TRU LIBRARY
76981000

PROGRAM REVIEW REPORT

on the

AUTOMOTIVE MECHANICAL REPAIR TRADE ENTRY PROGRAM

THE UNIVERSITY COLLEGE OF THE CARIBOO

LE
3
.C34
A6
AUTO
c.1

PROGRAM REVIEW REPORT

on the

AUTOMOTIVE MECHANICAL REPAIR TRADE ENTRY PROGRAM

UNIVERSITY COLLEGE OF THE CARIBOO LIBRARY
BOX 3010, KAMLOOPS, B.C.
V2C 5N3

MAY

1993

OFFICE OF INSTITUTIONAL RESEARCH & PLANNING

SUMMARY

The Automotive Mechanical Repair Trade Entry Program Review Committee is pleased to report that the automotive programs at both campuses of UCC continue to meet their key objectives, to the satisfaction of both students and employers. Surveys of current and former students, employers, Advisory Committee, and faculty reveal a program that is well regarded overall. Respondents indicate that they are pleased with the calibre of instruction at UCC and that graduates are well-equipped to enter apprenticeships in the mechanical trades.

Concerns were raised with respect to the competency-based/self-paced learning methods used in the program. It was felt by some that this approach was not always productive of ideal work ethics. There was also some anxiety that competency-based training was accomplished at the price of (a) useful classroom-based contact between instructor and student and (b) high rates of information retention. While motivated and self-disciplined students seem to thrive in this system, it is clear that many students lack the drive to maximize this advantage. The Committee concluded that a more pronounced structure in the day-to-day running of the program would be desirable.

A second area of concern was facilities. New AIT complexes notwithstanding, this area of the campus has received very little attention over the last few years, resulting in cramped and environmentally dubious workspaces. The promise of a replacement facility should not release the institution from its obligation to maintain adequate facilities in the interim. Modest, even cosmetic improvements, along with an improvement in the working conditions of the Tool Crib Attendant, would produce a more effective teaching/ learning situation.

The Committee has made a long list of recommendations, many of which pertain to the pedagogy and curriculum of the Automotive Mechanical Repair Trade Entry Program. In general, the program met with approval, and all parties recognized the contribution of both Kamloops and Williams Lake faculty to its success.

UNIVERSITY COLLEGE OF THE CARIBOO LIBRARY
BOX 3010, KAMLOOPS, B.C.
V2C 5N3

TABLE OF CONTENTS

THE PROGRAM EVALUATION COMMITTEE

COMMITTEE CHAIRPERSON	**John Belshaw,** Instructor, History
DIVISIONAL REPRESENTATIVE	**Howard Mayer,** Extension Services Co-ordinator, Applied Industrial Technology
EXTERNAL REPRESENTATIVES	**Mike Schewe,** Dean, Vocational Programs, Okanagan University College, Kelowna, B.C.
	Francis Ramunno, Owner/Manager, Riversyde Auto, Kamloops
PROGRAM RESOURCE PERSONS	**Lloyd Howard,** Instructor, Automotive Repair, Kamloops
	Les Batchelor, Chairperson, Mechanical Trades
	David Schalm, Instructor, Automotive Repair, Williams Lake
DIVISIONAL DEAN	**Earl Bloor,** Dean, Applied Industrial Technology
PROGRAM REVIEW CO-ORDINATOR	**Alastair Watt,** Associate Director, Institutional Research & Planning
GRAPHICS & ANALYSIS	**Larry Xiong,** Research Analyst
DATA ENTRY	**Wendy Trotter,** Institutional Research Clerk

INTRODUCTION

The evaluation of the Automotive Mechanical Repair Trade Entry Program was begun on January 4, 1993, when historical data on the program were requested from Earl Bloor, Dean, Applied Industrial Technology, via the "Data from Dean" form. A meeting on questionnaire design was held on January 13 between the Office of Institutional Research, Lloyd Howard (Instructor, Automotive Mechanical Repair) and Earl Bloor. Another meeting on identification of survey recipients was held with Lloyd Howard on February 2. The Williams Lake Automotive Repair instructor, David Schalm, was contacted on February 3 and apprised of the review. The Kamloops instructor and Learning Resource Centre Clerk were sent questionnaires on January 15, and the Williams Lake instructor on February 4. Questionnaires were mailed to the former students (Kamloops and Williams Lake) on January 28, and to Kamloops employers and Advisory Committee members on February 3. Williams Lake employers and Advisory Committee members were sent questionnaires on February 15. Current students in the Williams Lake intake were surveyed on February 15 and the Kamloops intake on February 18.

Second mailings were conducted as follows:

- former students on February 18;
- Kamloops employers and Advisory Committee members on March 5;
- Williams Lake employers and Advisory Committee members on March 12.

Telephonic follow-up with non-respondents was conducted intermittently between March 16 and April 2. The cut-off date for all responses was April 20. The Evaluation Committee convened to examine and analyze the summarized data on April 28 and 29, 1993.

BACKGROUND

The Automotive Mechanical Repair Trade Entry Program has been offered at the University College of the Cariboo in its present form since 1982. It was one of the original "vocational" programs to be offered at Cariboo when B and C blocks opened in 1972. At that time, it was a six month pre-apprenticeship program controlled by the Apprenticeship Branch/Ministry of Labour. The program accommodated sixteen students.

During the period 1977-81, a related program, General Mechanics, was offered in addition to the Automotive Pre-apprenticeship Program. The General Mechanics Program prepared students for entry into a variety of mechanical repair trades, including automotive, heavy duty and small engines. Its delivery spanned 9 months.

Trade Access (TRAC) programs replaced the Ministry of Labour controlled Pre-apprenticeship Programs in 1982. The Automotive Mechanical Repair Trade Entry Program has retained the self-paced, competency-based, open-entry/exit features of the TRAC program since then and continues to use the curriculum materials developed for the TRAC program.

Because of industry dissatisfaction with the graduates of a variety of TRAC programs, the Automotive Mechanical Repair Trade Entry Program discontinued the use of the TRAC name in 1991.

BACKGROUND (cont.):

The purpose of the Automotive Mechanical Repair Trade Entry program remains as it has been since its inception, i.e. to prepare workers to enter the Automotive Mechanical Repair Trade at the second year apprentice level and to progress to eventual journeyperson status in the trade.

The Williams Lake mechanics program began in 1978 and was identical to the General Mechanics program then being offered in Kamloops. In 1982 it was converted to the TRAC format and offered training in two specialty areas, Automotive and Heavy Duty. It continues to operate that way, with the ratio of Automotive to Heavy Duty students fluctuating with economic swings in the trades. For example, two years ago, most of the students pursued the Heavy Duty Mechanics specialty; this year, with demand for Heavy Duty Mechanics down, most students are completing the Automotive specialty.

Also noteworthy with respect to the Williams Lake operation is that the program has moved its location four times, finally settling (for the past five years) at its current site at the main Williams Lake campus.

The duration of the program, because of its self-paced, competency-based, open-entry/exit format, varies with each student, depending on the individual student's ability, previous experience and motivation. Highly talented, experienced and motivated students can complete the program in five months, while others may require up to nine months. On exit, students have achieved competency in the skills they require to operate in the industry at the second year apprentice level. Accordingly, the Automotive Mechanical Repair Trade Entry Program curriculum includes all the Level 1 Automotive apprenticeship technical training curriculum, plus introductory-level work to all vehicle systems.

