied Arts	4 years

APPENDIX VIII

A PARTIAL PROFILE OF APPAREL EDUCATION WORKSHOPS AND SEMINARS IN THE UNITED STATES

INSTITUTIONS OFFERING TECHNICAL WORKSHOPS & SEMINARS

North Carolina State University

Philadelphia College of Textiles
& Science

Southern College of Textiles

Colorado State University

Fashion Institute of Technology

Textile\Clothing Technology Corporation [TC]^2

W. Clair Harris Apparel & Textile
Centre of Excellence

Clemson Apparel Research Centre

DATE DUE - DATE DE RETOUR
