

STUDENT EVALUATION OF PROGRAM
2004/2005
REPORT



Going Places.

Cover image
Red River Raycer - winner of four North American Solar Challenge Awards

Table of Contents

Introduction	2	Education, Curriculum & Learning		Transportation, Aviation and	
Report Highlights	3	Resources Division	21	Manufacturing Division	36
Survey Process	4	Academic English for Univ/College Entrance		Aircraft Maintenance Engineer	
Aboriginal Education Division	6	English for Business Purposes		APP Aircraft Maintenance	
Aboriginal Self-Government Administra-		English for Health Care Aides		APP Automotive Service Education (ASEP)	
ACCESS Integrated Pre-Trades Program		English for Nursing Purposes		APP Automotive Service Technician	
Microcomputer Applications		English for Professional Purposes		APP Boilermaker	
Applied Sciences Division	8	English for Technical Purposes		APP Boilermaker - Entry-level	
Animal Health Technology		Intensive English as a Second Language		APP Machinist	
Chemical and Biosciences Technology		Industrial Technologies Division	25	APP Motor Vehicle Mechanic (ASSET)	
Child and Youth Care		Advanced Network Technology		APP Sheet Metal	
College Preparation for Nursing		APP Bricklaying		APP Transport Truck/Bus Mechanic	
Community Develop Community Intern		APP Cabinet Making		Automotive Technician - Certificate	
Dental Assisting - Level 2		APP Carpenter		Automotive Technician - Diploma	
Diploma Nursing (Accelerated)		APP Electrical		Gas Turbine Engine Repair & Overhaul	
Disability and Community Support		APP Painting & Decorating		Heavy Duty Equipment Mechanic	
Early Childhood Education		APP Plumbing		Manufacturing CAD	
Early Childhood Education - Workplace		APP Power Electrician		Manufacturing Technician	
Family Support Worker - FAS/E		APP Refrigeration		Technology Management	
Health Care Aide		APP Sprinkler/Fire Prot Installer		Welding	
Joint Baccalaureate Nursing		APP Steamfitting		Continuing Education Division	43
Medical Laboratory Technology		Architectural/Engineering Technology		Applied Counselling	
Medical Radiologic Technology		Building Design CAD Technology		Office Technician	
Radiation Therapy		Carpentry & Woodworking		Para Educator	
Business and Applied Arts Division ...	15	Computer Engineering Technology		Power Engineering Fifth Class	
Aviation Management		Electrical		Recreation Facilitator for Older Adults	
Business Administration		Electrical Engineering Technology		Sterile Processing Technician	
Business Administration Co-op		Electronic and Network Technology		Appendix A	46
Business Administration Integrated		Electronic Engineering Technology		Programs not illustrated in this Report	
Commerce/Industry Sales & Marketing		Environmental Protection Technology		Appendix B	46
Computer Analyst/Programmer		Geographic Information Systems Technology		Quality Categories	
Culinary Arts		Geomatics Technology		Appendix C	46
Deaf Studies		Greenspace Management		Quality Categories Questions	
Digital MultiMedia Technology		Instrumentation Engineering Technology		Appendix D	49
Graphic Design - Advanced		Municipal Engineering Technology		Technical Overview of Analytic Techniques	
Hotel & Restaurant Administration		Piping Trades		Appendix D1	52
Information Systems Technology		Refrigeration and Air Conditioning		Exploratory Factor Analysis Results	
Library and Information Technology		Structural Engineering Technology			
Professional Baking					
Tourism Management					



Introduction

Every year Red River College surveys students, in all full-time programs, towards the end of their program of study. The annual Student Evaluation Program Survey (SEPS) is part of Red River College's commitment to understand the attitudes and experiences of college students. The survey questionnaire includes demographic questions and forty-four questions concerning students' experiences with College programs, facilities and services. The data are used across the College to improve programs, facilities and services to students. Selected questions from the survey are part of internal Program Validations and are used as key College performance indicators.

This report presents the results of the 2004-05 SEPS in a mode that allows for a broad overview of findings and that facilitates wide distribution. The report opens with an outline of the College aggregate results, including a summary of student ratings of key aspects of the College and the characteristics of respondents by major program type, that is, Apprenticeship, Regular Program and Continuing Education. Primarily, the report summarizes student attitudes by Division and by Program. In order to summarize the findings, the data were first reduced through factor analysis. This statistical technique allows the information contained in a large number of questions to be summarized in a smaller set of factors. The main applications of factor analytic techniques are: (1) to reduce the number of variables and (2) to detect structure in the relationships between variables, that is to classify variables into categories.

The forty-four questions on the SEPS can be summarized in eight dimensions:

- Program Quality
- Quality of Orientation
- Quality of familiarization to College Policies
- Quality of welcoming, inclusive College Environment
- Quality of Instruction
- Quality of Program Resources
- Quality of College Facilities
- Quality of College Services

Students' assessments of the College are presented along these dimensions in a four point scale from one to four with one indicating strong dissatisfaction and four, strong satisfaction throughout the report.

The College encourages comments about this Report. Questions concerning the methodology of this study should be directed to Jim Goho, Director of Research and Planning at 204.632.2091 or jgoho@rrc.mb.ca.



Jim Goho
Director, Research and Planning

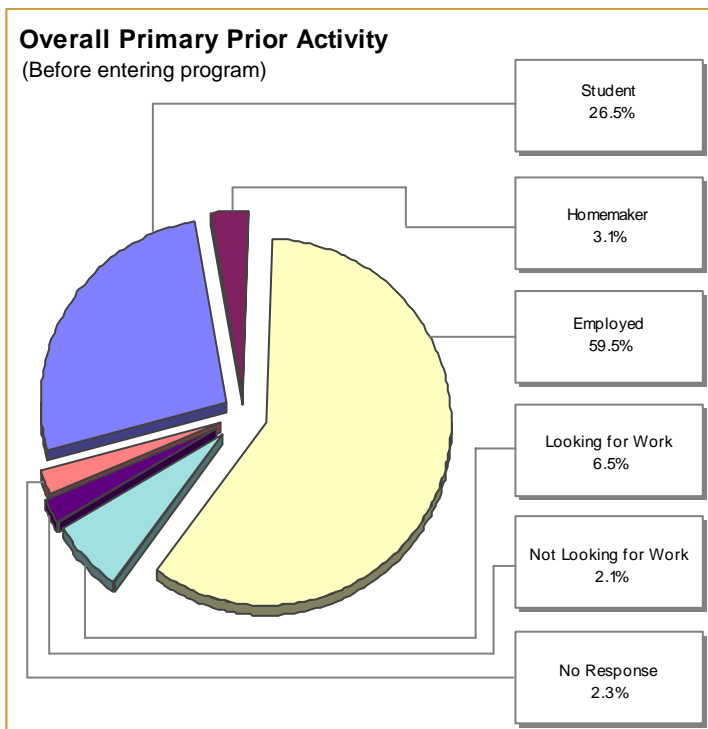
Report Highlights

Red River College's Student Evaluation of Program survey of 2004/2005 students shows that students express overall high levels of satisfaction with their education.

The main prior activity of students was being employed (59.5%) followed by being a student [either high school, college or university] (26.5%) and looking for work (6.5%).

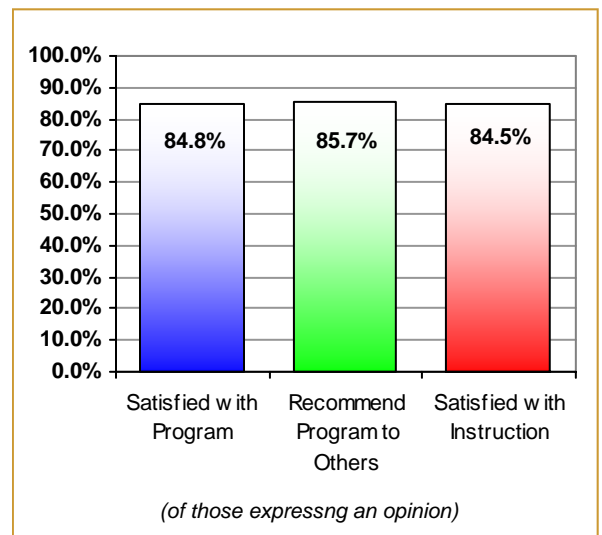
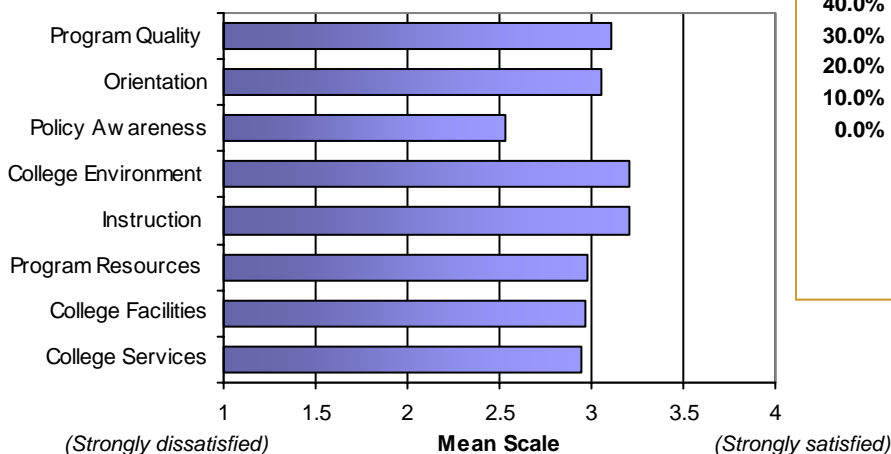
Of all students who responded to the survey, 85 percent were satisfied with their education, 86 percent would recommend their program to others, and 84 percent were satisfied with instruction.

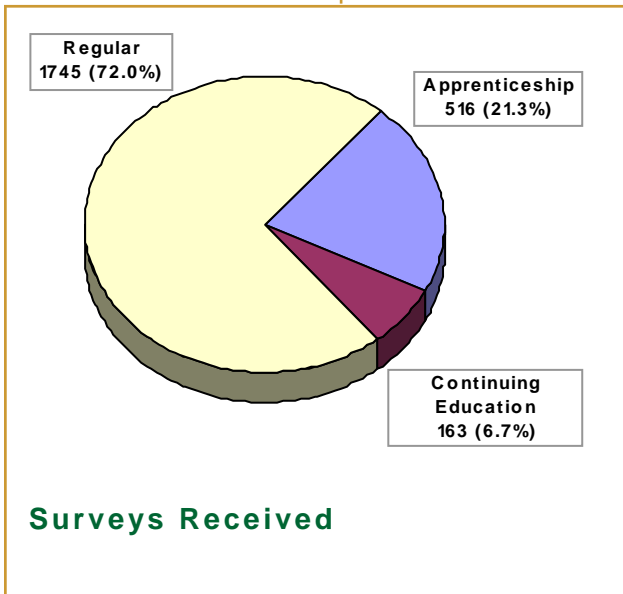
Students gave overall ratings higher than 3.0 to Instruction (3.21), College Environment (3.20), Program Quality (3.11), and Orientation (3.06). Program Resources at (2.98), College Facilities (2.97), and College Services (2.94) were rated near to 3.0, while Policy Awareness (2.53) was just above the mid-point.



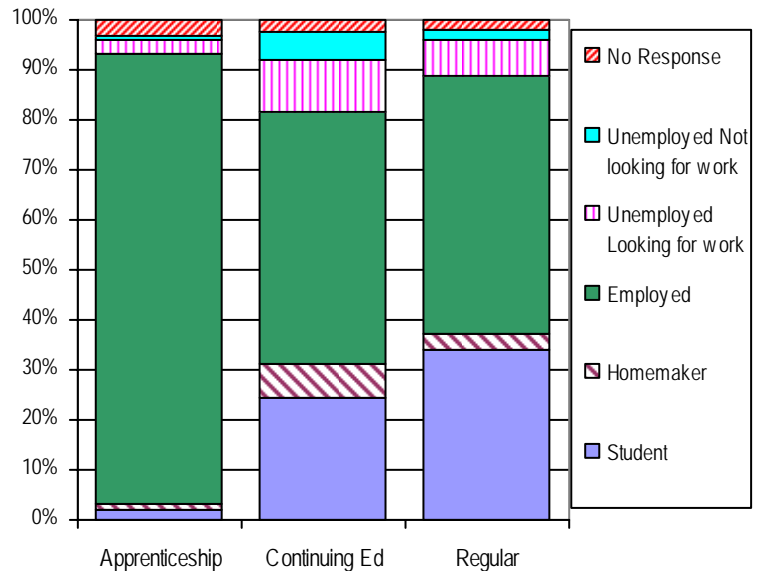
Achievement	# Programs Surveyed	Surveys Received
Advanced Diploma	5	46
Apprenticeship	19	547
Certificate	34	825
Diploma	41	932
External	1	57
No Award	2	17
Total	102	2424

Summary of Student Ratings of the College





Primary Prior Activity by Program Type



Prior activity of students varied by program type. By far, most Apprenticeship students were working. Most Continuing Education students were either employed or in school. More Regular program students were previously in school than students in the other program types.

Survey Process

Red River College surveys its students about their program on an annual basis. Students are asked to indicate their level of satisfaction with the education received.

The analyzed data from the completed and returned surveys are presented in this report for each program. Data are also presented for each Academic Division.

Scope of the Survey

Students from certificate, diploma and advanced diploma programs, as well as from apprenticeship, no

award and programs delivered in partnership with external agencies are surveyed during the last term of the program. Students of contract programs are generally not surveyed. A total of 2,424 students participated in the survey.

Methodology

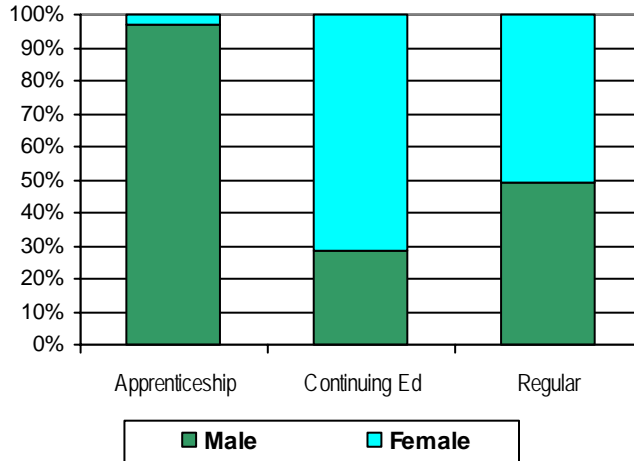
The survey is conducted annually during the last term of each program. To ensure anonymity class time is allocated without the instructor being present. A student volunteer collects survey materials from each student and seals them in a return envelope.

Response Rates

All program students who were in class were surveyed and a proportion of this population responded. The results in this report are based on those respondents. The survey methodology and fielding process does not allow for the calculation of response rates, although, anecdotally, most students in class respond. The number of students responding to the survey is identified in this report for each program.

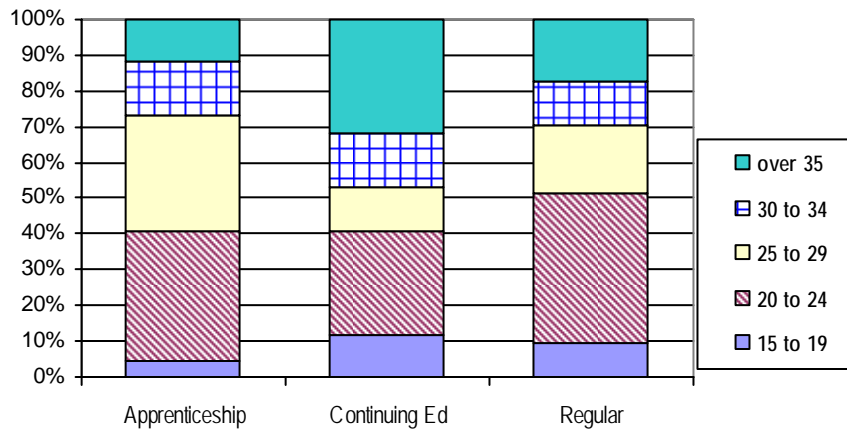
Gender of Respondents

There was a significant difference in gender by program type. Apprenticeship students were by far male, Continuing Education students were primarily female and Regular students were more evenly distributed with 50.9% female.



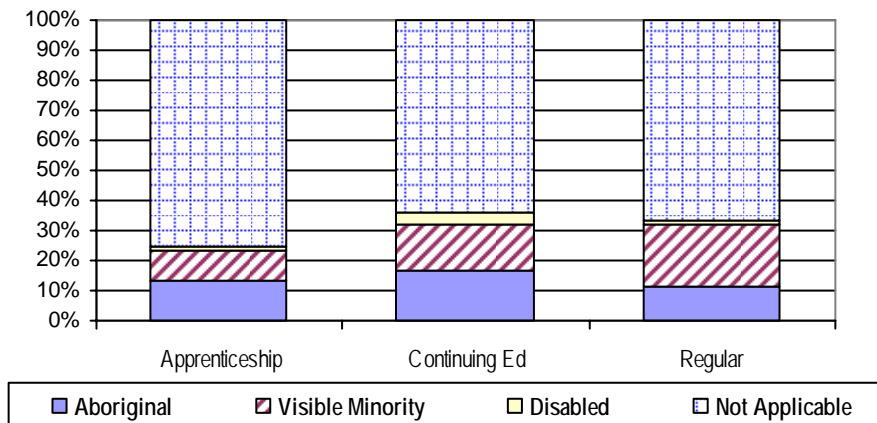
Age of Respondents

There was a variation in the age structure by program type. Almost sixty percent of both Apprenticeship and Regular students were 25 and over. Continuing Education students had the highest percent in the over 35 age group. Regular students tended to be younger.

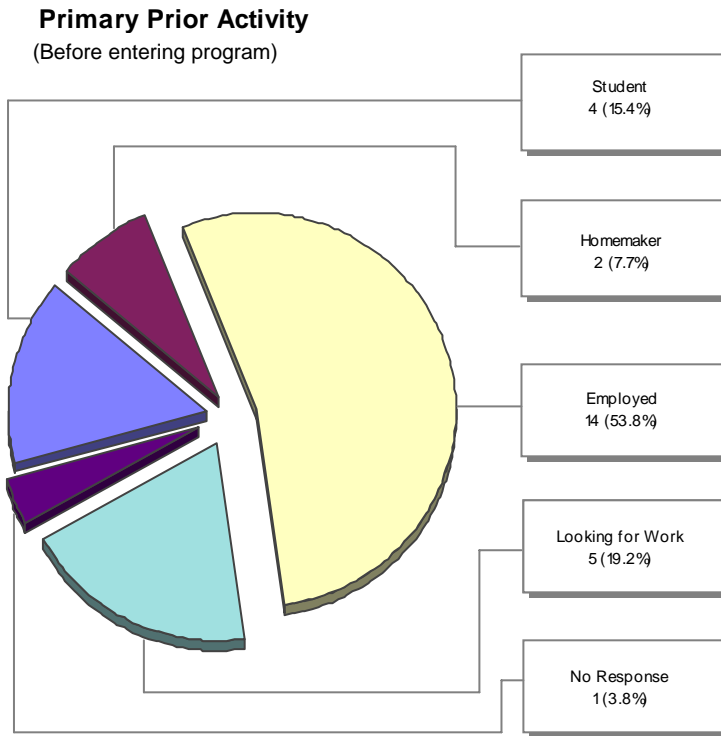


Designation of Respondents

The proportion of Aboriginal people, visible minorities and disabled people varied by program type, with Apprenticeship programs having a smaller proportion than Continuing Education or Regular programs.



Aboriginal Education Division



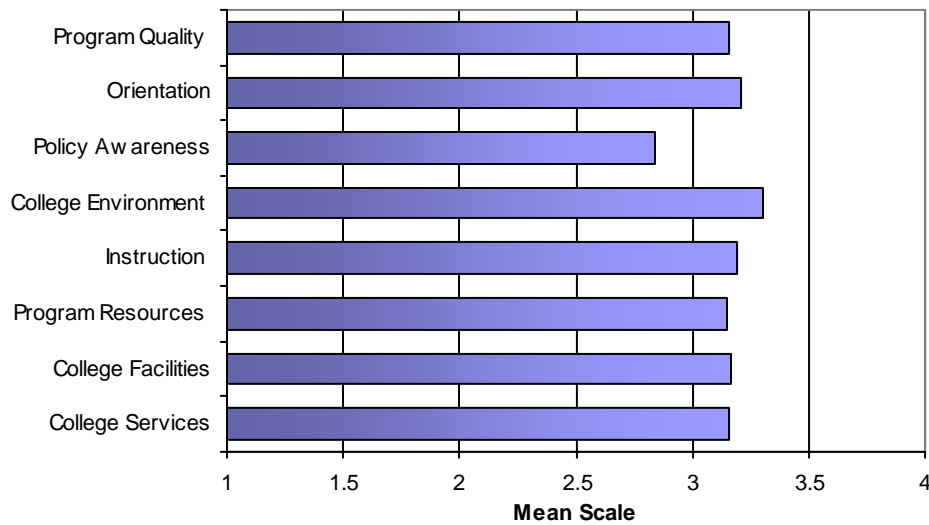
Number of Respondents in this Division: 26

Programs in this report:

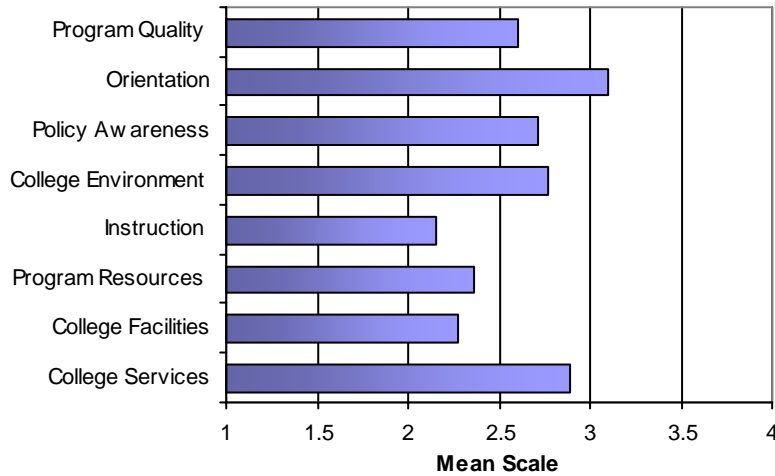
- Aboriginal Self-Government Administration
- ACCESS Integrated Pre-Trades
- Microcomputer Applications

Programs with less than 5 respondents are not illustrated in this report, but are included in the Divisional statistics.