UCC's Automotive (and Heavy Duty Mechanics) programs are probably the last in the province retaining the self-paced, competency-based, open entry/exit format which was introduced with the TRAC programming initiative in 1982. Private sector disappointment with the TRAC program has resulted in modifications to the program, as well as abandonment of the TRAC name. The program is now called the Automotive Mechanical Repair Trade Entry Program. Periodically, consideration is given to converting the program to the more traditional teacher-paced delivery mode.

Okanagan University College delivers pre-apprenticeship automotive training in the traditional mode as well as a higher level program in the cooperative format (Auto Tech includes an expanded curriculum which spans most of the apprenticeship curriculum.) Okanagan also delivers apprenticeship training for the automotive trade. Both Northern Lights College and CNC offer cooperative education programs which deliver the entire apprenticeship curriculum to their students over an expanded time frame, punctuated by periods of industry-based work experience.

ADMISSIONS DATA AND PERFORMANCE STATISTICS

Admissions Requirements:

Automotive Mechanical Repair Trade Entry Program:

a) **Educational Requirements:**

1. B.C. Grade 10, but Grade 12 strongly recommended, or mature student status.

2. Successful completion of CAT 19 test.

Note: The Provincial Apprenticeship & Training Board recommends that the minimum education requirements for entry into apprenticeships in this trade be successful completion of Grade 12 or equivalent including English 12, Math 11 or Trades Math 11 and Physics 11 or Science and Technology 11.

b) **General Requirements:**

1. Good health

2. Mechanical aptitude

3. Must have safety-toed shoes

4. Interview with program instructor

Program intakes are on the first Monday of each month, 12 months of the year.

Program Capacity/Program Demand over past five years:

Program capacity was 20 students per year until 1992/93, when the enrolment cap was raised to 24.

Student demand for this program fluctuates with the economy. In 1992/93, there was high student demand; while in 1990/91, the demand was low. Fortunately, demand for the trade entry Heavy Duty Mechanics program seems to counterbalance swings in demand for the Automotive Mechanical Repair Program. This allows maximum utilization of the combined Automotive/Heavy Duty Trade Entry facility.

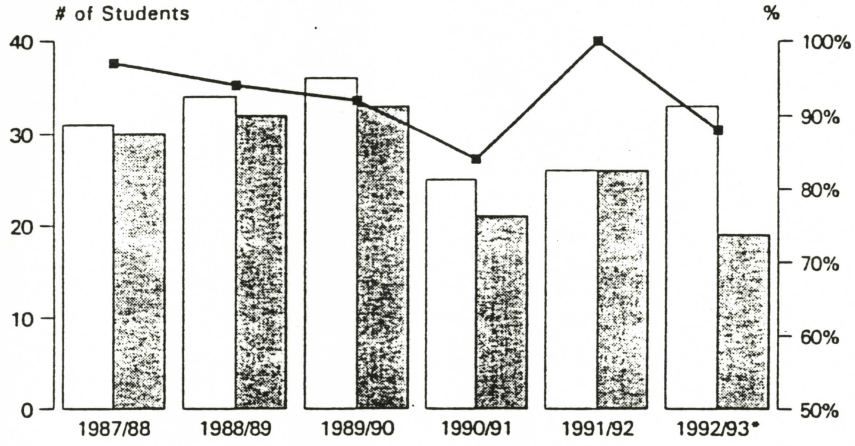
Student demand for this program has been steady; but demand also reflects the prevalent economic mood. There is usually a healthy wait-list (there were 14 students on the wait-list on February 11, 1993); however, many on the wait-list have preferred times for entering the program. Thus, there may be empty seats even though there is a lengthy wait-list. (Wait-listed students are those who have completed the admission procedures for the program, including writing and achieving the required scores on the pre-entry CAT-19 test.)

Program Capacity/Program Demand over past five years (cont.):

There has always been a steady demand for the Automotive Mechanical Repair Program in Williams Lake. There has been a high participation rate in the program by the Native Indian population. The Williams Lake program accommodated 16 students up to the past year when, because of the need to increase utilization rates, program capacity was increased to 20.

Completion Rates:

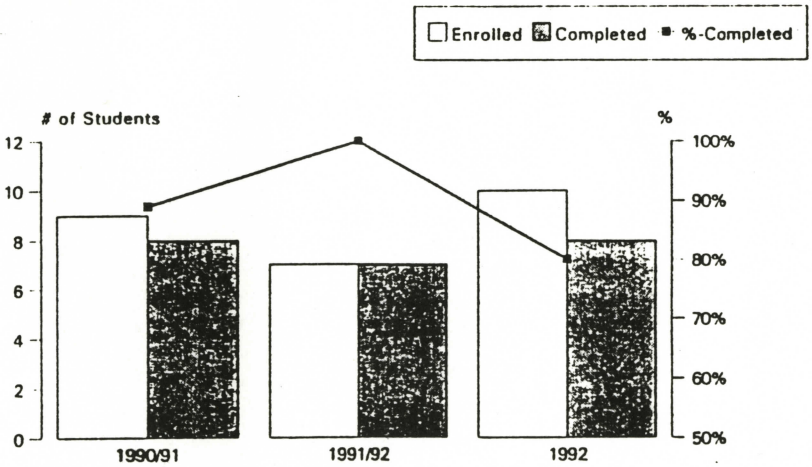
Automotive Repair Program Completion Rates: Sept. 1987 - Apr. 1993



Enrolled	31	34	36	25	26	33
Completed	30	32	33	21	26	19
Withdrawn	1	2	3	4	0	4
%-Completed	97%	94%	92%	84%	100%	88%

* 10 still enrolled as at Apr.2, 1993: completion rate is projected at 88%

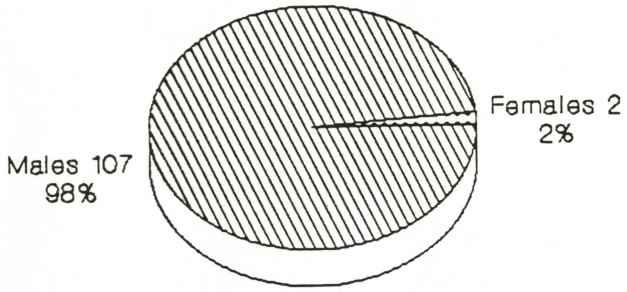
Automotive Repair Program Completion Rates
Williams Lake Campus: Sept. 1990 - Dec. 1992



Enrolled	9	7	10
Completed	8	7	8
Withdrawn	1		2
%-Completed	89%	100%	80%

Gender Ratio:

Of 109 former students surveyed (1987-92), 107 were men and 2 were women for a ratio of 54:1.



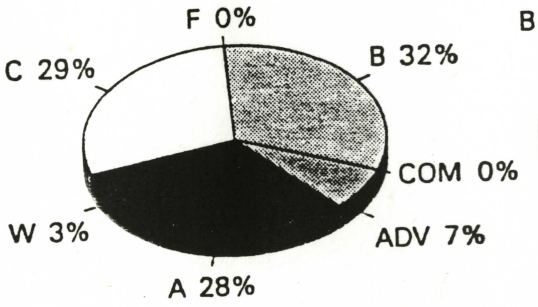
N=109

Grade Distribution:

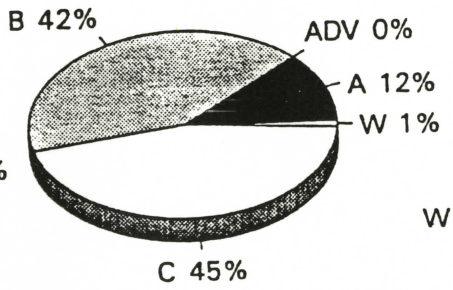
Grade distributions for the Automotive Mechanical Repair Trade Entry Program (1988-1992) are illustrated in the graphs below.

TRAC AUTOMOTIVE COURSE GRADES FALL 1988 - FALL 1992

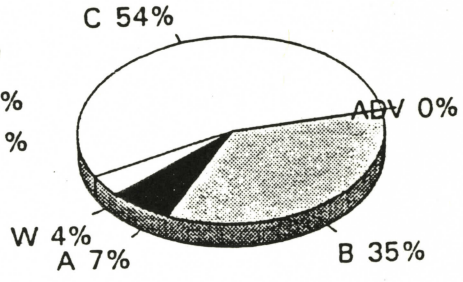
TRAC1 CCA-CCN (N=4975)



TRAC2 MEA-MEK (N=2871)



TRAC3 AUA-AUJ (N=860)



TABULAR SUMMARY OF QUESTIONNAIRE RESPONSES

The categories and quantities of responses are tabled below:

Recipient	# Sent	# Completed and Returned	% Return
Advisory Committee:			
Kamloops	6	6	100%
Williams Lake	11	9	82%
Employers:			
Kamloops	17	10	59%
Williams Lake	13	8	62%
Faculty and Support Staff:	3	3	100%
Students:			
Current:			
Kamloops (Feb. 18)	20	19	95%
Williams Lake (Feb. 15)	8	7	88%
Former:			
Kamloops	91	24	26%
Williams Lake	18	6	33%
TOTAL	187	92	49%

Former Students
Returned by Post Office: 23

Former Students Non-Respondents: 56

As at April 20, 1993

SUMMARY OF QUESTIONNAIRE DATA

The following trends were detected in the questionnaire responses:

1. **Advisory Committee:**

Kamloops:

All of the Advisory Committee members completed and returned their questionnaires. They highlighted the wide representation of the Advisory Committee and the opportunity for input. There were concerns, however, about poor preparation of incoming students, about the availability of training-related employment, about whether students were adequately prepared for the workplace, and about funding levels for the program.

Among the competencies critical to the program, work habits and teamwork were rated as most important, with math and computational skills being seen as important, but not critical. In the category of graduate performance, the Advisory Committee rated problem-solving skills and ability to adapt to change as lowest. It identified the need for more emphasis on engine emission controls, electrical systems, computerized diagnostics. and fuel injection.

Williams Lake:

Out of 11 Advisory Committee members surveyed, 9 responded for a return rate of 82%. Their concerns were for more Advisory Committee meetings. insufficiently rigorous entrance standards, availability of training-related employment, and level of graduate preparation for the workplace. As at Kamloops, inculcation of good work habits was rated the most important element of instruction. In the category of graduate performance, there was some concern in the following areas: willingness to assume responsibility, ability to learn new concepts, problem-solving and decision making skills, math and computation, and ability to adapt to change.

The same desire as in Kamloops was registered for more training in computer diagnostics. electrical systems. and electronics.

2. **Employers:**

Kamloops:

Of 17 employers surveyed, 10 responded for a response rate of 59%. Employers' ratings were somewhat lower than those of the Advisory Committee, a discrepancy possibly caused by employer expectations being higher than can be met by a trade entry program.

Among the critical elements of a sound program, work habits and practical/technical skills were identified as the most important, and writing and math/computational skills as least important. Discussion, however, clarified that writing skills are necessary for making out work orders and warranty claims, recording procedures, preparing resumes, etc.

2. Employers (cont.):

In the category of performance, graduates were rated somewhat lower than the ideal in the areas of writing skills, ability to work independently, willingness to assume responsibility, problem-solving and decision making skills, and math/computation.

Employers would like to see more preparation in servicing hydraulic brake, emission control, fuel injection and electrical systems. They suggested the deletion of engine overhaul and the addition of engine tune-up to the curriculum, and urged the introduction of a work experience component.

Williams Lake:

Of 13 employers surveyed, eight responded for a 62% response rate.

The same discrepancy between the ideal and the reality was noticed in Williams Lake employers' ratings of students' practical/technical skills, problem-solving and decision making skills, math and computation, and ability to adapt to change.

Like their Kamloops counterparts, they would like to see more curricular emphasis on servicing emission control, fuel injection, and electrical systems.

3. Faculty:

Kamloops:

One faculty member and one support staff member were surveyed. They both responded. They noted that they had not availed themselves of the resources available for curriculum development; that equipment and facilities were below par; that the role of the Advisory Committee in evaluating curriculum and advising the instructor needs adjustment, and that while the CAT-19 test identifies academic competencies, it has had to be supplemented by a Mechanical Aptitude Test.

The Learning Resource Clerk reiterated the need for instructoral release to update the computerized test bank, and pleaded for more materials and updated video tapes in the Learning Resource Centre.

Williams Lake:

One faculty member from Williams Lake was surveyed. He commented on the lack of academic preparation among students, the lack of emphasis on oral and written communication skills within the program, the need for revisions in the Specialty Level Learning Guide, the sense of isolation and lack of resources, equipment and supplies at Williams Lake, the need to be involved in articulation, and the--until now--absence of a dedicated classroom for Automotive/ Heavy Duty Mechanics instruction.

4. Current Students:

Kamloops:

Of 20 current students, 19 were surveyed on February 18, 1993, for a response rate of 95%. They were generally positive about the program, and registered concern only in the following areas: insufficient emphasis on written communication skills; lack of variety in learning activities and audio-visual materials (these ratings may be interpreted as criticisms of the self-paced/ competency-based instructional format); and the inadequacy of the classroom and shop facilities.

Among their subjective comments was a constant call for more instructors and formalized classroom instruction (which again may be seen as a criticism of the competency-based model, which spreads the instructor over 20 students operating at different speeds). Of the 19 students surveyed, 13 commented negatively on the attitude of the Toolroom Crib Attendant.

Williams Lake:

Of eight current students in Williams Lake, seven were surveyed on February 15, 1993, for a response rate of 88%. They were somewhat more critical of the program than were their Kamloops counterparts. In particular, they identified as concerns the lack of career advising, lack of emphasis on oral and written communication skills, and the mode of instruction. Dissatisfaction with the instructional format was echoed in low ratings of the variety of learning activities (2.29) , appropriateness of A/V materials (2.43), the balance between classroom and shop activities (2.29), and the availability of instructor for consultation outside of class time (2.40). The facilities for instruction were rated at 2.57 on a scale of 5.0.

5. Former Students:

Kamloops:

Of the 91 former students surveyed who attended the Kamloops campus, 24 replied for a response rate of 26%.

18% enroled for personal interest, as opposed to career preparation (36%) or qualification for employment (41%). Although females have not been well represented in the past, measures such as "Women Do Trades" are being taken to attract them into the program.

Former students reported that the skills that they are still using include: basic mechanical concepts and servicing of tires, wheels, hubs, bearings, hydraulic brake systems, and engine support systems. Somewhat alarmingly, 50% of respondents reported that their studies at UCC were not required to qualify them for their current occupation.