Summary of Student Divisional Ratings



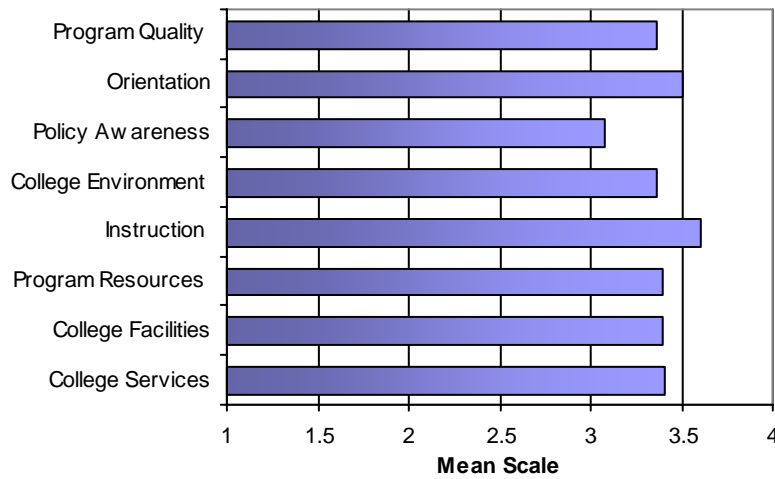
Aboriginal Self-Government Administration



Two-Year Diploma Program

Number of Respondents: 5

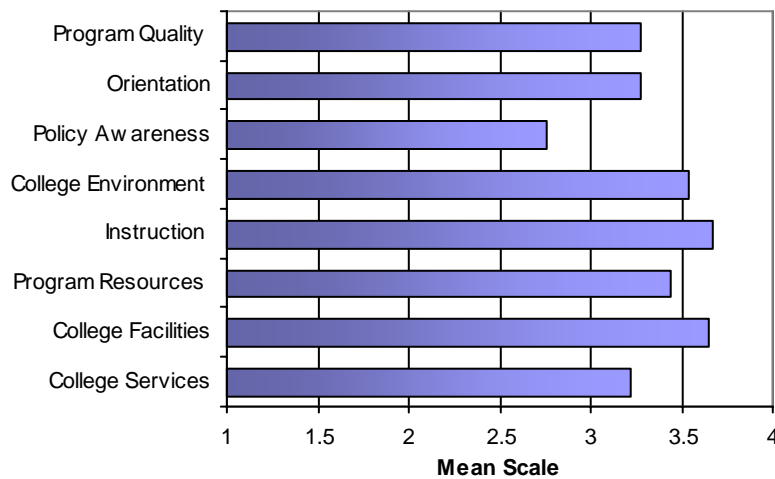
ACCESS Integrated Pre-Trades Program



Five-Month Preparatory Program

Number of Respondents: 5

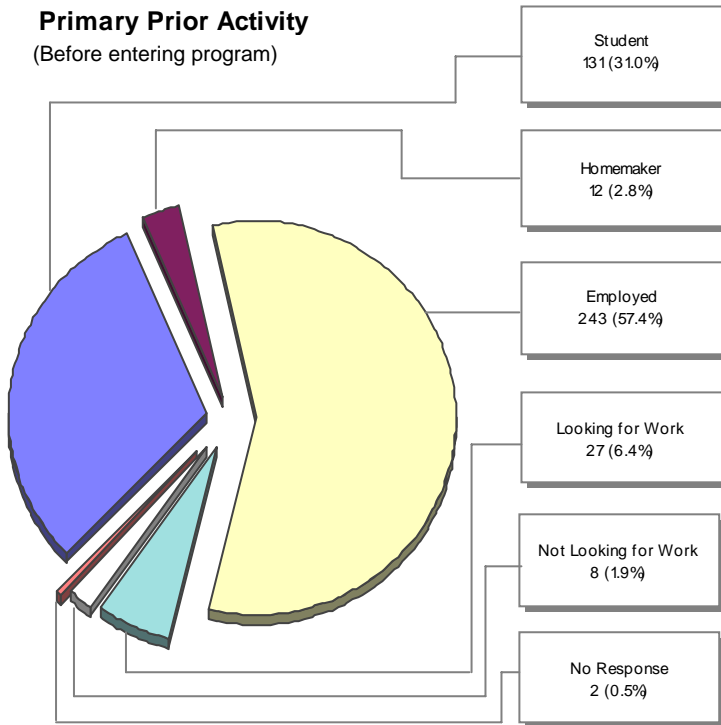
Microcomputer Applications



One-Year Certificate Program

Number of Respondents: 9

Applied Sciences Division

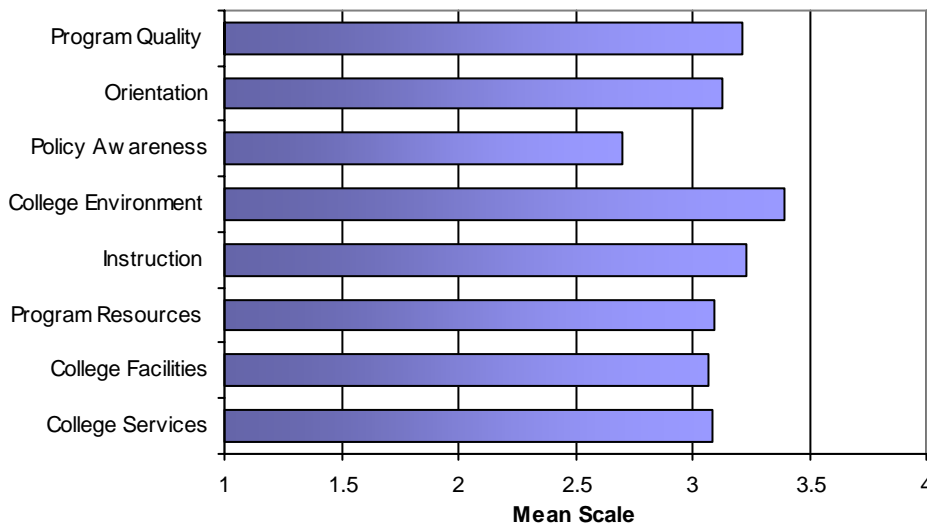


Number of Respondents in this Division: 423

Programs in this report:

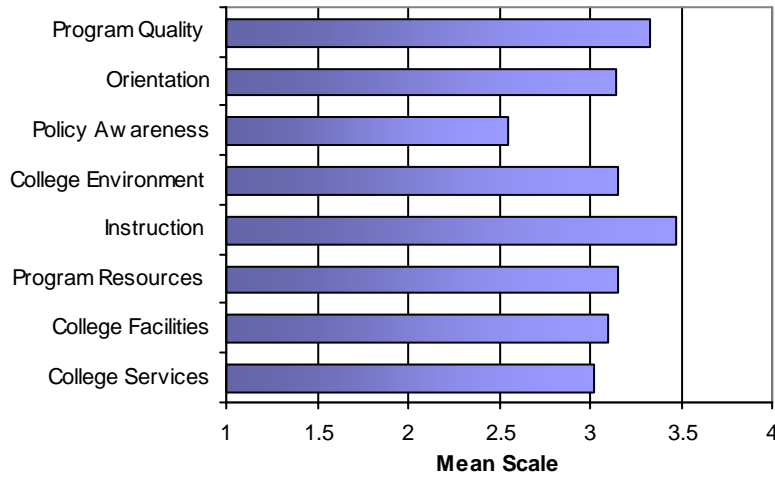
- Animal Health Technology
- Chemical and Biosciences Technology
- Child and Youth Care Worker
- College Preparation for Nursing
- Community Develop Community Intern
- Dental Assisting - Level 2
- Diploma Nursing (Accelerated)
- Disability and Community Support
- Early Childhood Education
- Early Childhood Education - Workplace
- Family Support Worker - FAS/E
- Health Care Aide
- Joint Baccalaureate Nursing
- Medical Laboratory Sciences
- Medical Radiologic Technology
- Radiation Therapy

Summary of Student Divisional Ratings



Programs with less than 5 respondents are not illustrated in this report, but are included in the Divisional statistics.

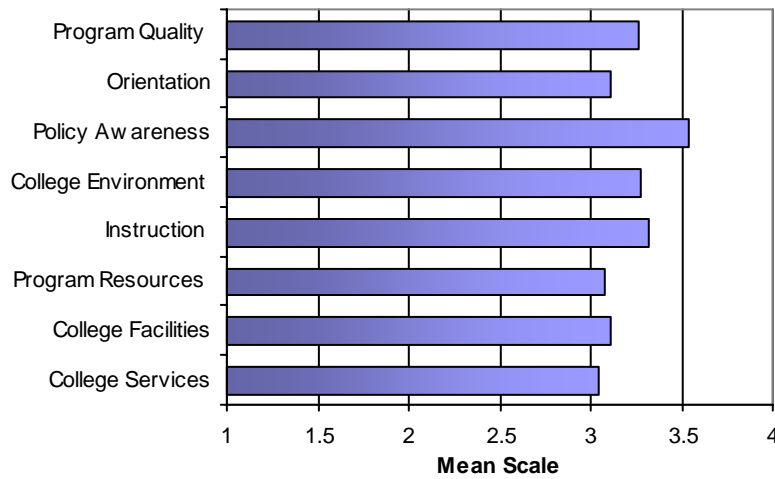
Animal Health Technology



Two-Year Diploma Program

Number of Respondents: 17

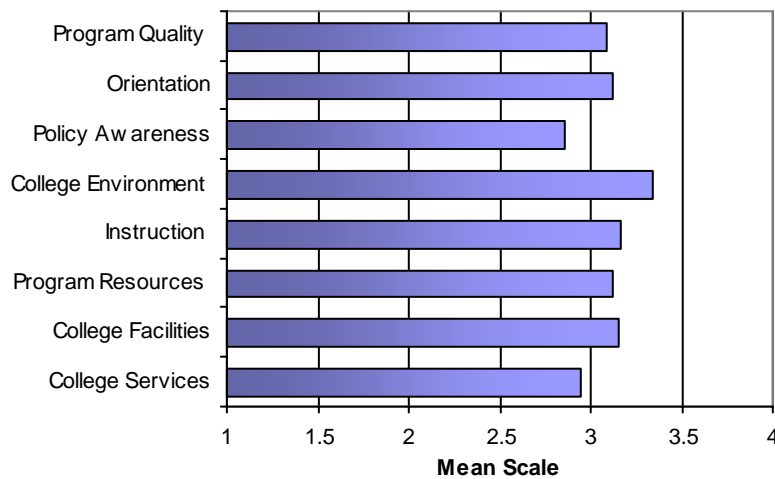
Chemical and Biosciences Technology



Two-Year Diploma Program

Number of Respondents: 19

Child and Youth Care



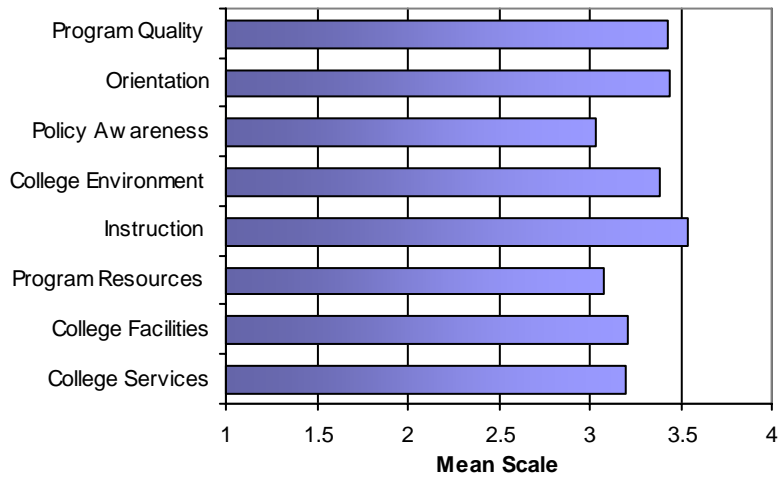
Two-Year Diploma Program

Number of Respondents: 16

College Preparation for Nursing

One-Year Certificate Program

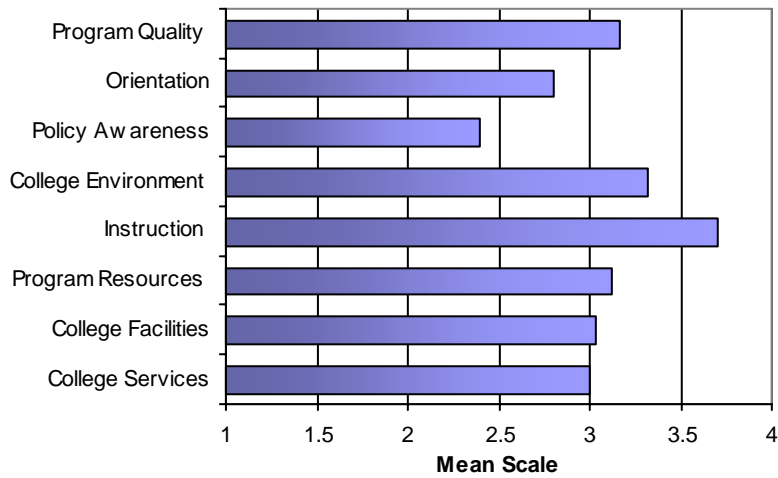
Number of Respondents: 23



Community Develop Community Intern

One-Year Internship Program

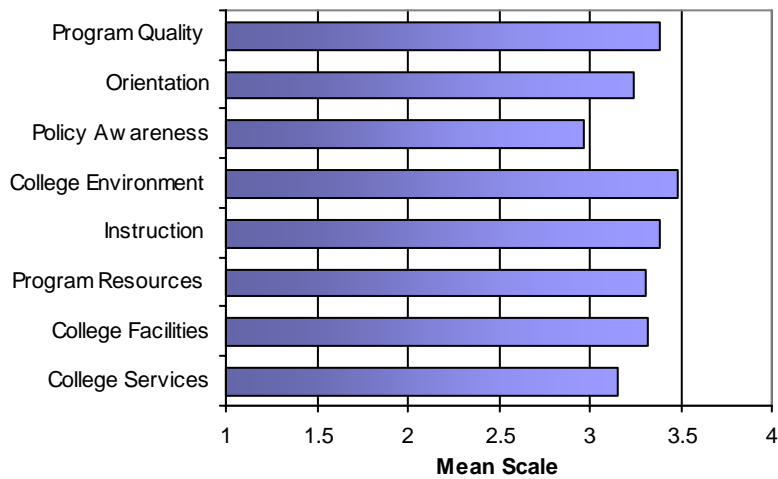
Number of Respondents: 5



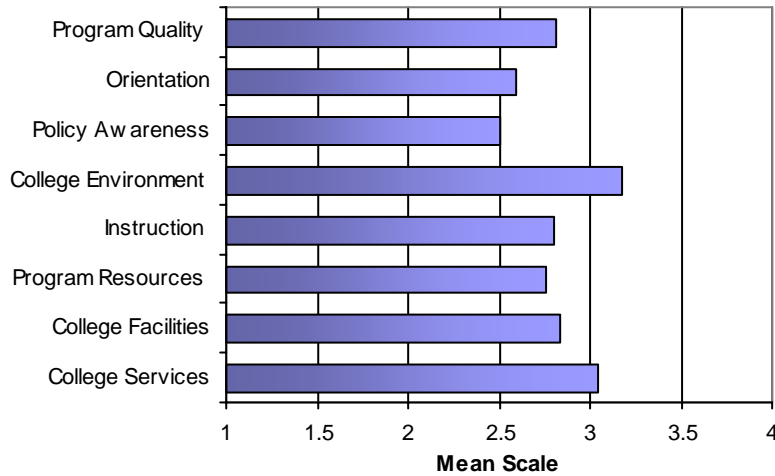
Dental Assisting - Level 2

One-Year Certificate Program

Number of Respondents: 39



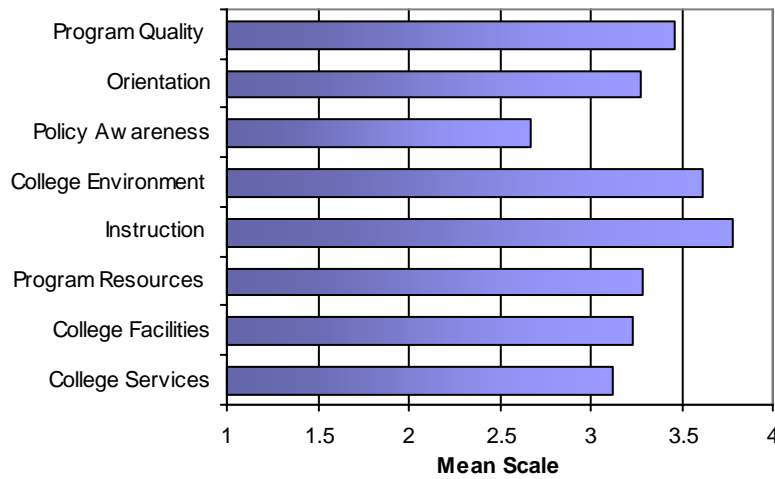
Diploma Nursing (Accelerated)