On general program effectiveness, they reported universal satisfaction, except for insufficient employment panels, visiting speakers, etc. Program content, procedures and resources received high ratings across the board. They recognized Lloyd Howard's instructional excellence and patience, but were critical of the fact that he functions not only as an instructor but as a service manager dealing with faculty and staff requests for automobile repairs.

5. Former Students (cont.):

Kamloops (cont.):

Wide standard deviations were recorded on the challenge of the program, its self-paced nature, the quality of supplies and adequacy of equipment. There were calls for more emphasis on electronics, computerized diagnostics and fuel injection systems.

(Data from this response group should be treated with caution; the low response rate means that statistically significant inferences cannot be derived from them.)

Williams Lake:

Of 18 former students surveyed, six responded for a return rate of 33%. They reported still using most of the mechanical concepts and training received. As with Kamloops students, their studies did not help them get work (67%) nor perform it (67%). Among the suggestions respondents made were more formalized classroom instruction, more curricular emphasis on electronics, and the elimination of multiple choice tests.

While the response rate was 33%, or the minimum required to draw statistically meaningful inferences, the sample size is probably too small to permit any confidence in the data.

EMPLOYMENT PROSPECTS

Types of Employment:

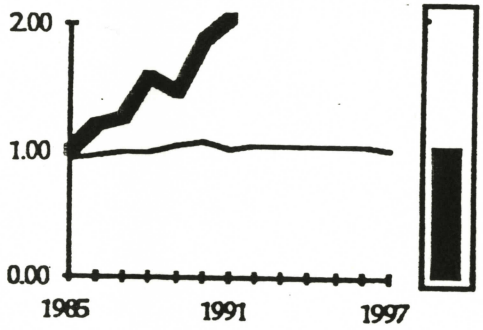
This course is intended to prepare people for employment as apprentices in the Automotive Mechanical Repair trade. Employment is normally indoors and may be anywhere from a small repair shop or service station doing general mechanical repairs to the complex service department of a large automotive dealership. Mechanics normally work a 40 hour week, with shift and weekend work sometimes required.

Job Opportunities Projection:

According to Job Futures, British Columbia, An Occupational Outlook to 1995, (1989 edition), the employment outlook for these occupations calls for slightly above average growth until 1995. Employment is affected by economic conditions and seasonal factors, with unemployment being slightly below average for the entire field. There are frequent shortages for skilled mechanics with specialized electronics knowledge. However, as the following chart, taken from the **1992 B.C. Colleges and Institutes Student Outcomes Report** suggests, while there may be demand in specialized areas there is a danger of over enrolment in general mechanics.

Fields of Study Where Enrolment Growth is Outpacing Employment

PDC 2322 - Auto Mechanic



New developments in engines, transmissions and suspension systems, and increased use of electronic components are changing the mechanic's job into that of a technician, with emphasis on vehicle diagnosis. This will increase the demand for automotive mechanics with training in propane and electronic fuel injection engines, onboard computers and electronics.

B.C. Employment Trends & Projections:

	1981	1987	1995
# employed	15,920	15,780	18,560

Annual Growth 1987-95: 2.1%

Estimated Job Openings in B.C. 1987-95

Growth (Net)	Attrition	Total
2,780	1,550	4,330

PRESENT MAIN ACTIVITIES OF FORMER AUTOMOTIVE MECHANICAL REPAIR STUDENTS

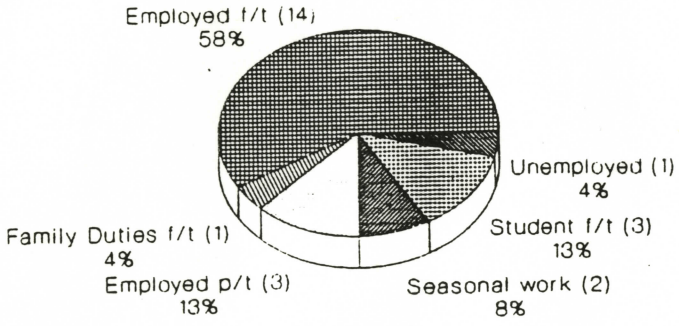
Kamloops:

Of 24 former student respondents, 14 (58%) reported being in full-time employment; 3 (13%) reported being employed part-time; 1 (4%) reported being unemployed; 3 (13%) reported being full-time students; 1 (4%) was involved in household/family duties full-time and 2 (8%) were employed in seasonal work.

Williams Lake:

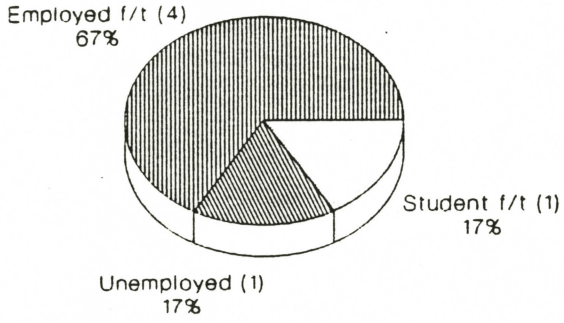
Of 6 former student respondents from Williams Lake, 4 (66.7%) are employed full-time; 1 (16.7%) reported being a full-time student; and 1 (16.7%) was unemployed and looking for work.

Kamloops



N=24

Williams Lake



N=6

Relationship of Training to Employment:

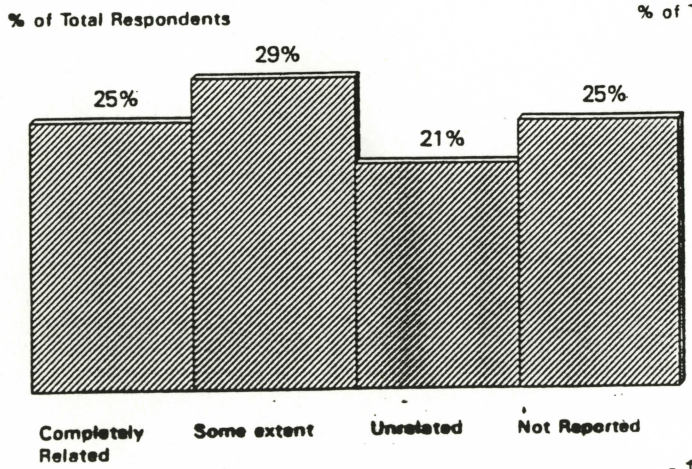
Kamloops:

Of the 24 former student respondents, 6 (25%) reported that their job was in the area for which they had been trained; 7 (29%) indicated that their employment was to some extent related to their training; 5 (21%) indicated that they were working in areas unrelated to their training, and 6 (25%) did not respond to this item.

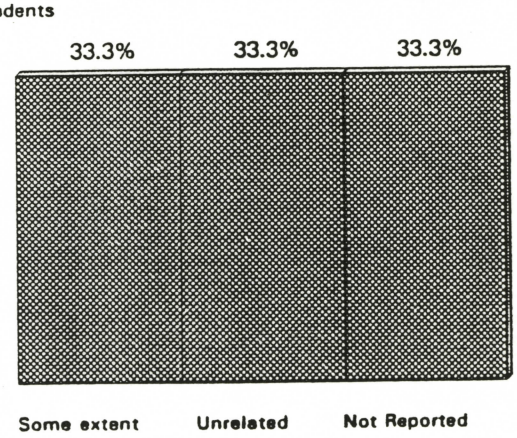
Williams Lake:

Of the 6 former student respondents from Williams Lake, none reported that their job was in the area for which they had been trained, 2 (33.3%) indicated that their employment was related to some extent; 2 (33.3%) indicated that they were working in areas unrelated to their training, and 2 (33.3%) did not respond.

(Kamloops N = 24)



(Williams Lake N = 6)



Current Salaries:

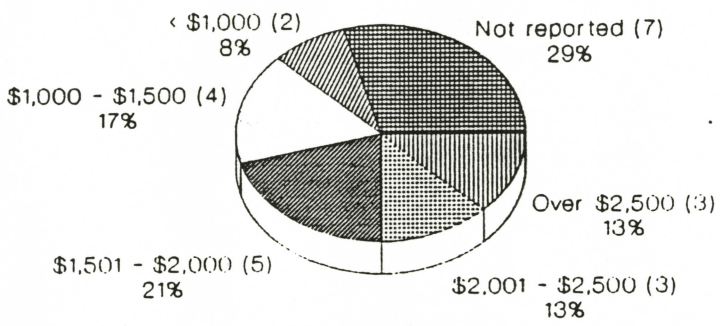
Kamloops:

Of 17 Automotive Mechanical Repair Trade Entry former students who divulged information about their current salary, 2 (8%) were earning less than $1,000/month, 4 (17%) were earning between $1,000 and $1,500/month, 5 (21%) were earning between $1,501 and $2,000/month, 3 (13%) were earning between $2,001 and $2,500/month, 3 (13%) were earning over $2,500/month; 7 (29%) did not respond to this item.

Williams Lake:

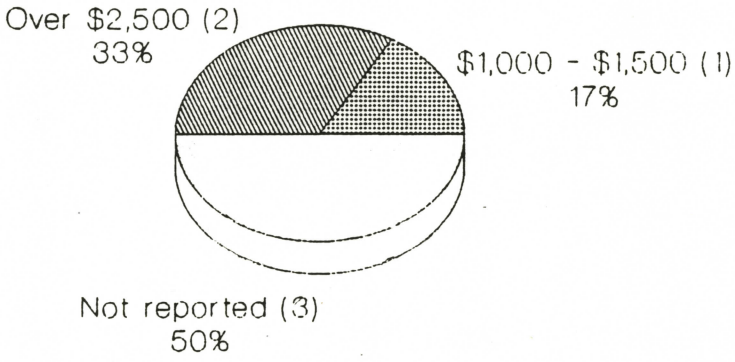
Of three Automotive Mechanical Repair Trade Entry former students from Williams Lake who divulged information about their current salary, 1 (16.7%) was earning between $1,000 and $1,500/month; 2 (33.3%) were earning over $2,500month, and 3 (50.0%) did not respond.

Kamloops



N=24

Williams Lake



N=6

Further Education Opportunities:

If a graduate of the Automotive Mechanical Repair Trade Entry Program desires further education, he/she can continue with an apprenticeship that lasts three years. Included in that term are three six-week school-based training periods, after which apprentices must write an Interprovincial examination. Upon successful completion, they will receive an Interprovincial Red Seal Certificate and a B.C. Trades Qualification (TQ) Certificate. The Provincial Apprenticeship Board prefers applicants with Grade 12, including English 12 and a Math and Science 11.

CONCLUSIONS

A. STRENGTHS OF THE PROGRAM

The Evaluation Committee identified the following strengths in the Automotive Mechanical Repair Trade Entry Program:

1. **Instruction:**

   Current and former students revealed for the most part an abiding respect for and loyalty to the Mechanical Repair faculty at UCC. Comments attached to the surveys reinforced the ratings with praise that was at times effusive. Interviews with three current students generated frank and unabashed praise for their instructors as well.

   Clearly the Automotive instructors bring a professional attitude to their work and a positive approach to the task of preparing trade entry students for apprenticeship.

2. **Course Breadth:**

   The comprehensive quality of the training given at UCC was repeatedly complimented. The preservation of a core of material which allows graduates to enter a 2nd year apprenticeship program or to take up work in the automotive sector is the foundation of the program's success.

3. **Competency-Based/Self-Paced Learning:**

   The competency-based learning model, which relies heavily on self-motivation, is recognized as a source of strength in the program. Specifically, it appears beneficial in four ways:

   a. Competency-based/self-paced learning is student oriented. It allows students the opportunity to enter the program when their finances permit, to exit and re-enter without incurring severe penalties, and to address the curriculum at their own pace.

   b. Competency-based/self-paced learning serves highly motivated students very well. They can complete the program at an accelerated rate if they have an aptitude for the material or a job prospect waiting for them. The same quality controls apply, but the better students are able to, in effect, 'challenge' modules of the course and graduate earlier. Hard work can result in projects and tests being completed ahead of schedule. This translates into lower overall costs for the student and the development of a work ethic that employers appreciate.

   c. The continuous intake format helps maximize enrolments and therefore serves UCC well. It permits students to join the program throughout the year and to thus bolster utilization rates. By being responsive to seasonal changes in the job market, the program ensures high enrolments and operates at near-capacity levels regularly.

   d. The program format fosters desirable work habits. It generates self-starters. Because of the varied nature of the program, the instructor is not constantly on the shop floor to answer questions. This fosters independence and self-reliance among the students and encourages them to work without immediate supervision.

4. Learning Resource Centre:

The LRC at Kamloops serves a number of functions. It contains a large collection of instructional videos, some reference texts, and computer-based examination systems. It is permanently staffed by a Resource Clerk who assists in the administration of exams. The proximity of the LRC to the Automotive Mechanical Repair shop is an advantage, in that it allows students to leave their projects briefly to make use of the reference material. It is, as well, close enough to the teaching personnel that assistance can be sought relatively easily.

B. AREAS WHICH CAN BE IMPROVED:

1. Instruction:

While the calibre of instruction can be described as high overall, there was some concern that there was insufficient student-instructor contact. In part this stems from the wide variety of non-teaching obligations which are undertaken by Automotive Repair faculty. It was also repeatedly argued that this situation was a consequence of the competency-based method of delivery (more on that below.). It was noted that the Williams Lake instructor has not yet taken his TQ (Automotive) examinations.

Greatly affecting instructional quality in Kamloops are course enrolments. The ceiling of 24 students was regarded as too high, given the number of faculty involved and the shortage of shop space.

2. Course Breadth:

Given the changes in automotive technology over the last decade, greater attention must be paid to computer diagnostics, fuel injection systems and advanced electronic systems. To some extent the curriculum has recently responded to these concerns, but students, Advisory Committee members and some employers believe that still more emphasis ought to be laid on these subjects. Some concern was also expressed about a potential variance between the prescribed competencies in the new curriculum and the materials used to instruct these. Errors in the Occupational and Specialty Level Learning Guides attracted criticism.

While several students complained that insufficient time was devoted to welding, the Committee concluded that this component would be more effectively addressed at the 2nd year apprenticeship level. In the first year, the emphasis should remain on introductory concepts, with a particular focus on safety aspects.

Employers and students both suggested that a work experience component would be beneficial to the program.

3. Competency-Based/Self-Paced Learning:

As well as the advantages identified in A. 3, this format has a number of shortcomings. Long-term knowledge retention is questionable, as students are geared only to pass a series of modular tests. The realities of apprenticeship in the private sector are quite different, and employers are unlikely to welcome a worker whose adherence to self-paced repair work slows down a business.