Two-Year Diploma Program

Number of Respondents: 57

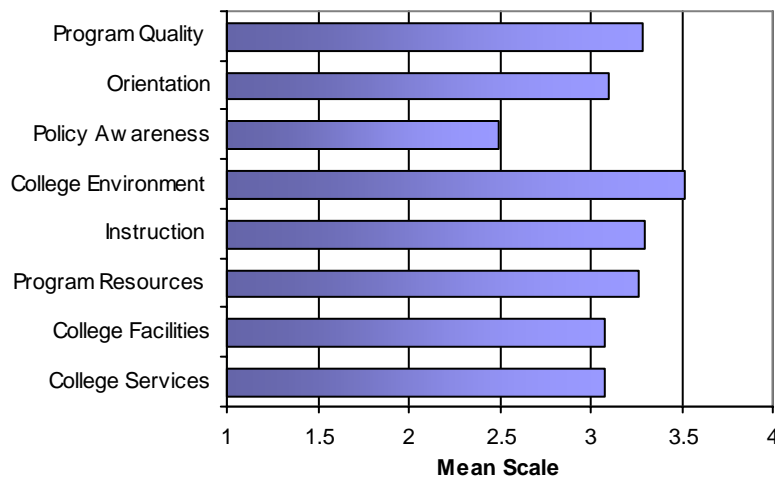
Disability and Community Support



Two-Year Diploma Program

Number of Respondents: 9

Early Childhood Education



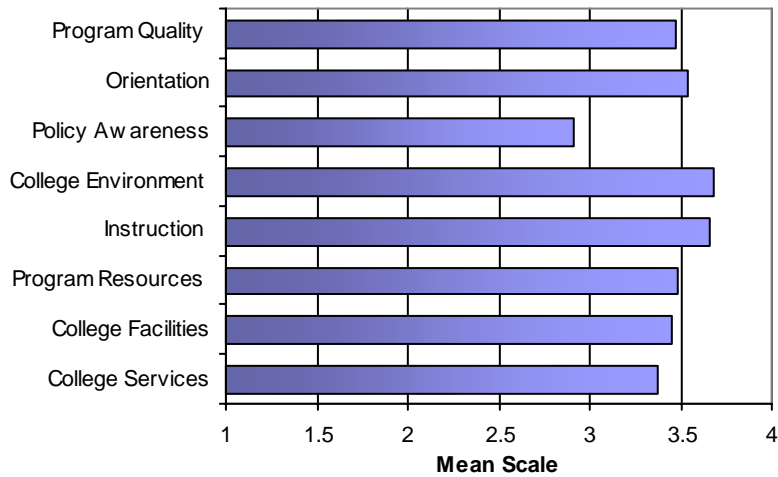
Two-Year Diploma Program

Number of Respondents: 35

Early Childhood Education - Workplace

Two-Year Diploma Program

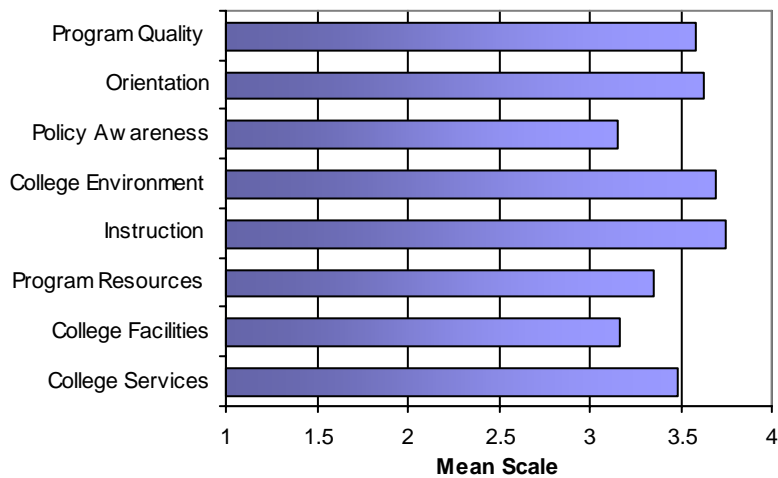
Number of Respondents: 45



Family Support Worker - FAS/E

Ten-Month Certificate Program

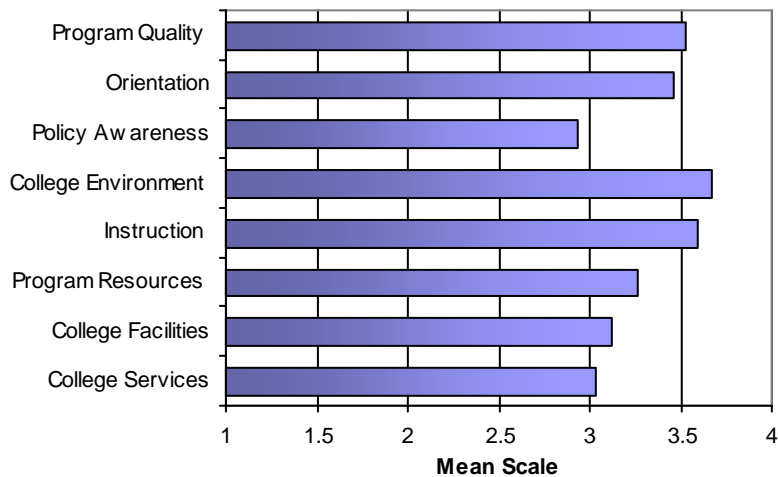
Number of Respondents: 16



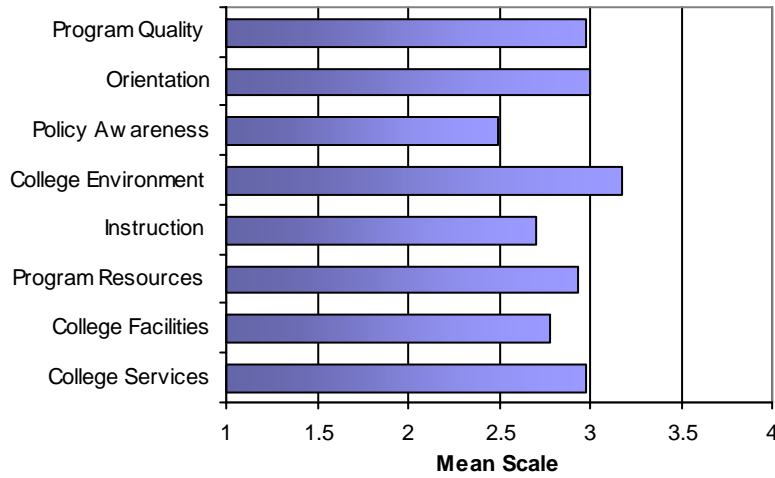
Health Care Aide

Twenty-Week Certificate Program

Number of Respondents: 40



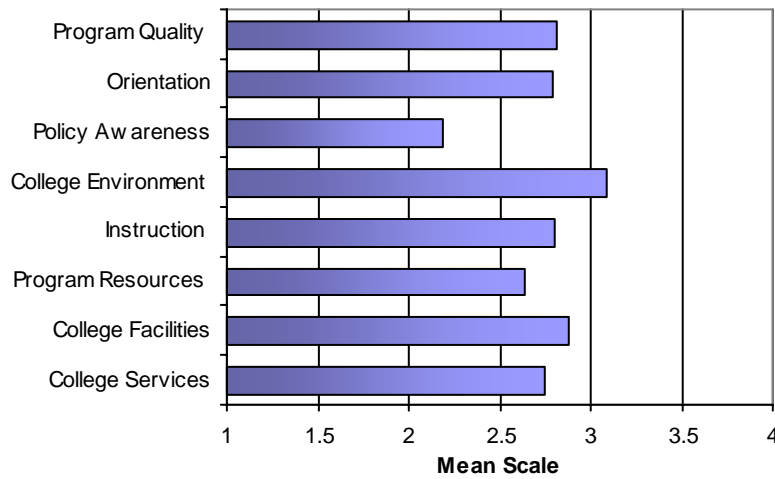
Joint Baccalaureate Nursing



Four-Year Joint Program

Number of Respondents: 57

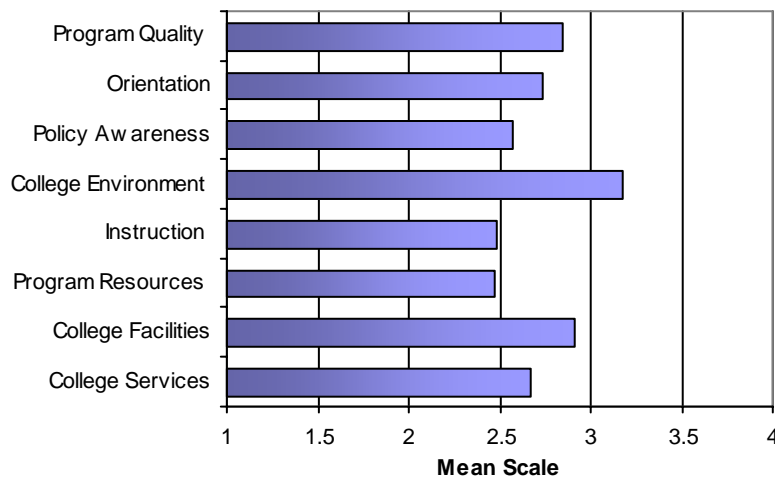
Medical Laboratory Sciences



Two-Year Diploma Program

Number of Respondents: 12

Medical Radiologic Technology



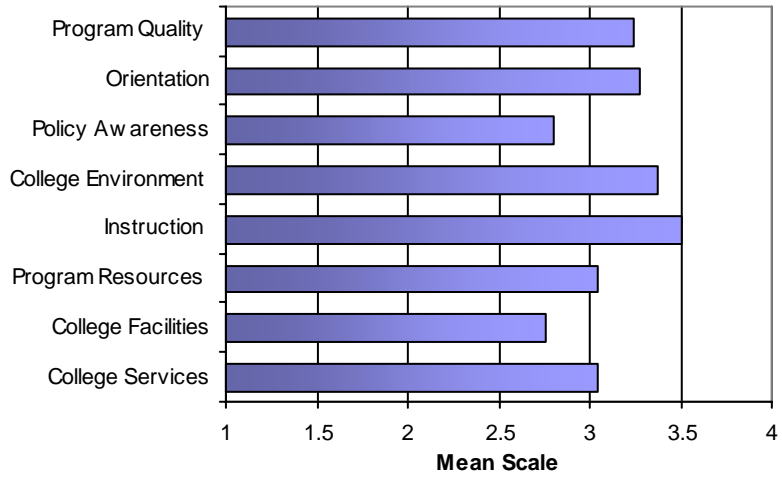
Two-Year Diploma Program

Number of Respondents: 16

Radiation Therapy

28-Month Diploma Program

Number of Respondents: 11



Business & Applied Arts Division

Number of Respondents in this Division: 503

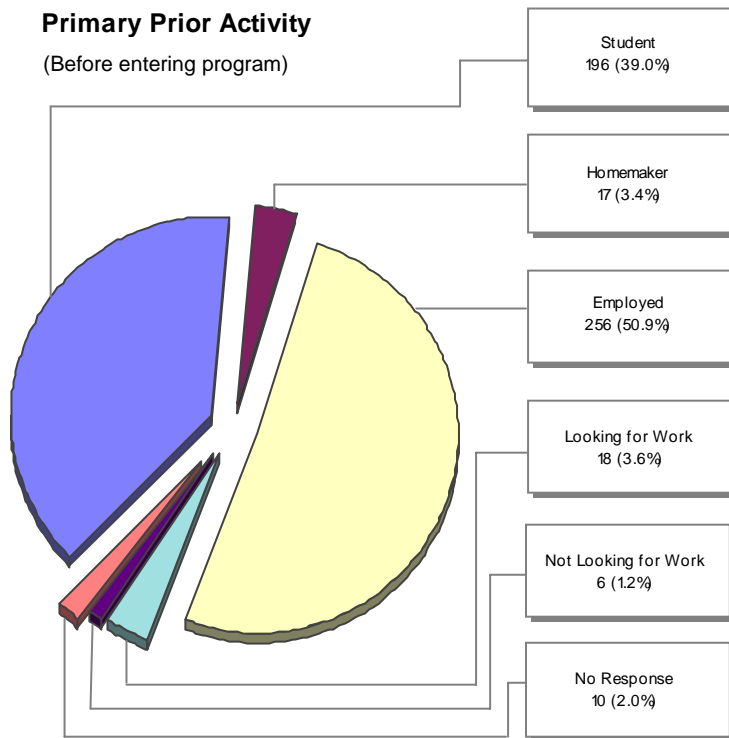
Programs in this report:

- Aviation Management
- Business Administration
- Business Administration Co-op
- Business Administration Integrated
- Commerce/Industry Sales & Marketing
- Computer Analyst/Programmer
- Culinary Arts
- Deaf Studies
- Digital MultiMedia Technology
- Graphic Design - Advanced
- Hotel & Restaurant Administration
- Information Systems Technology
- Library and Information Technology
- Professional Baking
- Tourism Management

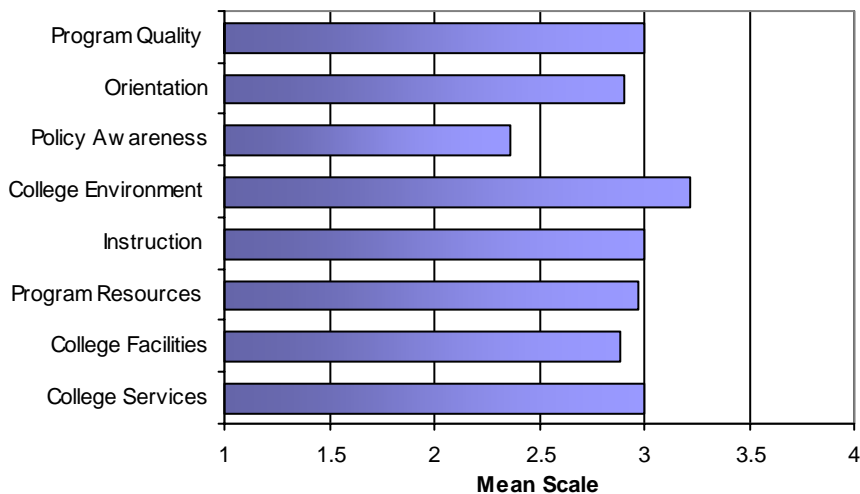
Programs with less than 5 respondents are not illustrated in this report, but are included in the Divisional statistics.

Primary Prior Activity

(Before entering program)



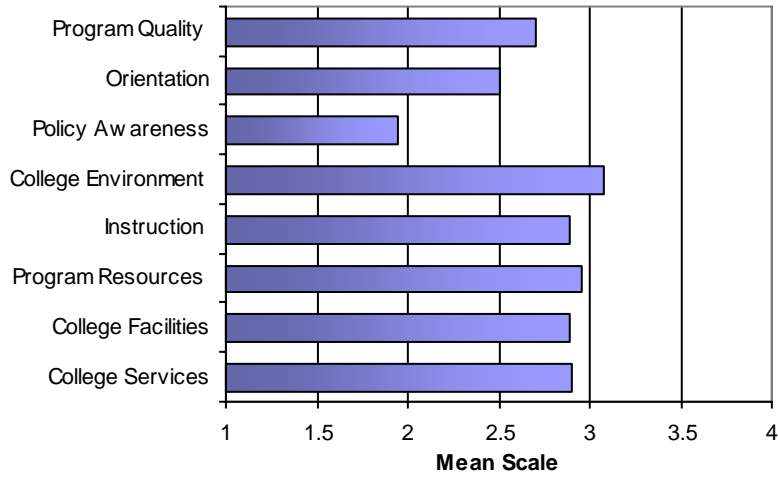
Summary of Student Divisional Ratings



Aviation Management

Two-Year Diploma Program

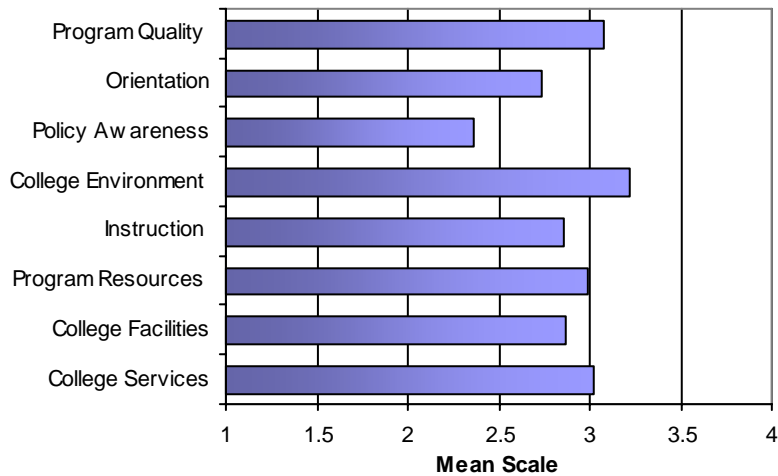
Number of Respondents: 7



Business Administration

Two-Year Diploma Program

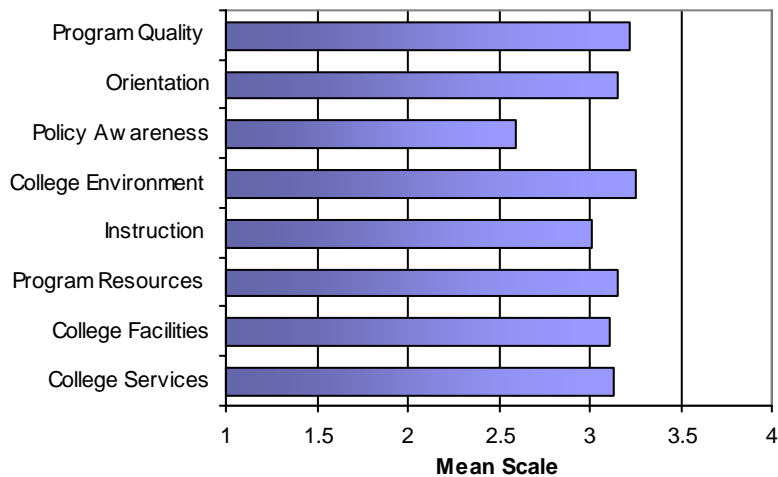
Number of Respondents: 179



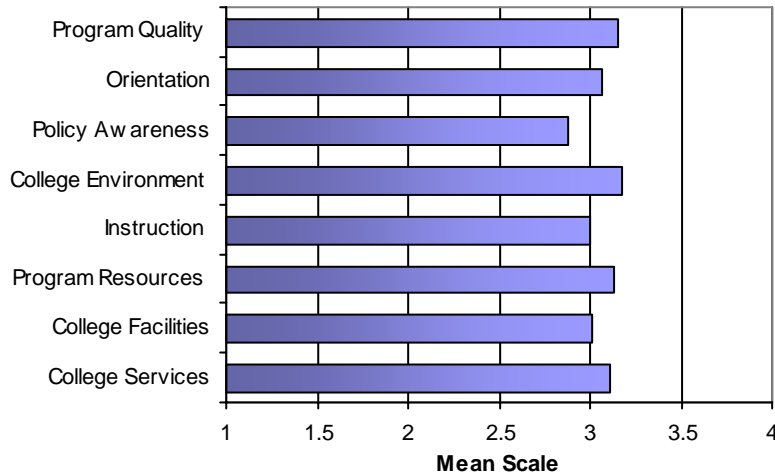
Business Administration - Co-operative Education

Two-Year Diploma Program

Number of Respondents: 14



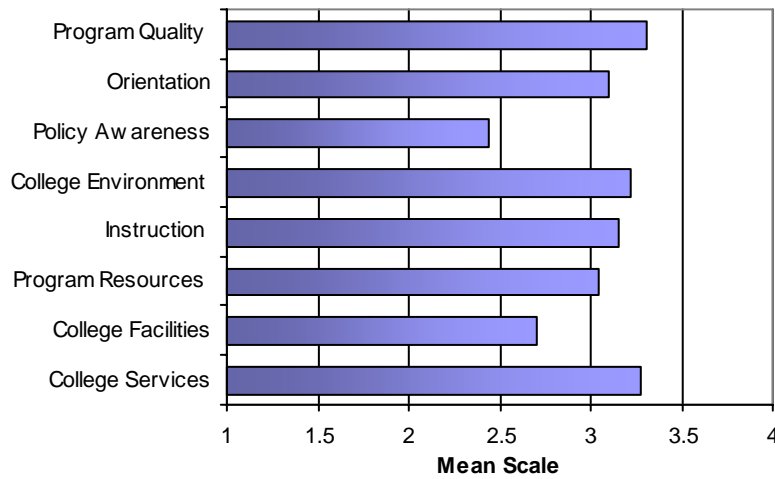
Business Administration Integrated



Three-Year Diploma Program

Number of Respondents: 15

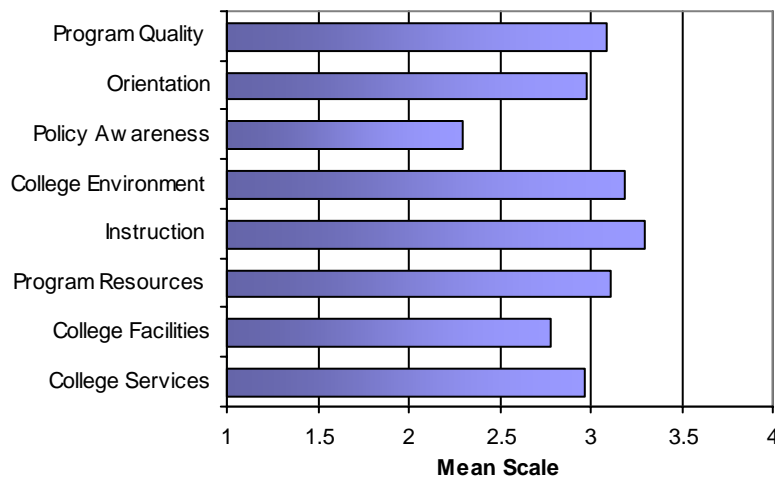
Commerce/Industry Sales & Marketing



One-Year Certificate Program

Number of Respondents: 24

Computer Analyst/Programmer



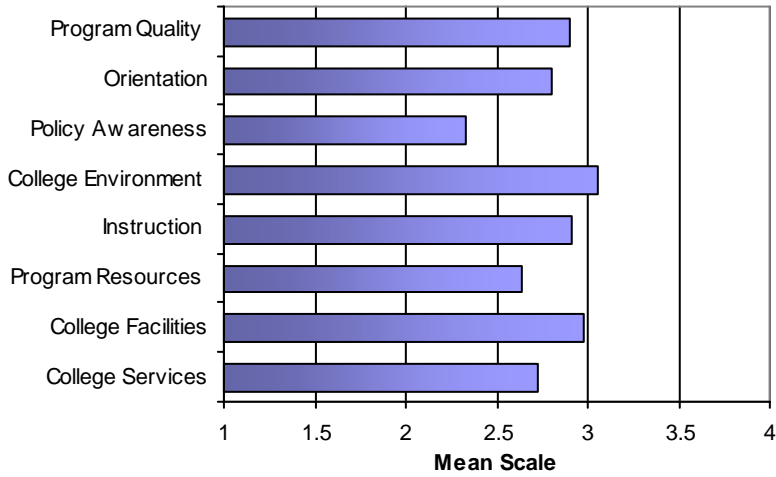
Two-Year Diploma Program

Number of Respondents: 70

Culinary Arts

Two-Year Diploma Program

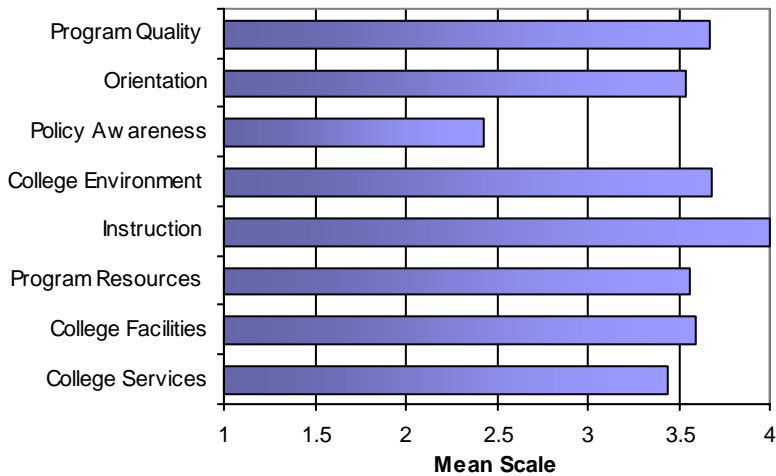
Number of Respondents: 40



Deaf Studies

One-Year Certificate Program

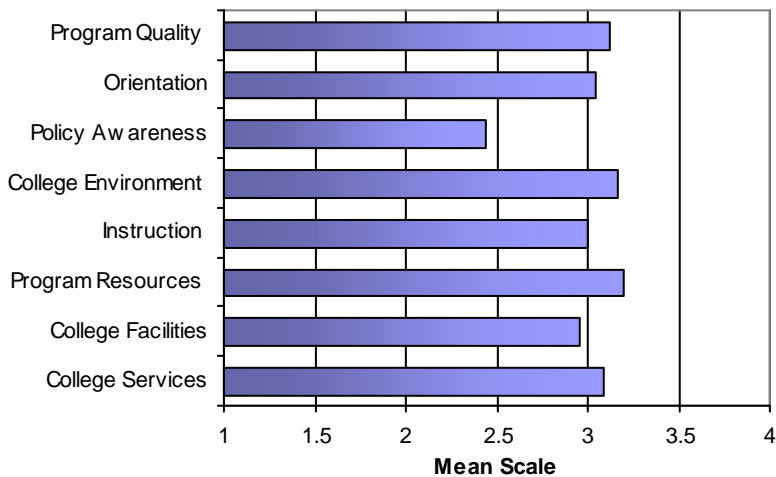
Number of Respondents: 15



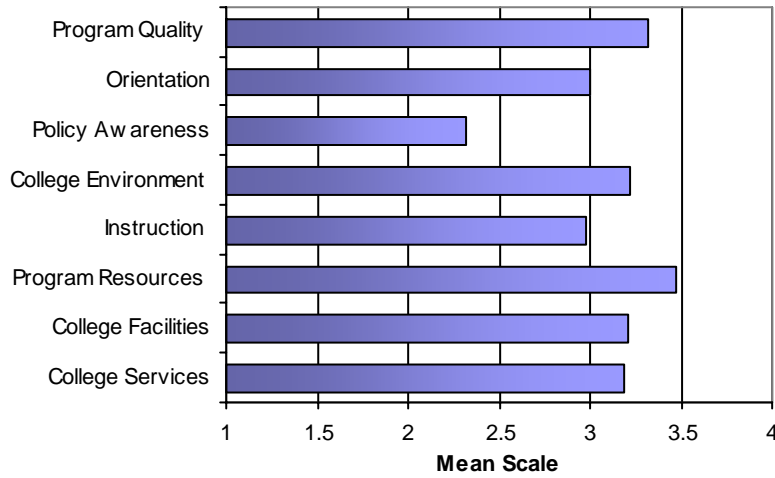
Digital MultiMedia Technology

Two-Year Diploma Program

Number of Respondents: 13



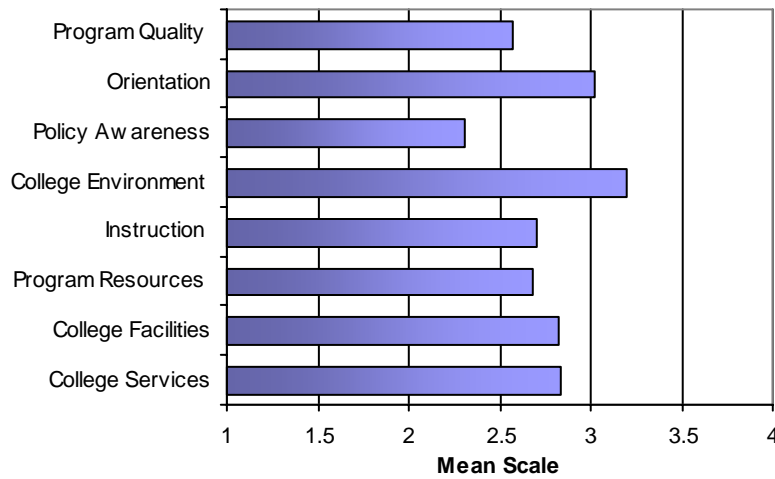
Graphic Design - Advanced



One-Year Advanced Diploma Program

Number of Respondents: 12

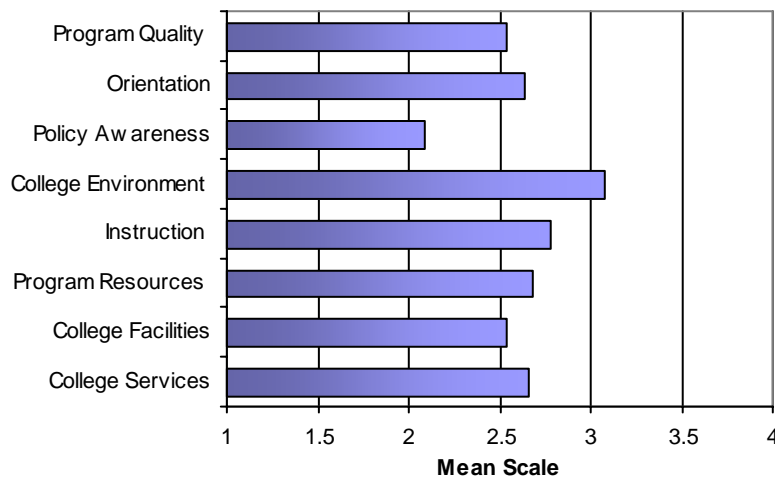
Hotel and Restaurant Administration



Two-Year Diploma Program

Number of Respondents: 19

Information Systems Technology



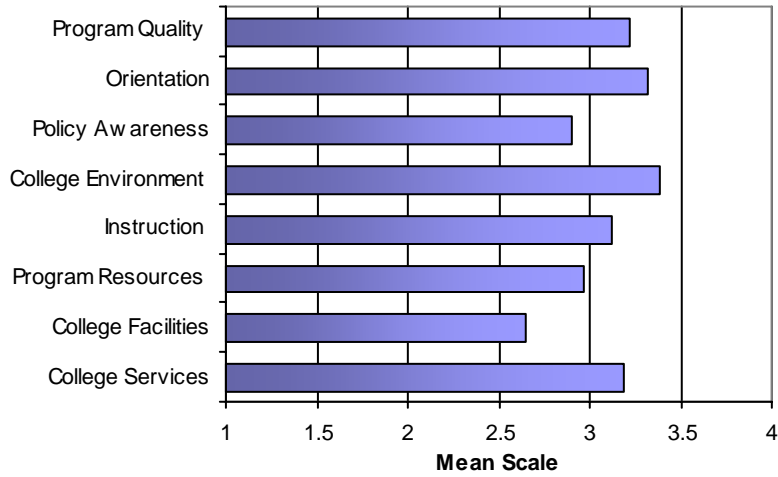
Two-Year Diploma Program

Number of Respondents: 30

Library and Information Technology

Two-Year Diploma Program

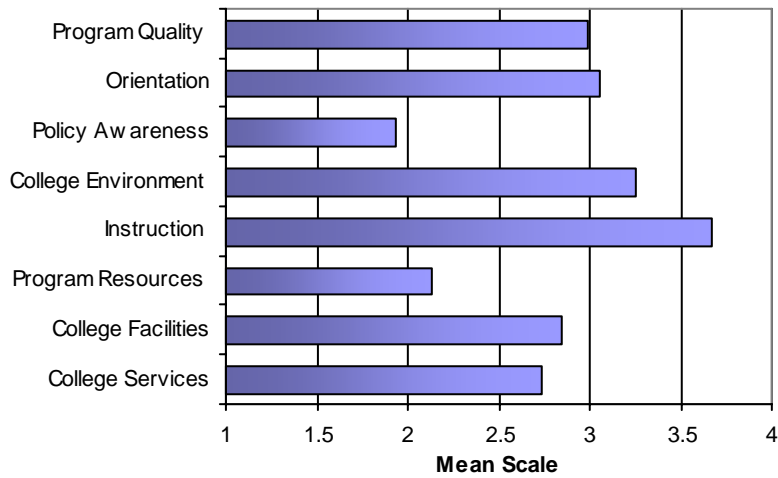
Number of Respondents: 18



Professional Baking

One-Year Certificate Program

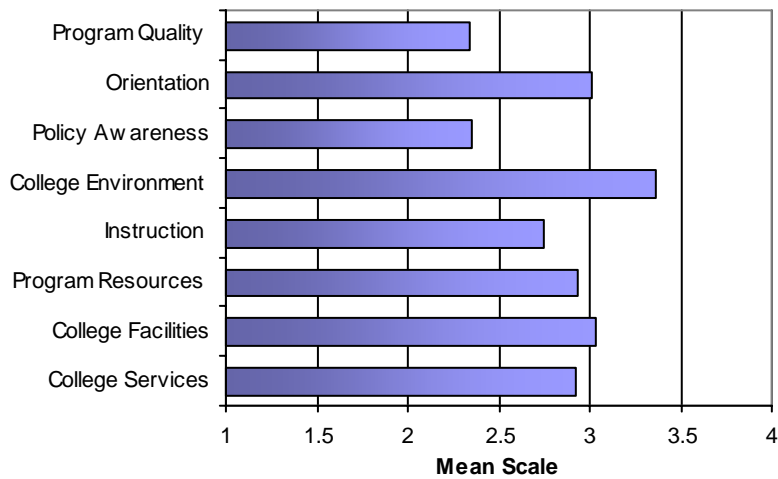
Number of Respondents: 9



Tourism Management

Two-Year Diploma Program

Number of Respondents: 33



Education, Curriculum and Learning Resources Division

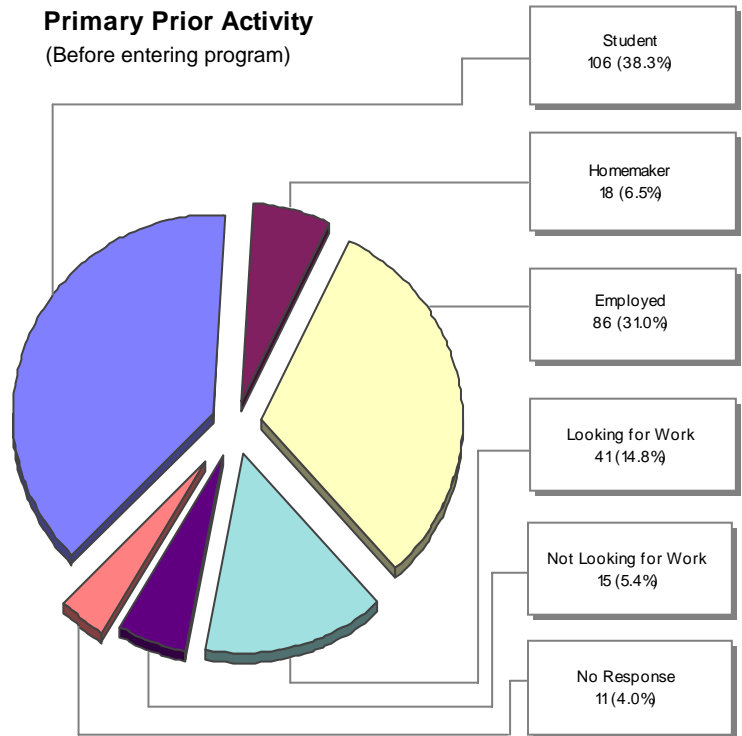
Number of Respondents in this Division: 277

Programs in this report:

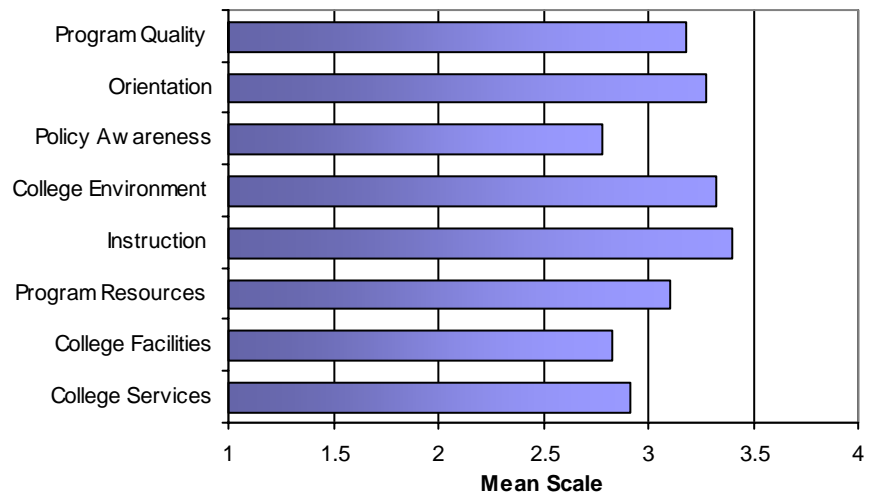
- Academic English for Univ/College Entrance
- English for Business Purposes
- English for Health Care Aides
- English for Nursing Purposes
- English for Professional Purposes
- English for Technical Purposes
- Intensive English as a Second Language

Programs with less than 5 respondents are not illustrated in this report, but are included in the Divisional statistics.

Primary Prior Activity
(Before entering program)