The question of positive work ethics was repeatedly raised in the surveys and in discussion, and deserves further consideration. While competency-based/self-paced learning works well for disciplined and motivated students, it does not serve less dynamic students as well. Moreover, students often pace themselves too slowly at the outset and subsequently run into time and financial problems towards the end of the program. At best, this may mean that they are obliged to hurry through the last few units; at worst, some are obliged to drop out.

Although Okanagan University College Automotive Repair Program has abandoned the competency-based/self-paced delivery method, UCC need not necessarily go that route. There must, however, be some modifications. For example, formal instruction and lecture style contact between faculty and students need to be reinstituted. As well, the introduction of a 'capstone' examination at the end of the program would serve to integrate and reinforce the modules of study and indicate that the successful student has achieved the standards required of a first year apprentice.

B. AREAS WHICH CAN BE IMPROVED (cont.):

4. **Facilities:**

The facilities situation at both campuses is inadequate. For example, the designated classroom space at Williams Lake is to be shared with another program, and so is not ideal. The shop facilities at Williams Lake are described as inadequate. The shop space at Kamloops is particularly worrisome. A brief tour revealed cramped conditions, inadequate ventilation, and noisy and poorly built classroom space above the shop floor. (See Barry Manfield's Report, IRP-93-01, of May 4, 1993, on Noise Levels, Air Quality, and Ventilation in Room C-202--attached as Appendix B).

The prospect of a brand new facility at Kamloops does hold out some encouragement for the future. Nonetheless, students taking the program in the next three years are entitled to quality education unencumbered by declining facilities.

As well, it was found that the programs at Kamloops and Williams Lake operated quite differently. For example, the fact that shop instruction at Williams Lake does not commence until 10:00 a.m. is not conducive to early morning punctuality among students. Likewise, differential allocation of computers means that faculty in Williams Lake are working under conditions which are distinct from those in Kamloops. A committed CML line to Williams Lake would allow the instructor there to utilize more fully the computerized testbank.

5. **Tool Crib Staff:**

The relationship between the Tool Crib Attendant and the students is less than ideal. The Committee recognizes that this in part derives from additional demands placed on the attendant over the last few years. However, the virtual unanimity with which the Tool Crib Attendant was resented or at least criticized by the current students cannot be ignored.

6. **Communicating Expectations:**

Many employers and some graduates of the program appear to have unrealistic expectations of the education and skills involved in the pre-apprenticeship program. The UCC curriculum focuses very directly on the core aspects of the trade. That is its mandate and that is also its strength. Employers, however, expect more sophisticated high tech automotive repair skills than a trade entry program can provide, and program graduates are often disgruntled at being assigned jobs which do not immediately recognize their training. To some extent this is a consequence of inadequate program marketing, but students and employers alike should be disabused of any unrealistic expectations they may harbour about the program.

7. **Students' Experience at UCC:**

Surprisingly few of the 1992/93 intake seemed to make use of any campus service apart from medical support (when they inadvertently compress their digits). The level of affinity with UCC is correspondingly uninspiring. For most, UCC is simply the place they attend for their training. There is no palpable sense of loyalty to, let alone affection for the institution. Students complain that there is nothing to do on campus, so they socialize elsewhere and have associations which are largely unconnected to UCC.

RECOMMENDATIONS

The following recommendations are cross-referenced to the 'Areas Which Can Be Improved' section of the report. Although they are not listed in overall order of priority, Recommendations 6 and 1 are the most urgent. It should be stressed that Recommendations 9 and 10 are reiterations of two which appeared in the **Marine/Small Engine Repair Program Review Report** (January, 1993).

1. That the Dean, Applied Industrial Technology, and the Vice-President, Instruction, pursue the goal of lower course enrolments immediately. A ceiling between 16 and 20 would be more appropriate than the present 24 in Kamloops. Acceptable utilization rates could be achieved by factoring Automotive Repair-related part-time vocational FTE's into the Automotive Repair annual FTE count, as done in fiscal years 1991/92 and 1992/93 (see Conclusion B.1., p. 16).

2. That Mr. David Schalm, Automotive Mechanical Repair Program instructor, Williams Lake, take his Trades Qualification examinations at the earliest convenient time (see Conclusion B.1., p. 16).

3. That Mr. Lloyd Howard apply for a one month short-term leave to undertake curriculum development. This would include incorporation of introductory computer diagnostics, fuel injection, and electronics into the curriculum, correcting the errors in the Occupational Level Learning Guide and upgrading the Specialty Level Learning Guide (see Conclusion B.2., p. 16).

4. That the Kamloops and Williams Lake Automotive Repair instructors ensure that their instructional materials match the identified competencies of Year 1 of the new curriculum (see Conclusion B.2., p. 16).

5. That the Automotive Repair instructors, working with the support of the Dean, Applied Industrial Technology, establish a work-experience component which would be grafted onto the existing program within a year. This would enable the students to gain familiarity with the pace of work in the workplace and the challenges they are likely to face, and allow employers to preview prospective employees without commitment (See Conclusion B.2., p. 16).

6. That the Dean, Applied Industrial Technology, the Chairperson, Mechanical Trades, and the Automotive Repair faculty evaluate the pros and cons of competency-based/self-paced instruction versus conventional classroom instruction and decide whether the Automotive Repair Program should remain with the continuous intake format, should incorporate some elements of formal instruction while retaining its competency-based/self-paced delivery method, or should move completely to a block intake, conventional instruction model.

   The relationship of the program to others in its area--e.g., Heavy Duty Mechanics and Commercial Transport--and the potential impact of block intake on utilization rates should be assessed, as should the Williams Lake situation, where Automotive Repair and Heavy Duty Mechanics are offered as a "melded" program.

   A decision on program format and delivery method should be reached by Fall, 1993, so that any changes can be incorporated in the 1994/95 UCC Calendar and the revised program (if such is the case) implemented in Fall, 1994 (see Conclusion B.3., p. 16).

7. That the Automotive Repair instructors introduce and administer 'capstone' exams at the end of each program, effective 1993/94 (see Conclusion B.3., p. 16).

8. That the Dean, AIT, and the Awards Office review the present methods of disseminating information about financial aid to Automotive Mechanical Repair students and that means be found to improve awareness at the high school level of the financial support available (see Conclusion B.3., p. 16).

Recommendations (cont.):

9. That the Vice-President, Administrative Services, initiate the off-campus relocation of the Marine/Small Engine Repair Program in Kamloops (see Conclusion B.4., p.17; see also the **Marine/Small Engine Repair Program Review Report,** January, 1993. p. 14, Recommendation 3.i.).

10. That the Director, Information & Facilities Services, ensure that Automotive Repair shop space on both campuses receives some cosmetic improvement (i.e., the walls should be painted to 12 feet, the floors as well, complete with safety lines. and some improved shelving should be added). (See Conclusion B.4., p. 17; see also the **Marine/Small Engine Repair Program Review Report,** January, 1993, p. 14, Recommendations 3. ii. and 3. iii).

11. That the Campus Dean, Williams Lake, and the Automotive Repair instructor there examine the possibility of convening Automotive Repair classes at 8:00 a.m., rather than 10:00 a.m., so as to inculcate better work habits in the students (see Conclusion B.4., p.17).

12. That the Director, Information and Facilities Services, ensure that computer facilities at Williams Lake are on par with those in Kamloops and investigate the possibility of installing a committed line for CML testing in Williams Lake (see Conclusion B.4., p. 17).

13. That the Dean, Applied Industrial Technology, allocate funds to increase the number and calibre of individualized tool kits so as to relieve pressure on the Tool Crib Attendant (see Conclusion B.5., p. 17).

14. That the Kamloops Automotive Repair instructor regularly remind students of the particular responsibilities of the Tool Crib Attendant so that expectations of him are not unreasonable (see Conclusion B.5., p. 17).

15. That the Dean, AIT, press for the hiring of a half-time Tool Crib Attendant (see Conclusion B.5., p. 17).

16. That the Automotive Repair instructors and the Chairperson, Mechanical Trades, review the image of the Automotive Repair Program to ensure that regional employers have a clear idea of what skills an Automotive Repair Trade Entry graduate is likely to bring to his/her first job (see Conclusion B.6., p. 17).

17. That the UCC Student Society and the Student Services Division be encouraged to launch a joint review of the campus experience of students in AIT programs (see Conclusion B.7., p. 17).

APPENDIX A

METHODOLOGY

The data were collected in the following ways:

1) Standard questionnaires were administered to Automotive Mechanical Repair Trade Entry former students, Advisory Committee members, employers, faculty, and current students in Kamloops and Williams Lake. All data were processed with an SPSSX software program to achieve mean, mode, and standard deviation responses. Verbal comments for each group were recorded separately and anonymously.

2) "Descriptive Data" on the Automotive Mechanical Repair Trade Entry Program's history, description, objectives, budget, etc. were solicited from Earl Bloor, Dean, Applied Industrial Technology, via the standard "Data Required from Dean/Chairperson/ Program Co-ordinator" form, along with course outlines.

3) Statistical data on annual FTE, attrition rates, graduation rates, and grade distribution were provided by the Office of Institutional Research.

4) Several discussions were conducted with Lloyd Howard, Instructor, Automotive Mechanical Repair Trade Entry, and Earl Bloor, Dean, Applied Industrial Technology, on the design of the questionnaires. The Committee interviewed the following people associated with the Automotive Mechanical Repair Trade Entry Program:

Philip Cayen, Automotive Repair student;
Geoff Meyer, Automotive Repair student;
Alan Norrish, Automotive Repair student;
Lynda Wilson, Dean, Williams Lake Campus.

University College of the Cariboo
OCCUPATIONAL HEALTH AND SAFETY DEPARTMENT

MEMORANDUM

TO: Alastair Watt
Associate Director, Institutional Research and Planning

FROM: Barry Manfield
Health and Safety Officer

C.C: Earl Bloor
Les Batchelor
Lloyd Howard
Leno Zanier
Derek Chambers
John Feller
A.C. Brown [info only]

DATE: May 4, 1993

REF. NO: IRP93-01

RE: **Marine/Small Engine Repair Program - Requested Input**

Please accept this memorandum as our report of findings concerning the air quality of Room C-202, the airflow conditions in Room B-101 and any related health hazards.

I apologize for the delay, but we could not finalize our investigations without including the Facilities Services Department representative responsible for ventilation. Unfortunately due to our respective work loads and other commitments it was very difficult to coordinate our activities so that we could jointly investigate the existing ventilation system in these two areas. This was only accomplished recently.

Room C-202

Numerous complaints from students and staff were received concerning noise levels, poor air quality, contamination by engine emissions, etc. These comments indicated that this room may not be suitable for its intended use. The initial request was made to the Occupational Health and Safety Department as a result of the Program Review committee to investigate these concerns in relation to this room and its intended use as a classroom.

Air quality and noise level tests were conducted on January 18, 19 and 20, 1993 together with preliminary investigations. The existing ventilation system was examined during that time and again on May 3, 1993 in conjunction with Mr. Doug Halliday, the Manager of Mechanical and Electrical Services. The results of these findings are related below.

a. Room Description

This is a rectangular shaped room [approximately 18 feet wide, by 37 feet long, by 9 feet high] which is situated in the southwest corner of the heavy duty shop. It is located above a similar shaped room which is used as a combined instructor's offices and lunch room [C-102/104]. No measurements were taken in the lower room although casual observations were made there.

Access to Room C-202 is by a wooden stairway leading from the shop floor. Drum storage of oils and solvents is adjacent to the bottom of this stairway and this is the only entrance/exit from this room. There is an air space between the top of Room C-202 and the bottom of the main shop roof. This open area has been screened off with "chicken wire" reportedly in an effort to prevent pigeons and other birds from establishing nests in that area. A square metal duct leads from the air handling unit on the roof to the rooms below.

The interior finish of the room is painted plaster with single pane windows located along the east wall overlooking the shop. Chalk boards and white boards are located on most of the west wall. The desks are a hard surface [Arborite] with metal legs. No acoustic tiles or finishes are present on the walls or ceiling.

b. Noise Levels

Due to the high number of hard surfaces present, this room has very poor acoustics and as a result, any sound generated inside the room is significantly amplified by repeated reflection. It is akin to being inside a drum. Any noise which is generated outside the room also contributes to the interior sound levels by vibrating off the window panes. The nature of the room is such that any conversation associated with an instructional activity is significantly hampered by the echoes generated from the lack of acoustics.

The ambient noise levels present in the shop vary widely depending on the activity. Generally, these noise levels generated in the shop are below the regulated action level of 85 dB.[1] Exceptions to this would be loud engines, use of grinding equipment, impact noises [hammering, etc.], air operated equipment, etc. but their duration is not lengthy.

At the time of investigation, noise levels ranged between 60 and 70 dB. Although this level of noise is not hazardous, it is definitely detrimental to effective instruction.

c. Air Quality

The room was empty at the time of conducting air sampling and reportedly had been for some time. Activity levels in the shop area were also low, so airborne contaminants were expected to be low. Air samples were collected using a Gastec Colorimetric Detector Tube system. Gases tested for included ozone, carbon monoxide, methylethylketone, formaldehyde, nitrogen dioxide, xylene and carbon dioxide. Tests for all substances, **except** carbon dioxide were negative. Carbon dioxide was

---

[1] The abbreviation "dB" refers to the term decibel. One decibel is the minimum difference in loudness that is usually perceptible. The decibel is used to describe a level of quantities that is proportional to sound power. When measuring sound levels a logarithmic scale is used and a small increase in decibels represents a large increase in sound energy. Technically, each increase of 3 dB represents **a doubling** [2 X] of sound energy, an increase of 10 Db represents a tenfold increase [10 X], and a 20 dB increase represents a 100-fold increase [100 X] in sound energy.

identified at a level of > 500 parts per million [ppm].[2] Given that this room had not been used recently, this was a higher level than was expected.

Again, no specific health hazards could be identified due to the lack of contributing sources [from the shop floor] at the time of investigation. Based on past experience, the position of the room and an examination of the operating practices, we can make certain assumptions regarding this space.

In the event of an airborne contaminant being generated at or near the shop floor [carbon monoxide, exhaust vapours, welding fumes, caustic vapours, etc.],[3] these would negatively impact the air quality in this room. Many of these substances are initially lighter than air. They can be expected to rise and collect in corners and spaces at the roof level, where they eventually cool and settle. It can be anticipated that such a situation will develop around C-202 under the right conditions. If people are present in this area at that time, they will be exposed to those airborne contaminants. That will cause some discomfort, but whether or not it is a health hazard would depend on the levels of contaminant at the time of exposure. This can only be determined through accurate sampling during exposure.