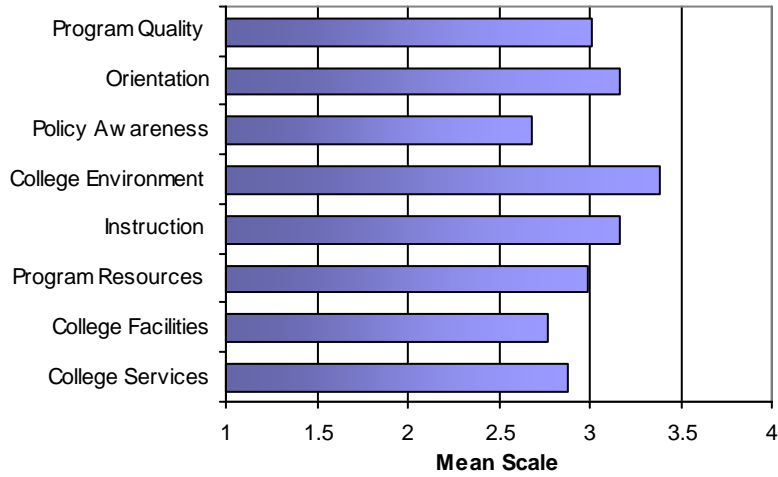
Summary of Student Divisional Ratings



Academic English for Univ/College Entrance

Certificate Program

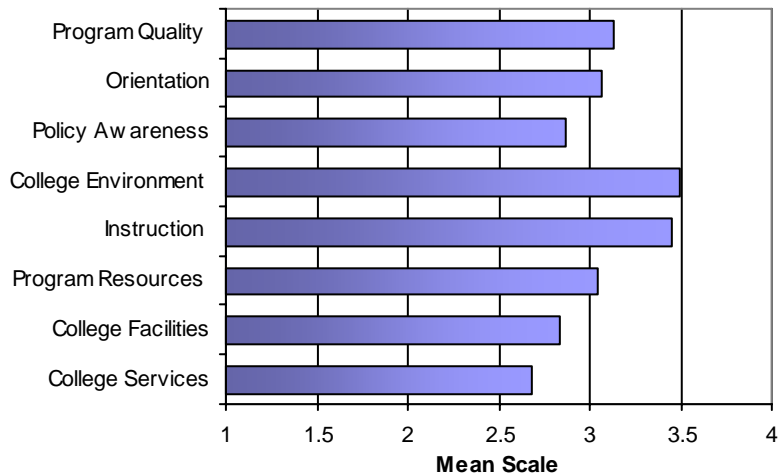
Number of Respondents: 86



English for Business Purposes

Certificate Program

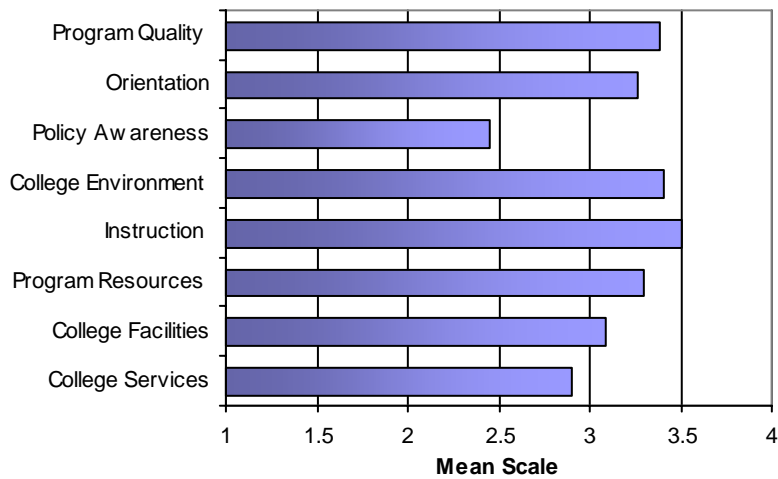
Number of Respondents: 14



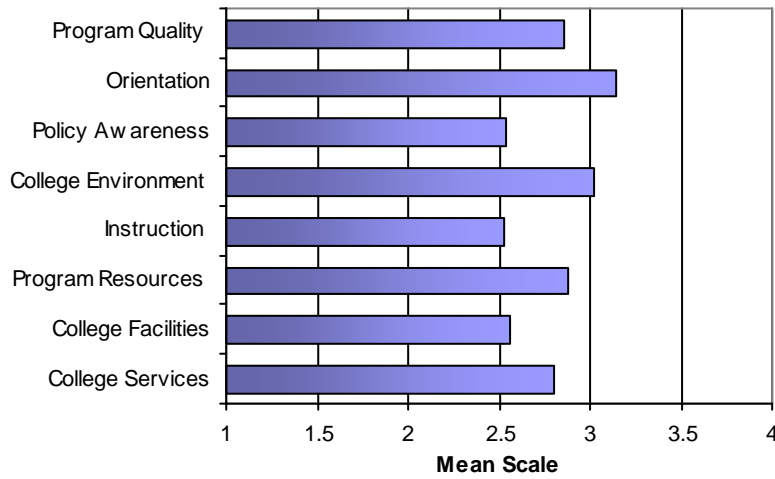
English for Health Care Aides

Certificate Program

Number of Respondents: 13



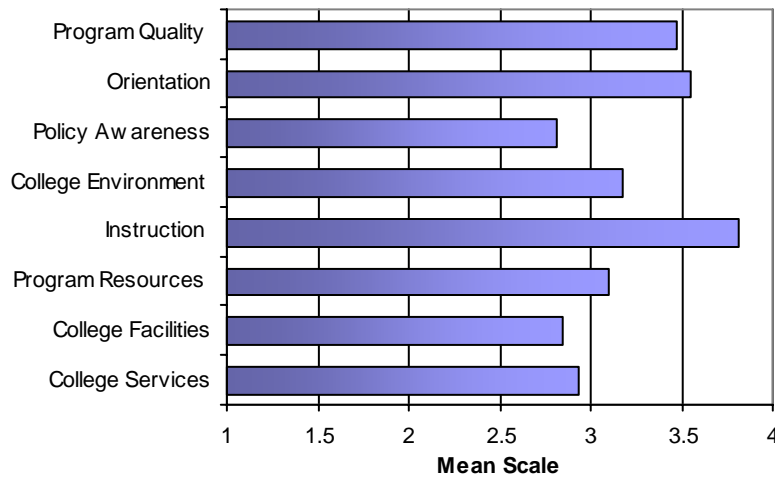
English for Nursing Purposes



Certificate Program

Number of Respondents: 14

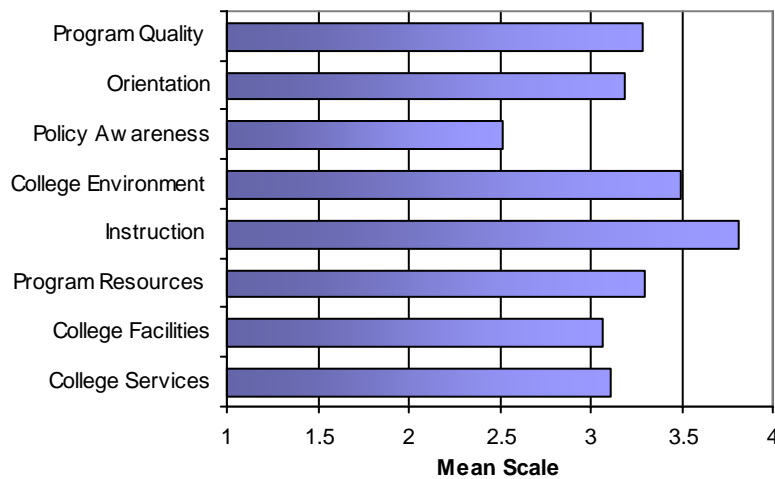
English for Professional Purposes



Certificate Program

Number of Respondents: 28

English for Technical Purposes



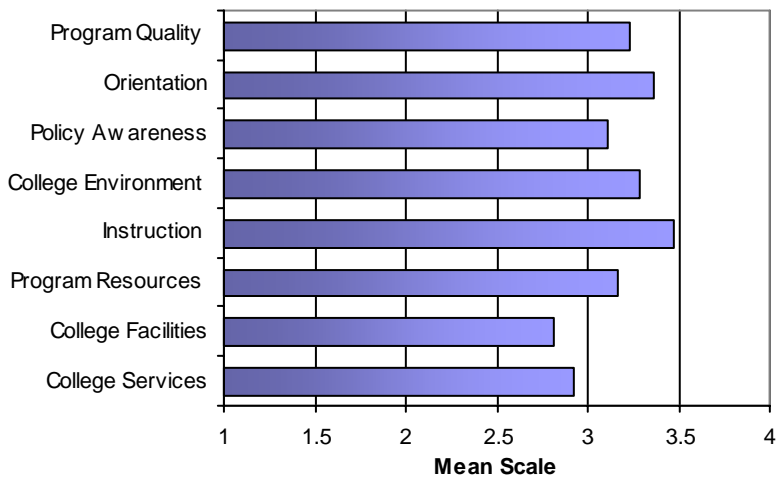
Certificate Program

Number of Respondents: 28

Intensive English as a Second Language

Certificate Program

Number of
Respondents: 94



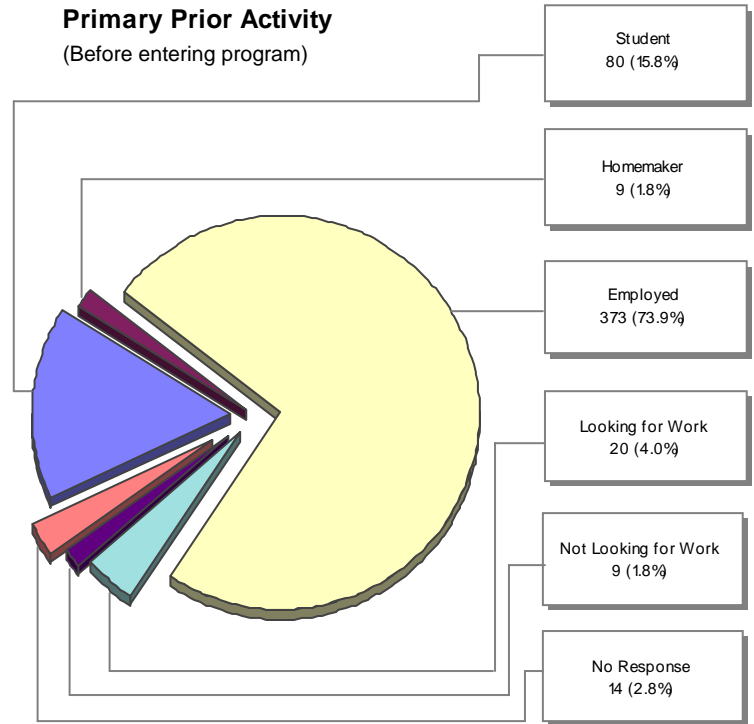
Industrial Technologies Division

Number of Respondents in this Division: 505

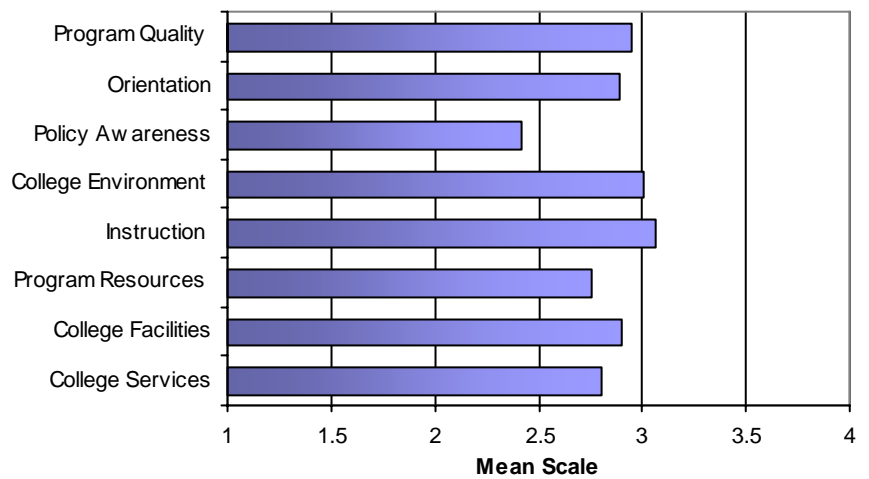
Programs in this report:

- Advanced Network Technology
- APP Bricklaying
- APP Cabinet Making
- APP Carpenter
- APP Electrical
- APP Painting & Decorating
- APP Plumbing
- APP Power Electrician
- APP Refrigeration
- APP Sprinkler/Fire Prot Installer
- APP Steamfitting
- Architectural/Engineering Technology
- Building Design CAD Technology
- Carpentry & Woodworking
- Computer Engineering Technology
- Electrical
- Electrical Engineering Technology
- Electronic and Network Technician
- Electronic Engineering Technology
- Environmental Protection Technology
- Geographic Information Systems Technology
- Geomatics Technology
- Greenspace Management
- Instrumentation Engineering Technology
- Municipal Engineering Technology
- Piping Trades
- Refrigeration and Air Conditioning
- Structural Engineering Technology

Primary Prior Activity
(Before entering program)



Summary of Student Divisional Ratings

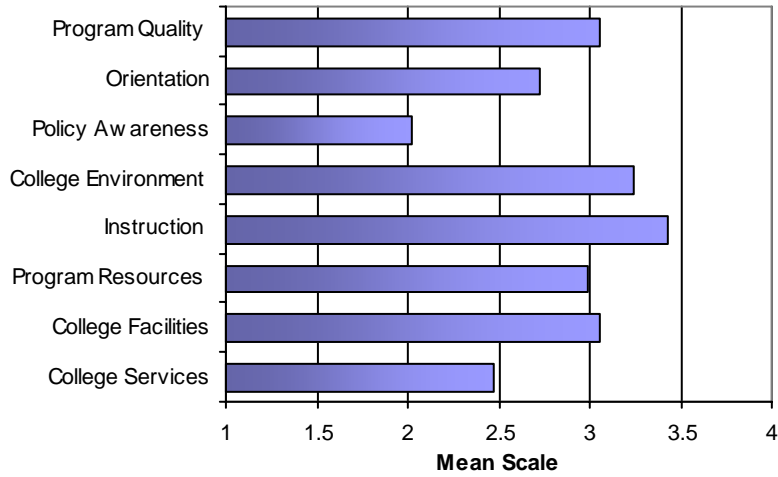


Programs with less than 5 respondents are not illustrated in this report, but are included in the Divisional statistics.

Advanced Network Technology

One-Year Advanced Diploma Program

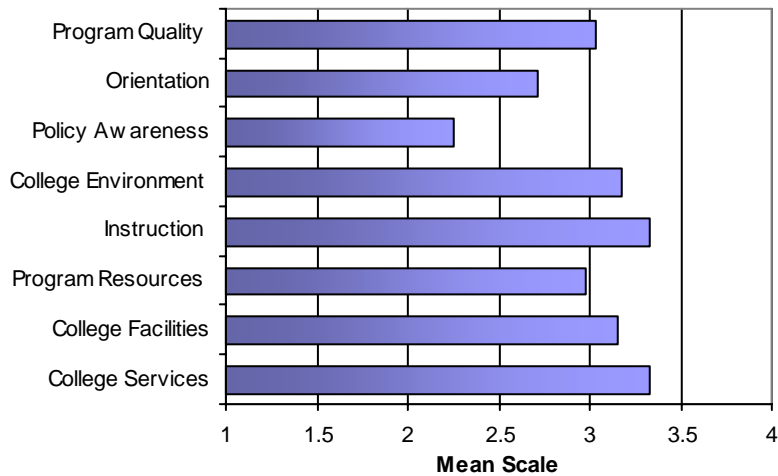
Number of Respondents: 11



APP Bricklaying

Apprenticeship Program

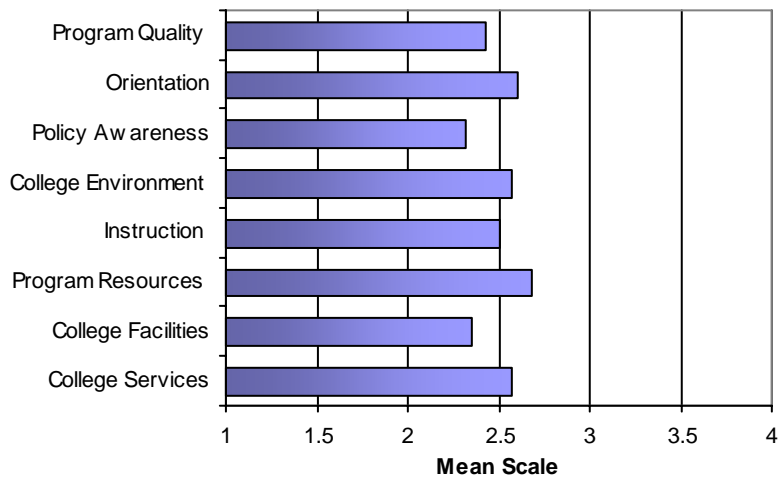
Number of Respondents: 8



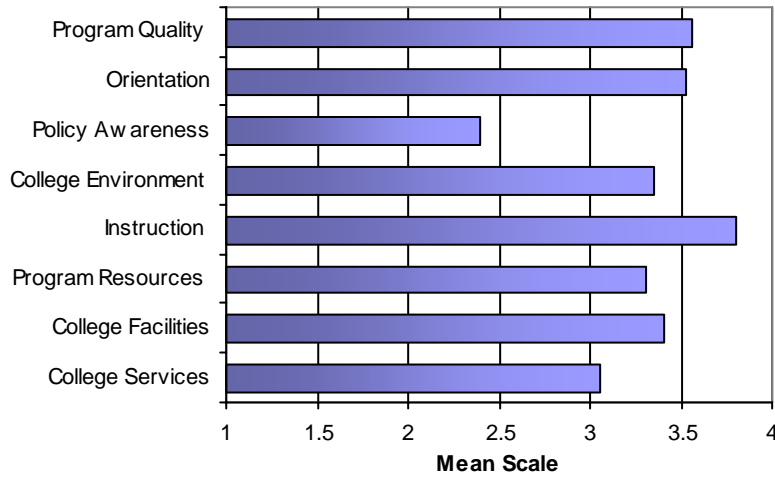
APP Cabinet Making

Apprenticeship Program

Number of Respondents: 5

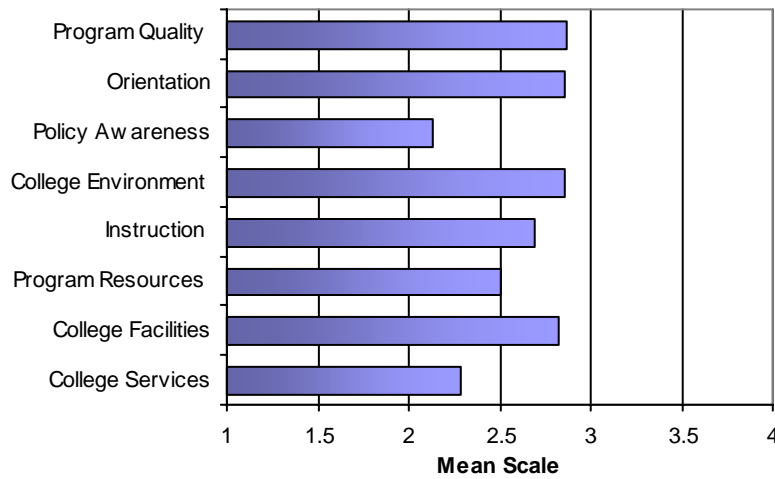


APP Carpenter



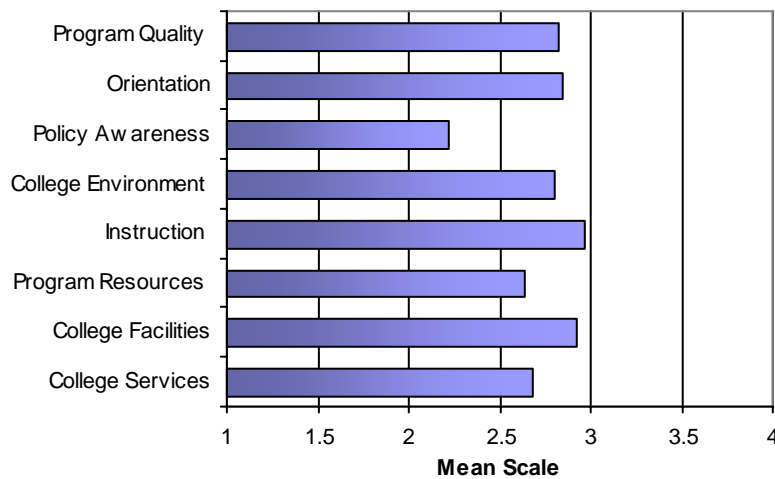
Apprenticeship Program
Number of Respondents: 23

APP Electrical



Apprenticeship Program
Number of Respondents: 47

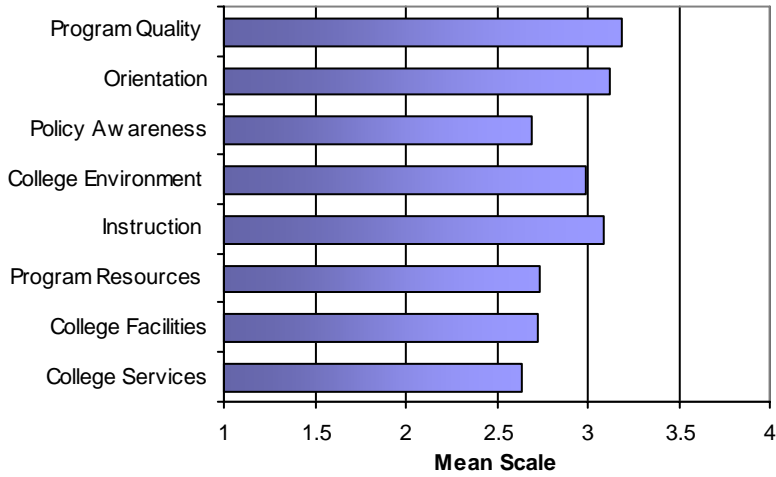
APP Painting & Decorating



Apprenticeship Program
Number of Respondents: 19

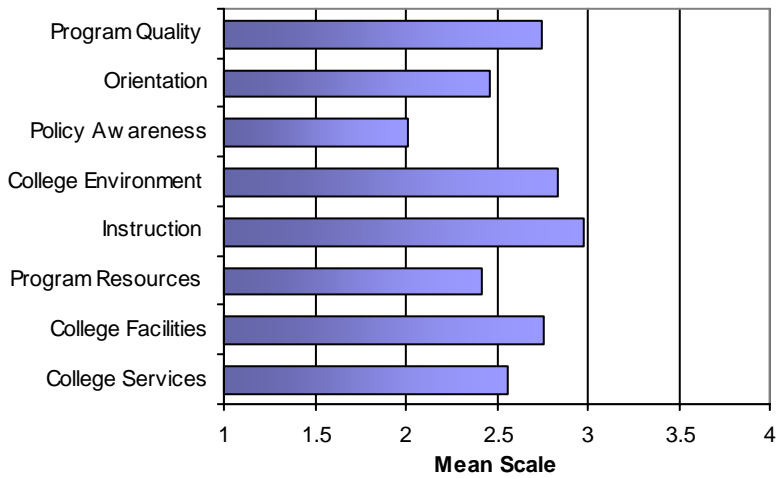
APP Plumbing

Apprenticeship Program
 Number of Respondents: 64



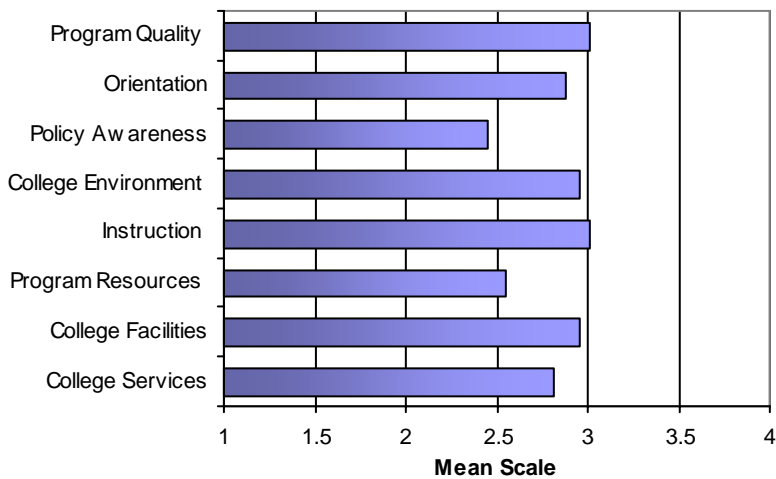
APP Power Electrician

Apprenticeship Program
 Number of Respondents: 13

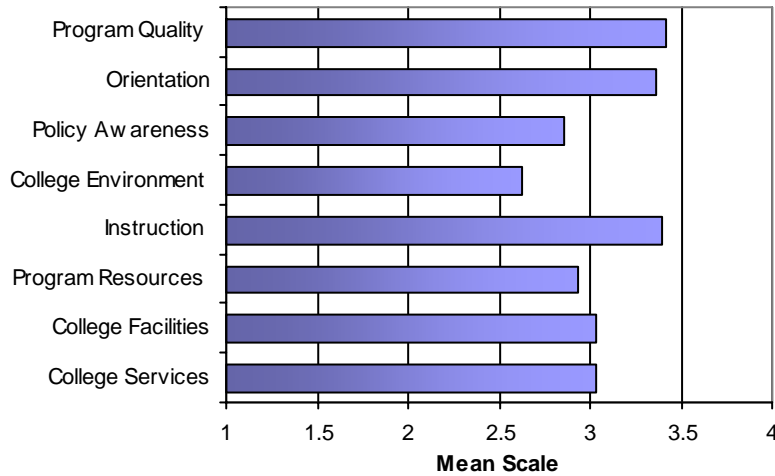


APP Refrigeration

Apprenticeship Program
 Number of Respondents: 49

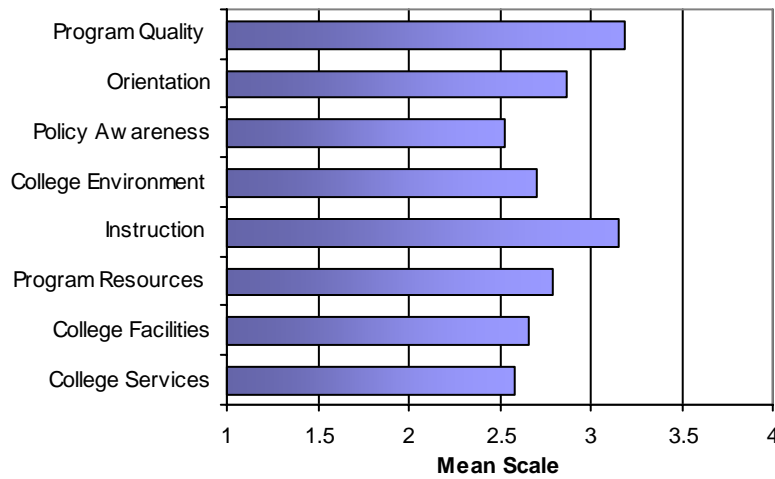


APP Sprinkler & Fire Protection Inspection



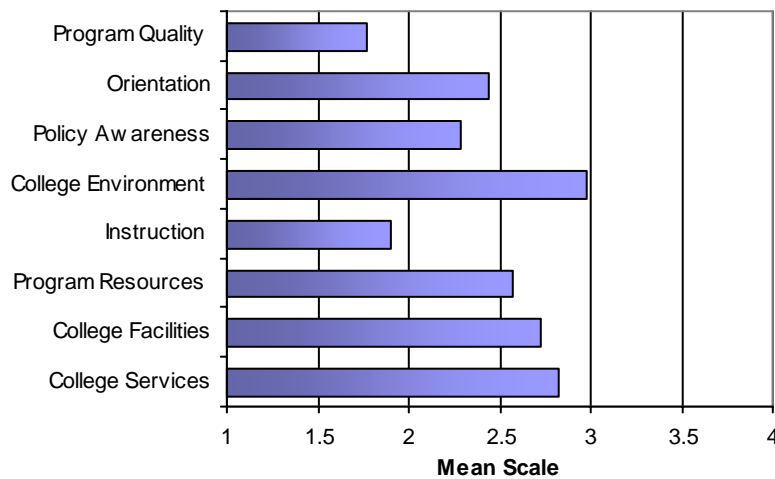
Apprenticeship Program
Number of Respondents: 19