Under normal circumstances, adequate ventilation could be used to control any contaminant levels. Unfortunately, the ventilation system which exists here, has a negative impact on the classroom environment of C-202 both through its noise contribution and the potential to introduce some of the contaminants which are trying to be controlled.

d. Ventilation

This room reportedly has a separate air handling unit which is mounted on the roof directly above C-202. The air space separation above the room provides some noise dampening from this unit, but not completely. Three air inlet diffusers [2' x 2'] are present in the ceiling and one exhaust vent [1' x 2'] is located in the north wall at ceiling height. The system is controlled by a wall mounted thermostat located in the upper classroom. This localized air handling unit reportedly services both C-202 and C-102/104 below.

Airflow velocities were measured at these duct openings [airflow volumes were not calculated]. Inlet airflow for each inlet ranged between 330 and 400 feet per minute [fpm], while out-going velocity [through the exhaust vent] was approximately 86 fpm. This potentially indicates an unbalanced system.

During discussions with some of the instructors who have used this room, they advise that they seldom turn on the ventilation system due to the noise levels generated by the fan and resultant airflow. The already poor acoustics present in the room would magnify this additional noise, thereby lowering the quality of instruction and communication. Some other instructors who use this room

---

[2] Carbon dioxide levels are widely used as an indicator of Indoor Air Quality since human occupants produce this substance regularly. Indoor air quality guidelines indicate that carbon dioxide levels of 1000 ppm are an upper limit for occupational exposure. Although this quantity is not considered as a health hazard, it is a recommended maximum in order to satisfy comfort and productivity. As carbon dioxide levels approach this level, there is often a noticeable increase in drowsiness, lethargy, fatigue, reduced attention span, etc. by the occupants. Adequate ventilation can be used to minimize carbon dioxide levels through dilution by introducing fresh air to the work environment.

[3] There is a ventilation system in the heavy duty shop area, but it is reportedly inefficient. This could not be confirmed or denied since there was no activity in this area at the time of assessment.

indicated that they did not know they had to turn on the fan at the thermostat to get increased ventilation.

A further cursory examination of the system indicated that under the "right" conditions, the ventilation system would actually draw into the room any vehicle/equipment exhaust vapours generated in the main shop area or from outside the building. Under the current arrangements, there is little which can be done to rectify that specific problem.

Facilities Services has agreed to examine the air handling unit to determine if the noise levels can be reduced.

e. Thermal Comfort

Thermal comfort in this room was not specifically investigated, but it can be expected that due to its location near the ceiling of the shop, it will become warm under certain circumstances. Since people are reluctant to use the ventilation system, this warmth will further detract from the learning environment through increasingly drowsiness of the occupants.

f. Other Hazards

The presence of the flammable/combustible materials located at the bottom of the access stairway and the fact that there is only a single exit from this room, constitutes a serious potential hazard. In the event of a fire occurring in the shop area and involving the flammable/combustibles at the bottom of the stairs, any occupants of room C-202 could be quickly trapped due to rapid fire spread. Either the flammable / combustibles should be moved to an alternate outside storage area [reportedly not feasible], or the room should not be used as a classroom.

g. Summary

Under the current conditions this room is unsuitable for teaching due to the several contributing factors which will degrade the learning environment, plus the fire hazard. It could not be confirmed that any health hazard exists, but this should not be ruled out. Air sampling would have to be conducted under "worst case" conditions in order to accurately determine that.

The application of acoustic tiles to the ceiling and/or at least one wall would probably reduce the amount of noise reflection, as well as improve the learning environment and the ability of the instructor to be heard. This might also allow the use of the ventilation system when necessary to regulate both the quality of the air and the thermal comfort. It is difficult [if not impossible] to control the noise generated in the shop area. The flammable/combustible storage would also have to be moved to make the room acceptable as a classroom.

Room B-101

This is a rectangular classroom located on the main floor of B-block on the east side. As such it receives the mid-day sun and the resultant thermal heating. The classroom was not in use at the time of investigation, therefore no air samples were taken.

The original complaint received indicated that there was little or no air flow in this and adjacent classrooms. As a result, as the day progresses, students become increasingly drowsy and lethargic. Learning abilities and retention will decrease. These symptoms and conditions are indicative of poor indoor air quality and lack

of adequate air changes per hour.[4] Information provided indicated that this condition started when the second floor addition was installed on B-block. Prior to that no problems were experienced.

The ventilation system was examined and discussed with the appropriate Facilities Services Manager. It was confirmed that the current system is not providing sufficient air to the main floor. As such, this fails to meet the various regulatory ventilation standards.

This deficiency is due in part to the fact that the airflow sensor regulating the system in this area is located on the second floor of B-block. When this unit detects that enough air is being received in the second floor area it sends a message to the variable blade fans on the air handling unit and reduces the volume of air being put into the system. Examination of the main damper on the ducts feeding the first floor area showed that it was wide open. This indicated that the first floor portion of the system was demanding more air. An examination of the fans demonstrated that the second floor sensor had decreased the fan output capacity so that no further air was available. As a result, this system is not providing a balanced adequate airflow to both floors of B-block.

It was discussed and agreed with the Facilities Services Mechanical Manager that the air handling system should be examined and the loading reviewed. First to determine its cleanliness [in case a filter or heater coil is plugged and therefore restricting airflow] and second to improve the "balance" of air distribution between the two floors. Under the current system, the first floor is getting insufficient airflow under most conditions. If no obstruction is located within the duct work for this area, the installation of another sensor and control mechanism to regulate the first floor may be necessary to achieve suitable equilibrium of air distribution.

It has since been learned that the pending renovations to the old book store area to accommodate the move of the finance department may put a further increased load on this air handling system. If this new demand and the existing shortfall are not adequately addressed first, any additional loading on the ventilation system will only make matters worse.

Conclusions

Room C-202 is substandard as a classroom facility. No specific health hazards caused by airborne contaminants have been identified, however there are definite negative working conditions related to ergonomics.[5] Structural, finishing and/or ventilation system modifications could be made in an attempt to improve the rooms usefulness, however the costs associated with that may not be justified. It may be cheaper and more efficient to find alternate instructional space and use this area for storage, etc. If the room is to be renovated to become more suitable as a classroom, then the flammable storage would have to be re-located away from the access stairs and preferably outside.

---

[4] Number of air changes per hour is the ratio of the ventilation rate [per hour] to the room volume.

[5] **Ergonomics** is the science and study of people at work. It examines the interactions between people and the equipment or machines which they use. It also involves an evaluation of the actual operating environment, since work space design directly and indirectly affects everything we do. It is a multi-disciplined complex subject which involves evaluation of many contributing factors, including such things as lighting, ventilation, indoor air quality, etc.

Room B-101 is currently receiving insufficient airflow to ensure a good learning environment. Correction of this will require maintenance and/or modifications to the existing controls system. This should be investigated as soon as possible. Adjacent rooms may have similar deficiencies and should be considered in any review of the system.

Please note that copies of this memo were not routed to all parties involved in your program review process. You may wish to provide this information to anyone I missed.

Should you have any questions regarding this, or if this office can be of further assistance, please do not hesitate to contact me. Thank you for your attention.

Barry N. Manfield, C.R.S.P., A.Sc.T.
Health and Safety Officer

BNM/ts

Date Due

NOV 26 1996			
NOV 27 1996			
OCT 20 1998			
OCT 10 1998			

BRODART, INC. Cat. No. 23 233 Printed in U.S.A.

U.C.C. LIBRARY

70698667

LE 3 .C34 A6 AUTO
Program review report on the
University College of the
c.1 70698667