APP Steamfitting



Apprenticeship Program
Number of Respondents: 13

Architectural/Engineering Technology

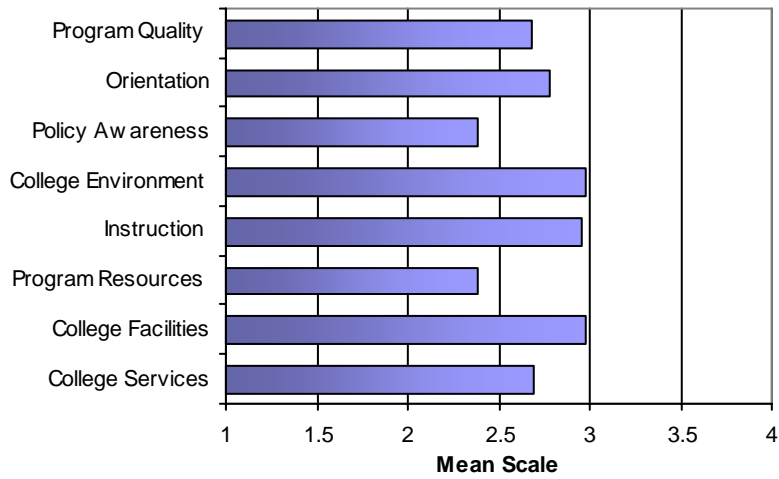


32-Month Diploma Program
Number of Respondents: 16

Building Design CAD Technology

Twenty-Month
Diploma Program

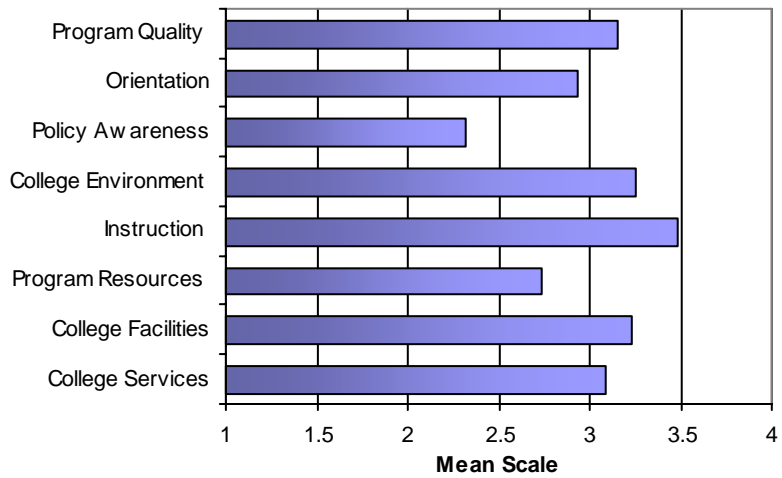
Number of
Respondents: 14



Carpentry & Woodworking

One-Year Certificate
Program

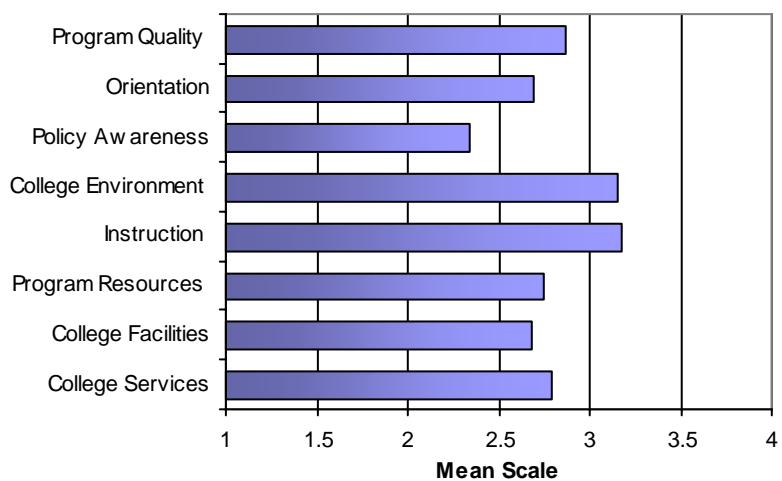
Number of
Respondents: 14



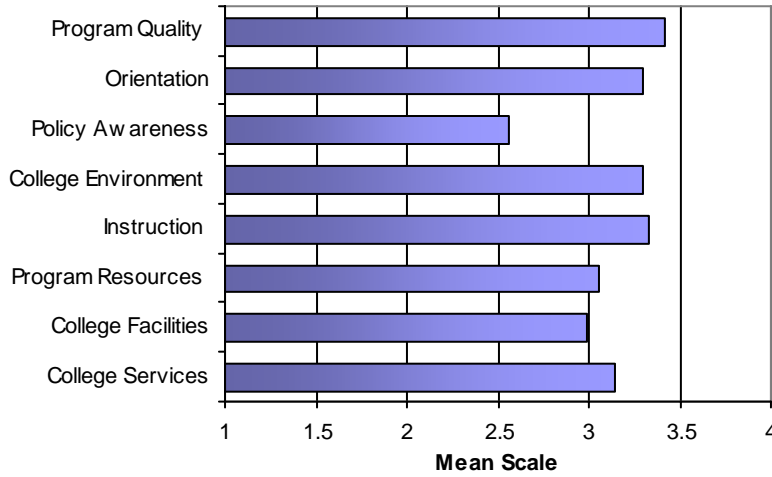
Computer Engineering Technology

Two-Year Diploma
Program

Number of
Respondents: 16



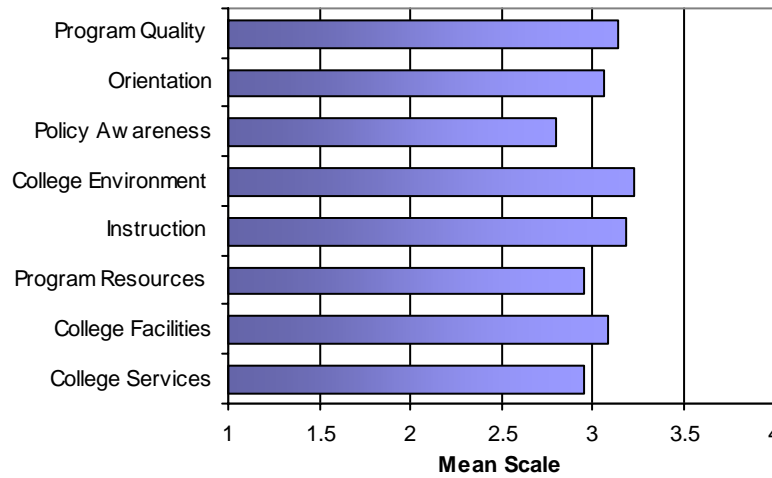
Electrical



One-Year Certificate Program

Number of Respondents: 12

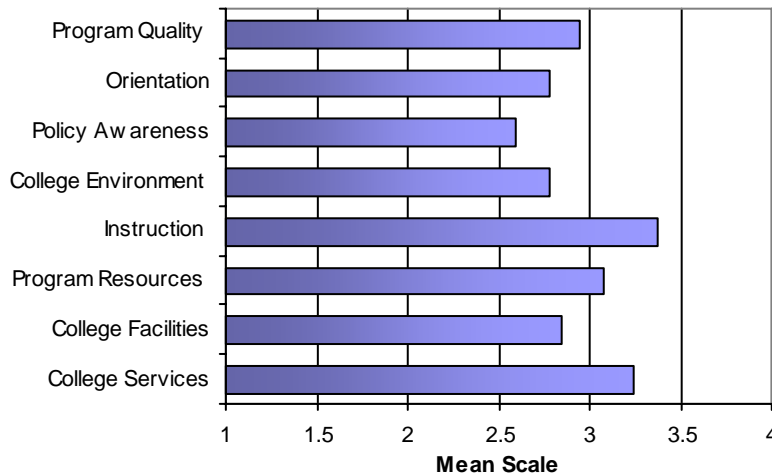
Electrical Engineering Technology



Two-Year Diploma Program

Number of Respondents: 23

Electronic and Network Technician



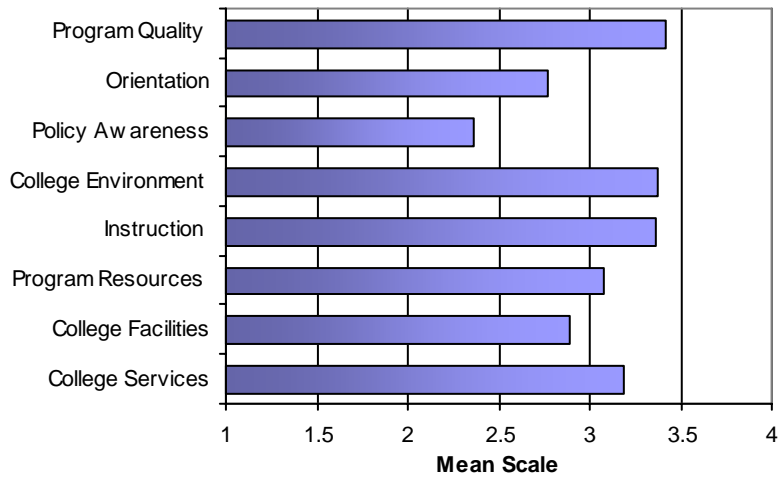
One-Year Certificate Program

Number of Respondents: 10

Electronic Engineering Technology

Two-Year Diploma Program

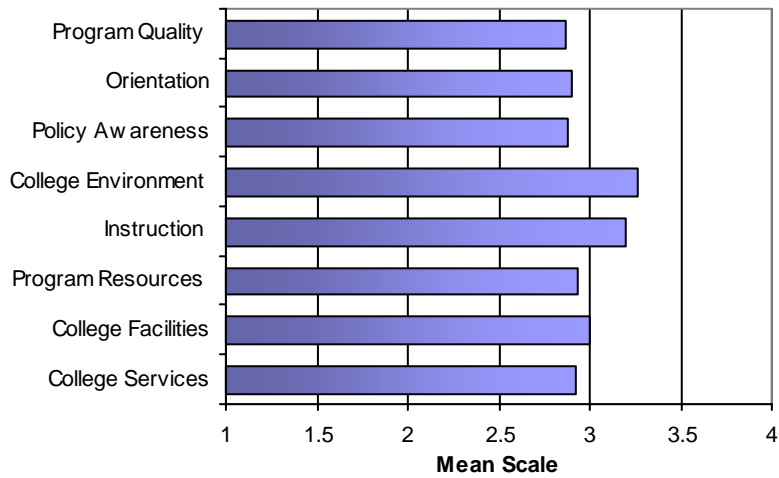
Number of Respondents: 17



Environmental Protection Technology

32-Month Diploma Program

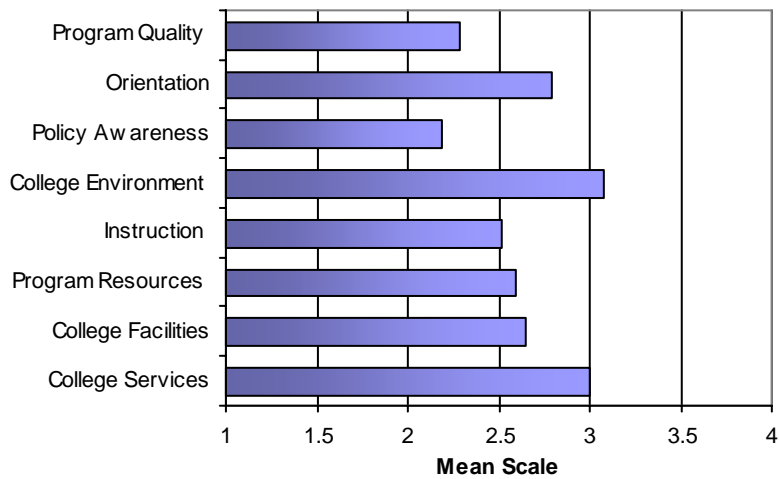
Number of Respondents: 5



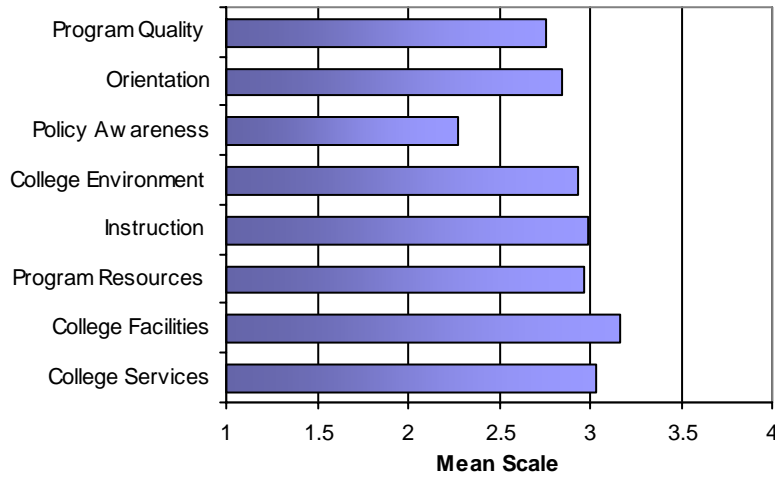
Geographic Information Systems Technology

One-Year Advanced Diploma Program

Number of Respondents: 13



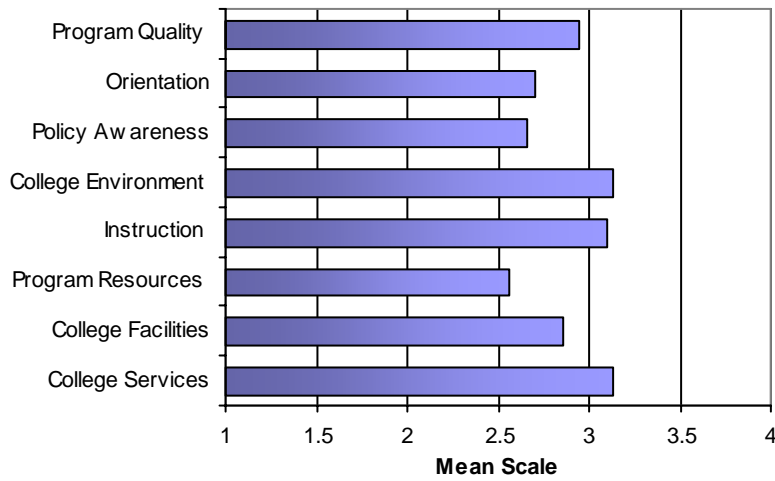
Geomatics Technology



32-Month Diploma Program

Number of Respondents: 16

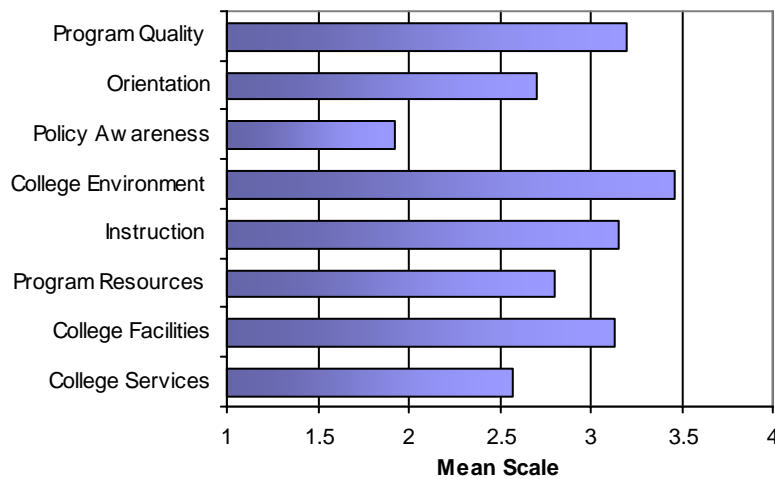
Greenspace Management



30-Month Diploma Program

Number of Respondents: 13

Instrumentation Engineering Technology



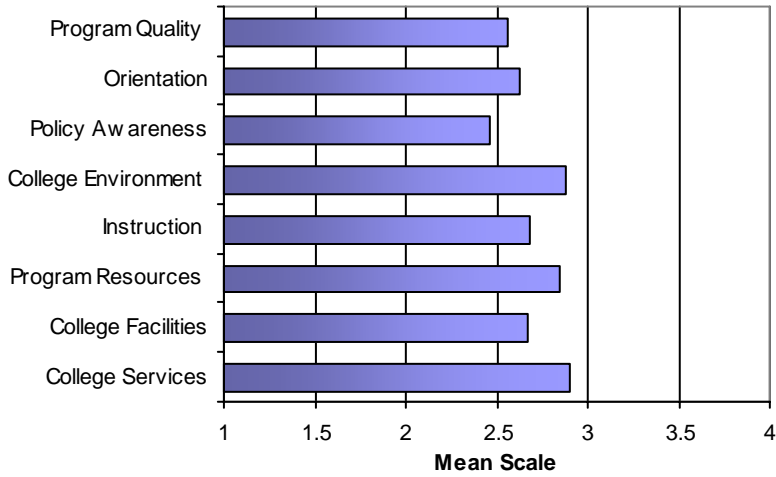
Two-Year Diploma Program

Number of Respondents: 5

Municipal Engineering Technology

Two-Year Diploma Program

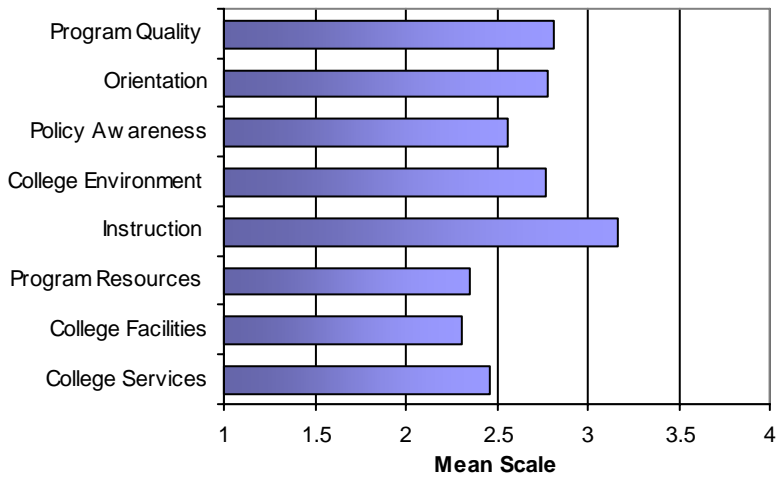
Number of Respondents: 19



Piping Trades

One-Year Certificate Program

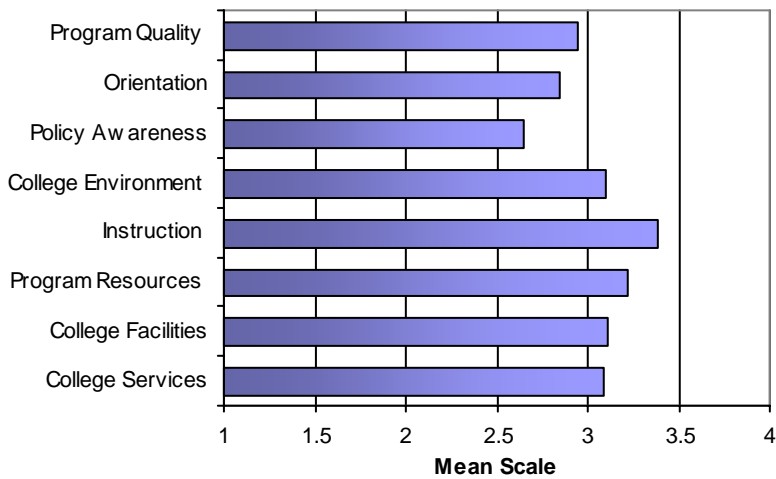
Number of Respondents: 9



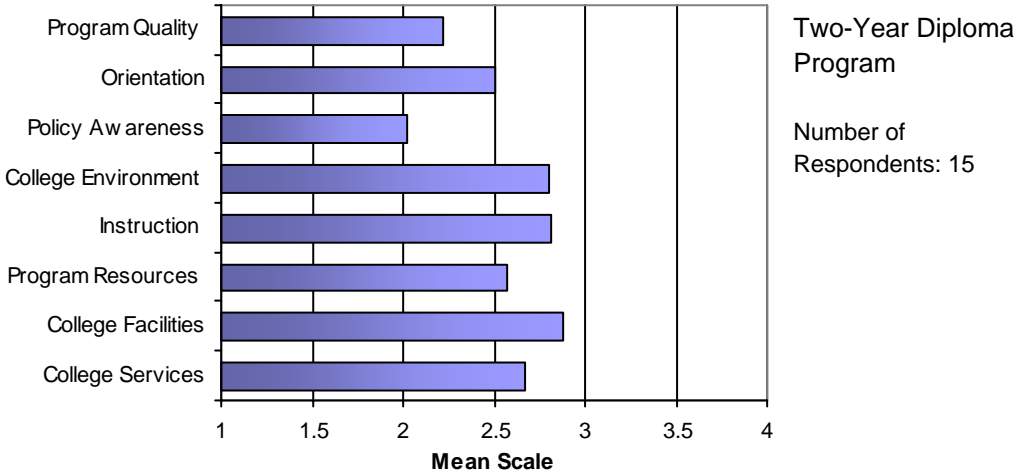
Refrigeration and Air Conditioning

One-Year Certificate Program

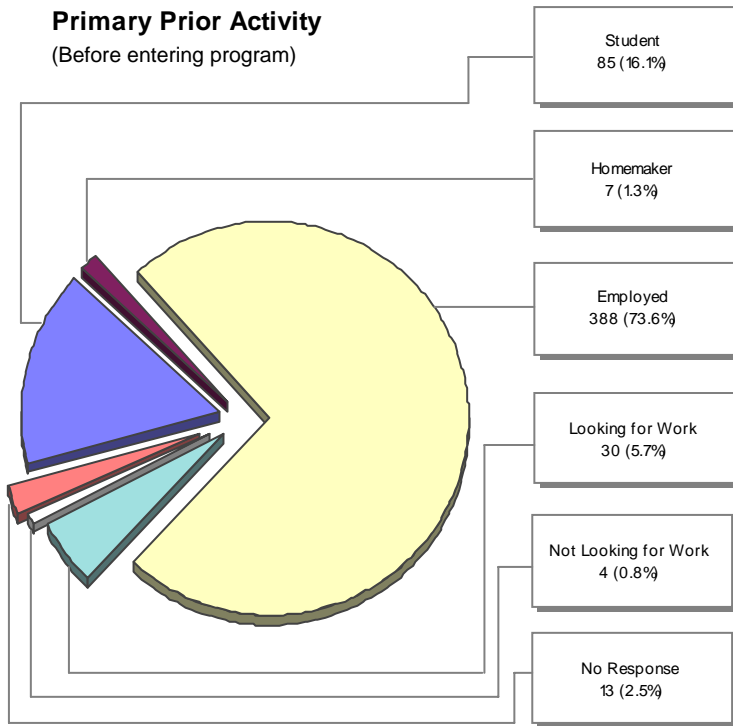
Number of Respondents: 16



Structural Engineering Technology



Transportation, Aviation and Manufacturing Division

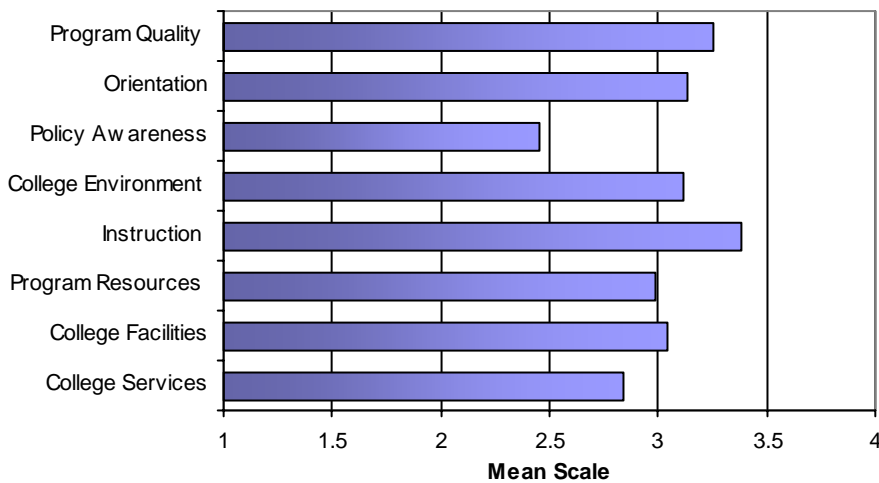


Number of Respondents in this Division: 527

Programs in this report:

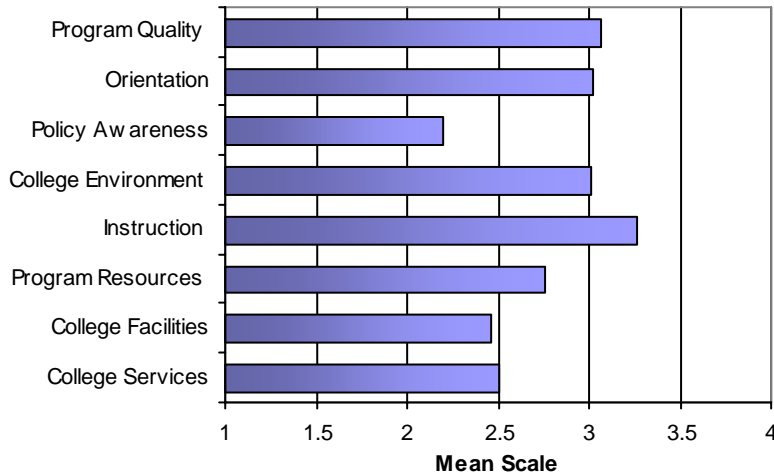
- Aircraft Maintenance Engineer
- APP Aircraft Maintenance
- APP Automotive Service Education Program
- APP Automotive Service Technician
- APP Boilermaker
- APP Boilermaker - Entry-level
- APP Machinist
- APP Motor Vehicle Mechanic (ASSET)
- APP Sheet Metal
- APP Transport Truck/Bus Mechanic
- Automotive Technician - Certificate
- Automotive Technician - Diploma
- Gas Turbine Engine Repair & Overhaul
- Heavy Duty Equipment Mechanic
- Manufacturing CAD
- Manufacturing Technician
- Technology Management
- Welding

Summary of Student Divisional Ratings



Programs with less than 5 respondents are not illustrated in this report, but are included in the Divisional statistics.

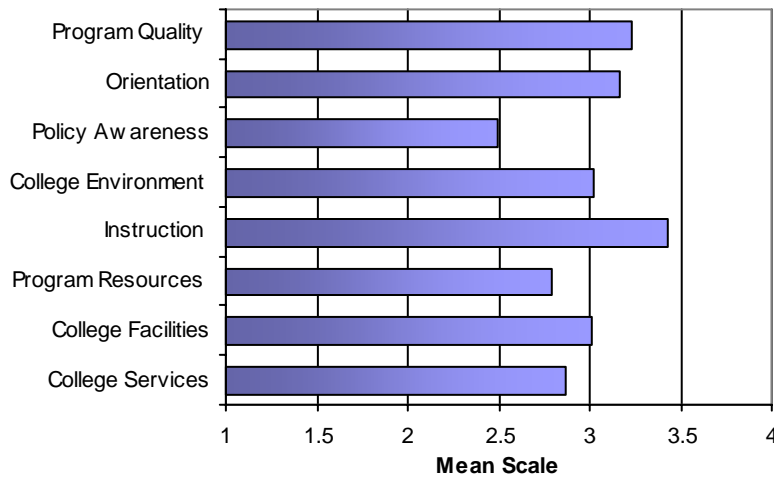
Aircraft Maintenance Engineer



15-Month Diploma Program

Number of Respondents: 49

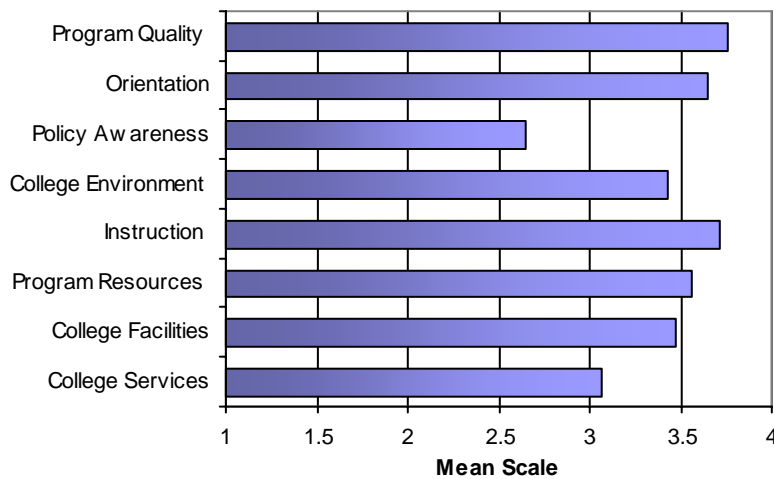
APP Aircraft Maintenance



Apprenticeship Program

Number of Respondents: 31

APP Automotive Service Education Program

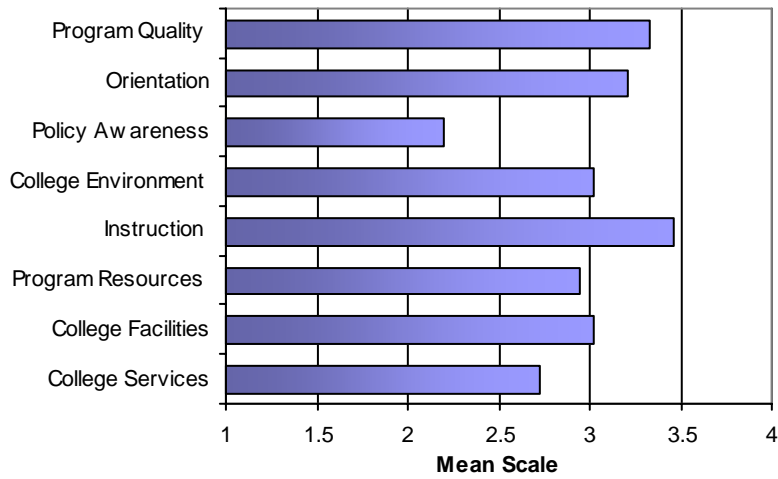


Apprenticeship Program

Number of Respondents: 31

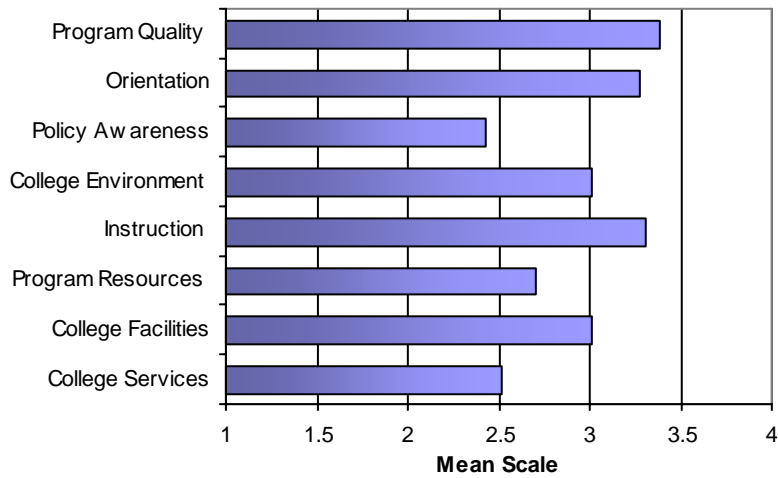
APP Automotive Service Technician

Apprenticeship Program
 Number of Respondents: 43



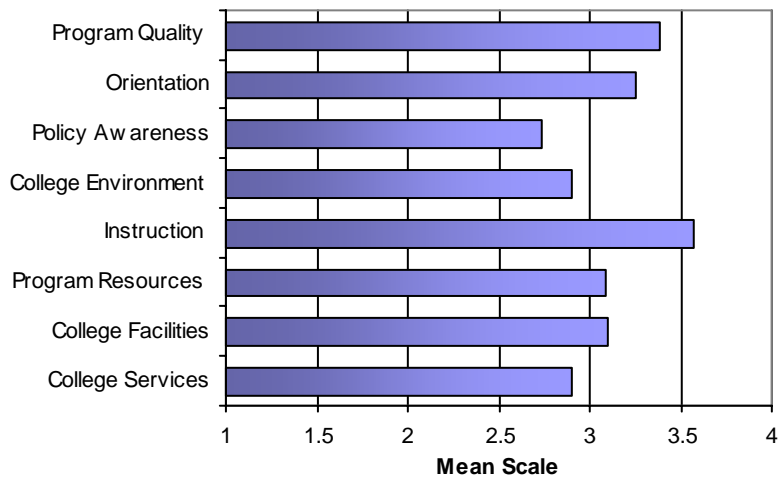
APP Boilermaker

Apprenticeship Program
 Number of Respondents: 35

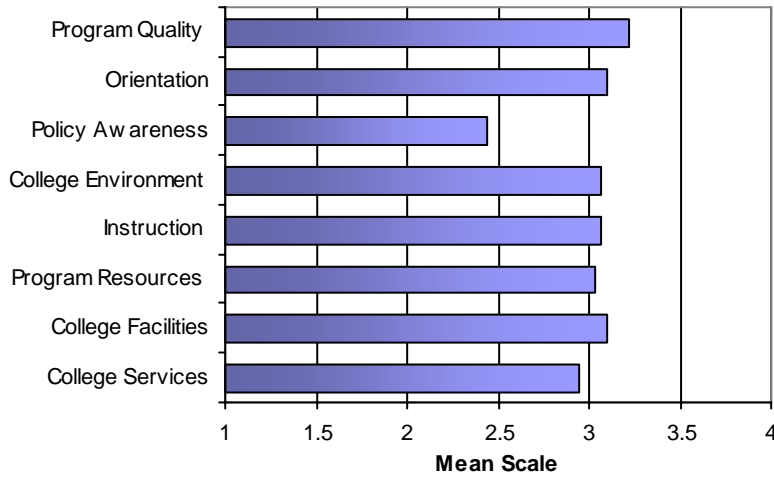


APP Boilermaker - Entry-level

Apprenticeship Program
 Number of Respondents: 10

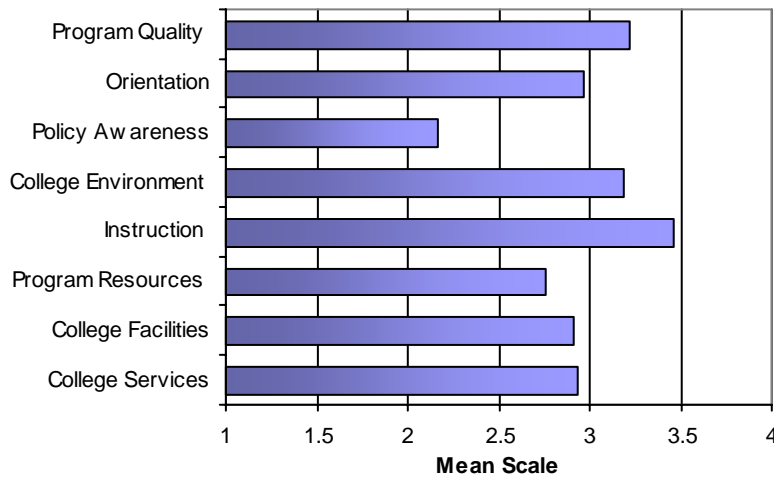


APP Machinist



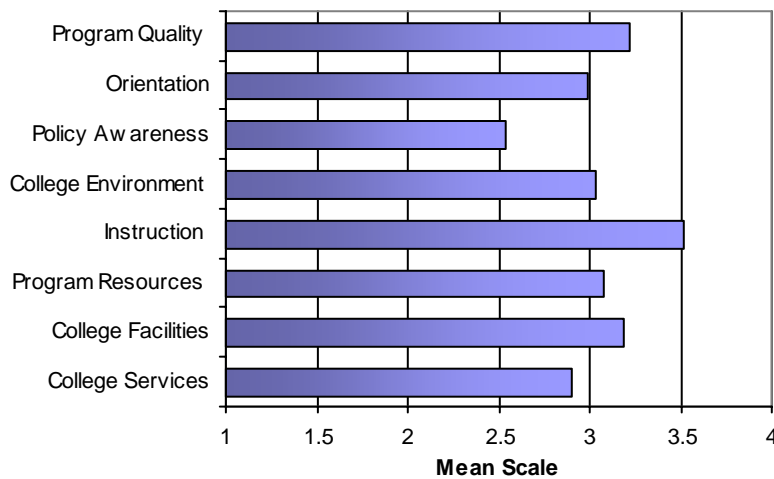
Apprenticeship Program
Number of Respondents: 33

APP Motor Vehicle Mechanic (ASSET)



Apprenticeship Program
Number of Respondents: 29

APP Sheet Metal

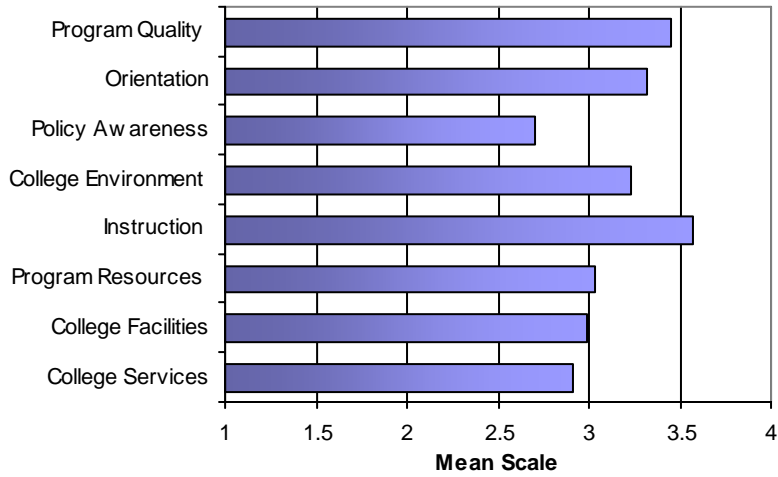


Apprenticeship Program
Number of Respondents: 41

APP Transport Truck/Bus Mechanic

Apprenticeship Program

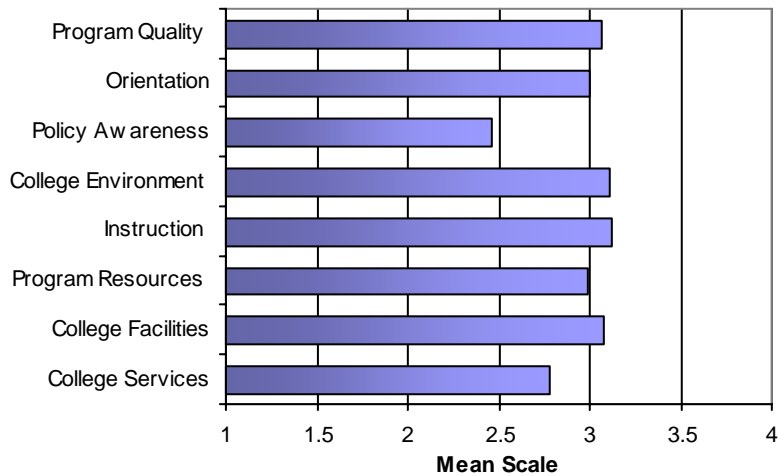
Number of Respondents: 34



Automotive Technician - Certificate

One-Year Certificate Program

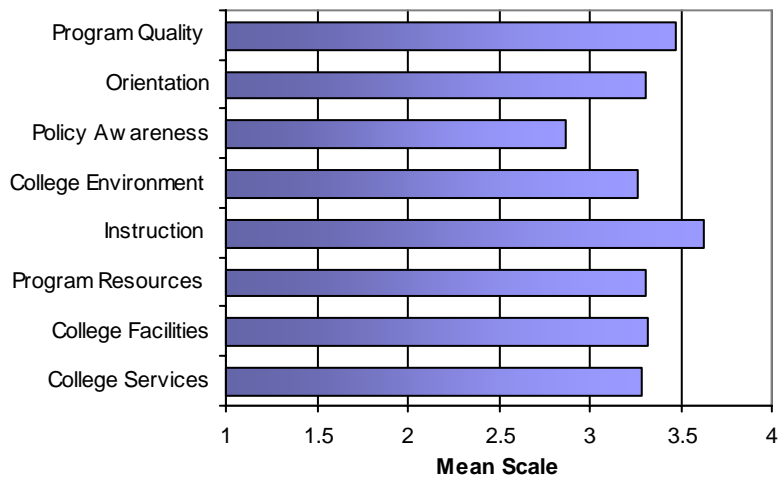
Number of Respondents: 40



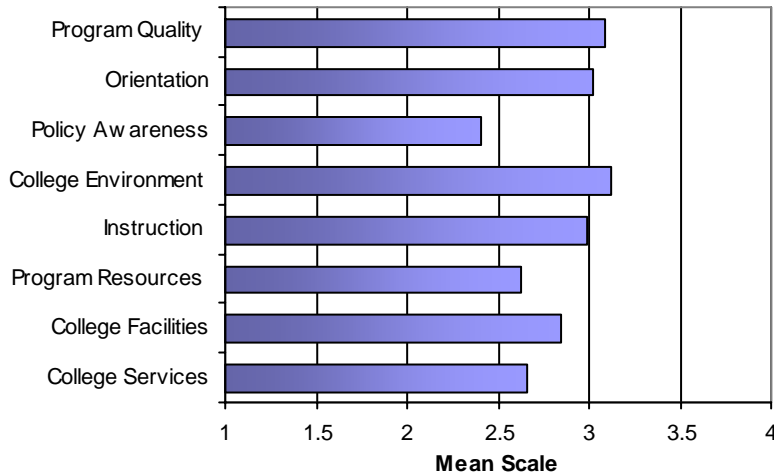
Automotive Technician - Diploma

Two-Year Diploma Program

Number of Respondents: 19



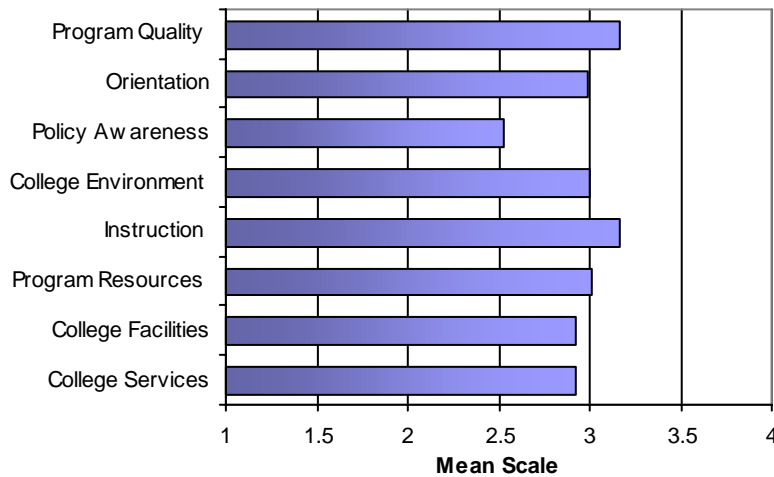
Gas Turbine Engine Repair & Overhaul



One-Year Certificate Program

Number of Respondents: 26

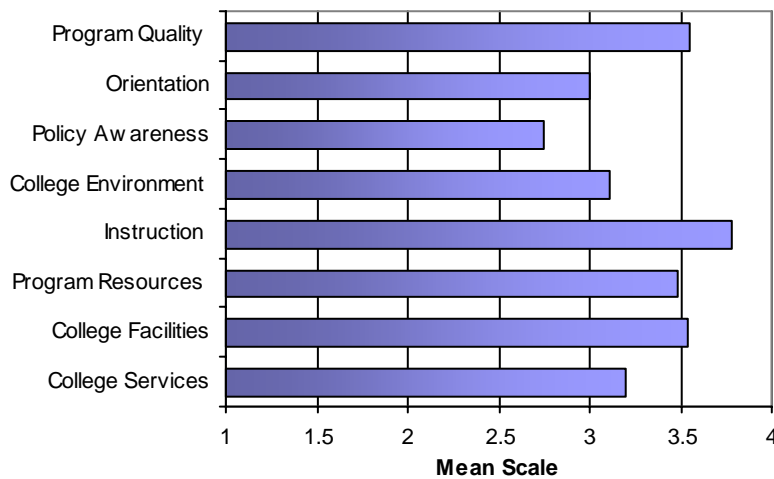
Heavy Duty Equipment Mechanic



One-Year Certificate Program

Number of Respondents: 35

Manufacturing CAD



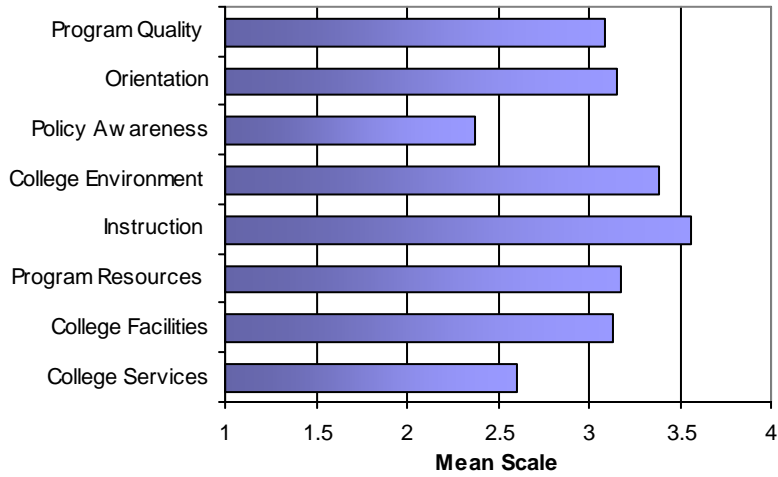
One-Year Certificate Program

Number of Respondents: 8

Manufacturing Technician

Two-Year Diploma Program

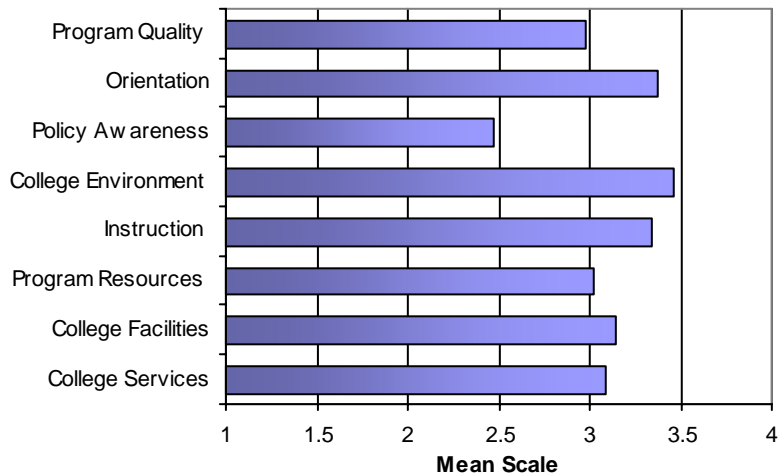
Number of Respondents: 19



Technology Management

One-Year Advanced Diploma Program

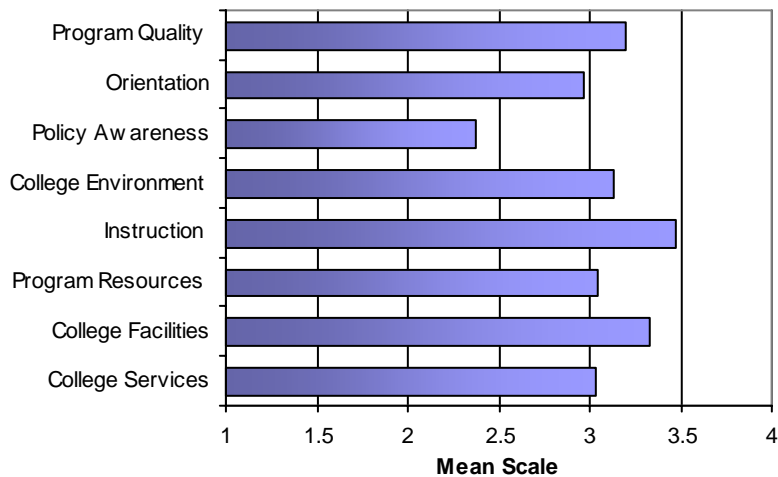
Number of Respondents: 8



Welding

Seven-Month Certificate Program

Number of Respondents: 29



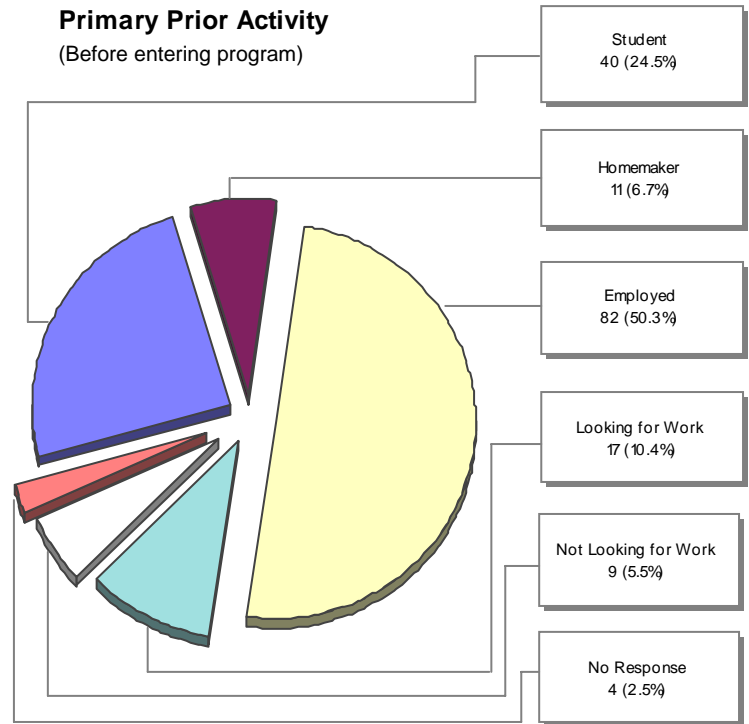
Continuing Education Division

Number of Respondents in this Division: 163

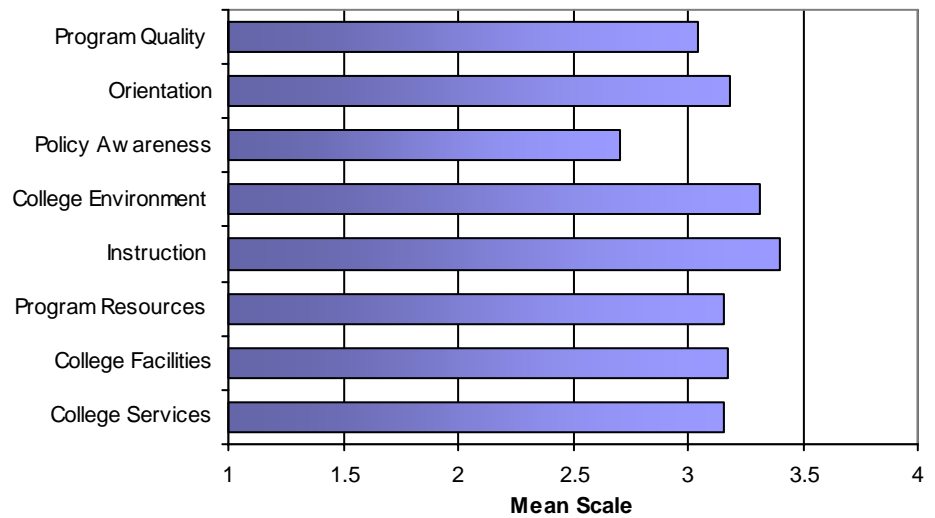
Full-time Continuing Education Programs in this report:

- Applied Counselling
- Office Technician
- Para Educator
- Power Engineering Fifth Class
- Recreation Facilitator for Older Adults
- Sterile Processing Technician

Programs with less than 5 respondents are not illustrated in this report, but are included in the Divisional statistics.



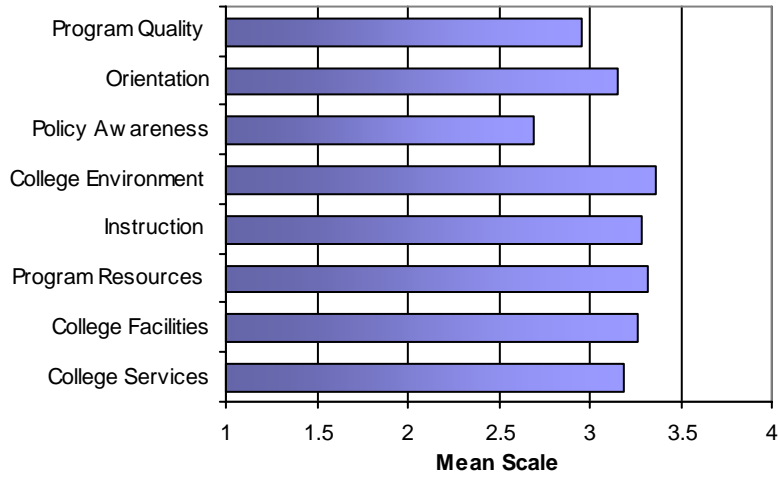
Summary of Student Divisional Ratings



Applied Counselling

Six-Month
Certificate Program

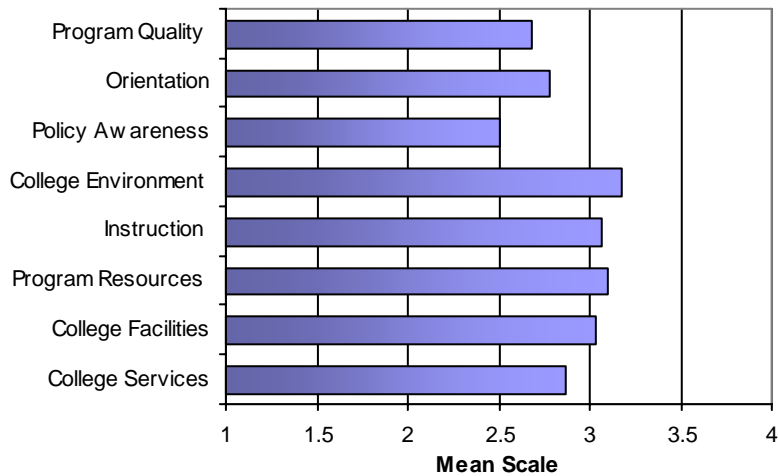
Number of
Respondents: 39



Office Technician

Seven-Month
Certificate Program

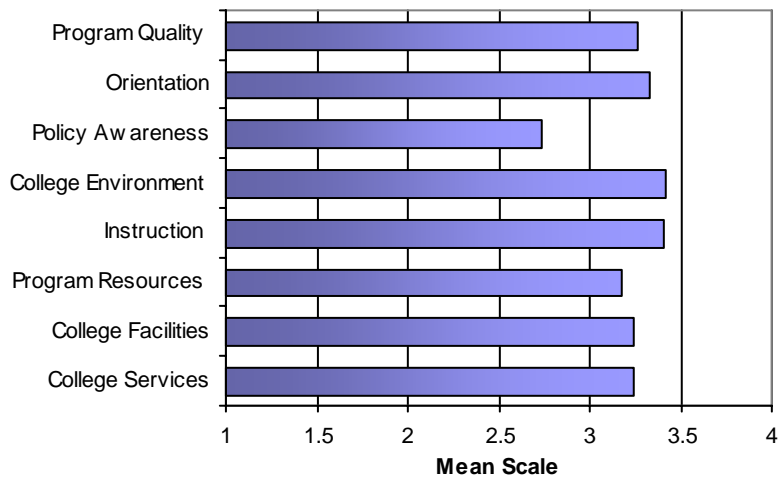
Number of
Respondents: 24



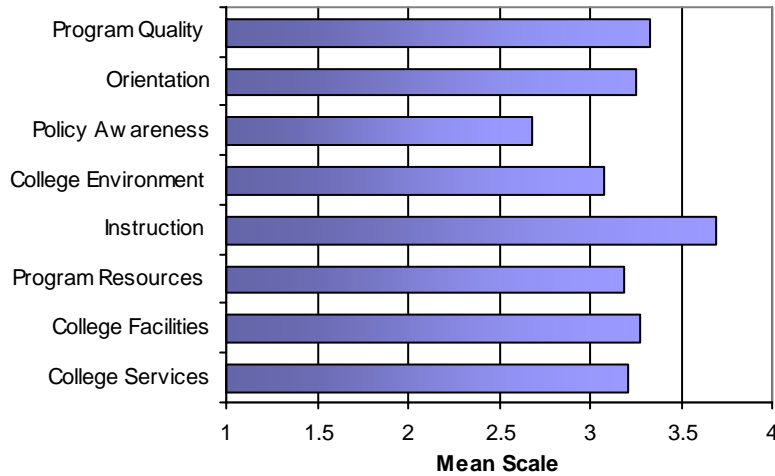
Para Educator

Five-Month
Certificate Program

Number of
Respondents: 45



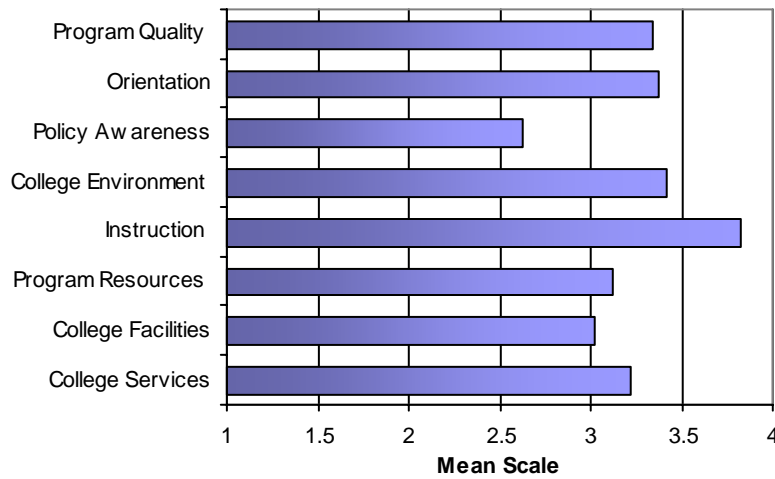
Power Engineering Fifth Class



Three-Month
Certificate Program

Number of
Respondents: 18

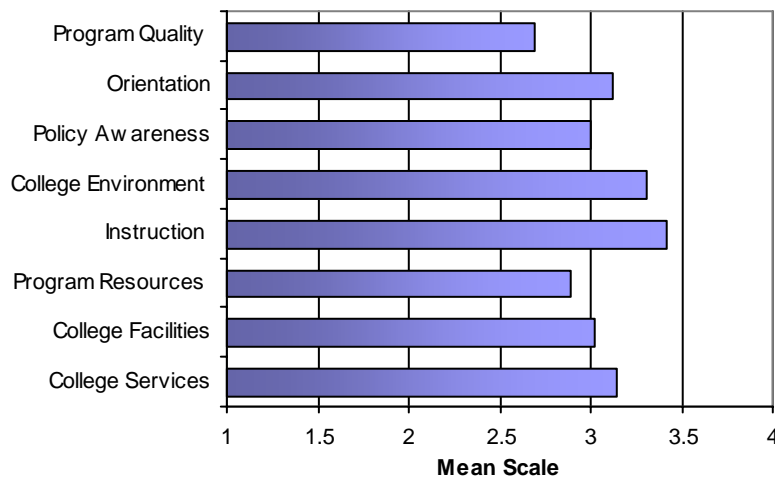
Recreation Facilitator for Older Adults



Seven-Month
Certificate Program

Number of
Respondents: 17

Sterile Processing Technician



Certificate Program

Number of
Respondents: 20

Appendix A - Programs with less than 5 respondents

Aboriginal Education

- Aboriginal Language Specialist
- ACCESS Integrated Science and Technology

Applied Sciences

- Community Develop Practitioner Intern
- MRI and Spectroscopy

Business & Applied Arts

- American Sign Language - English Interpretation
- Computer Accounting Technician (Laptop)

Industrial Technologies

- Wood Products Manufacturing Technology - Diploma

Transportation, Aviation and Manufacturing

- Co-op Vocational Education
- Introduction to Aircraft Maintenance

Appendix B - Quality Categories

Quality Category (Dimension)	Chart Category	Survey Question Number
Overall Program Quality	Program Quality	12 to 17
Quality of Orientation	Orientation Quality	18 to 19
Quality of familiarization with College policies	Policy Awareness	20 to 24
Quality of the welcoming, inclusive college environment	College Environment	25 to 31
Quality of Instruction	Instruction	32 to 35
Quality of program resources	Program Resources	36 to 41
Quality of College facilities	College Facilities	42 to 47
Quality of College services	College Services	48 to 55

Appendix C - Quality Category Questions

Note: Question 1 - 11 ask for demographic information.

Program Quality (Program Quality)

12. Before I applied, I had a good understanding of the program's purpose.
13. The training I have received in this program has met my expectations.
14. The program content is relevant to my career goals.
15. The tuition fee for this program is reasonable for the education provided.
16. Overall, I am satisfied with this program.
17. I would recommend this program to others.

Quality of Orientation (Orientation Quality)

18. The orientation to the program provided by the Department was effective in explaining the requirements of the program.
19. Upon admission to the program, I was made aware of my role and responsibilities as a student.

Appendix C - Quality Category Questions continued

Quality of familiarization to College policies (Policy Awareness)

20. I am familiar with the College's challenge for credit policy.
21. I am familiar with the College's transfer of credit policy.
22. I am familiar with the College's appeals procedure as it relates to academic and/or discipline issues.
23. I am familiar with the College's harassment policy.
24. I am familiar with Prior Learning Assessment at the College.

Quality of the welcoming, inclusive college environment (College Environment)

25. My gender does not limit my success in the program.
26. My race or ethnic origin does not limit my success in the program.
27. My physical ability does not limit my success in the program.
28. My financial situation does not limit my success in the program.
29. My English language skills do not limit my success in the program.
30. My Mathematical skills do not limit my success in the program.
31. My experience in the program has increased my awareness of values and cultures that are different from my own.

Quality of Instruction (Instruction)

32. The instructors treat students with respect.
33. The instructors are effective in delivering the program.
34. The instructors are knowledgeable in the areas they teach.
35. Overall, I am satisfied with the quality of instruction within the program.

Quality of program resources (Program Resources)

36. The training materials (texts, workbooks, handouts, etc.) used in the program are current.
37. I am satisfied with the quality of the training materials used in this program.
38. The equipment used in this program is appropriate for learning the required skills.
39. The equipment used in this program is current with industry.
40. There is a sufficient quantity of equipment provided for the program.
41. There is a sufficient quantity of CURRENT library resource materials for use by students in the program.
(Books, video tapes, audio tapes, periodicals, pamphlets, etc.)

Appendix C - Quality Category Questions continued

Quality of College facilities (College Facilities)

42. The classroom facilities are appropriate.
43. The shop/lab facilities are appropriate.
44. Adequate study space is available to students.
45. Student lounge space is adequate.
46. The gymnasium/fitness facilities are satisfactory.
47. Overall, the College facilities meet my needs as a student.

Quality of College services (College Services)

48. I am satisfied with the service provided from the Academic Support Services (Tutorial Centre).
49. I am satisfied with the service I received from the Counselling Centre.
50. I am satisfied with the service I received from the Job Centre.
51. I am satisfied with the service I received from the Library.
52. I am satisfied with the service I received from the Bookstore.
53. I am satisfied with the service I received from the Enrolment Services Department.
54. I am satisfied with the service I received from the Print and Graphic Centre/Copy Centre.
55. Overall, I am satisfied with the quality of service provided by the College.

Appendix D - Technical Overview of Analytic Techniques¹

Surveys include many questions about one or more topics. Typically how respondents answer these different questions tends to form patterns, that is, many of the responses are correlated. The RRC Student Evaluation of Program (SEPS) has 44 attitude questions on a variety of matters about the College.

Factor analysis is a statistical approach used to analyze interrelationships among a large number of variables and to explain these variables in terms of their common underlying dimensions or factors (Fisher & van Belle, 1993; Green & Salkind, 2003; Pedhazur & Schmelkin, 1991). This statistical technique allows the information contained in a large number of survey questions to be summarized in a smaller set of factors. The analysis compresses the original variables into a smaller set of dimensions. There are two main types of factor analysis, confirmatory and exploratory.

The analysis in the first annual SEPS report (2003-04 survey) was exploratory. Exploratory factor analysis is used to discover the factor structure of a set of observed variables. Observed variables are the measured variables and are sometimes called indicator variables or manifest variables or reference variables, such as items in a survey instrument. It is often used when researchers have no hypotheses about the nature of the underlying factor structure of their measures.

Factor analysis generates a correlation matrix for all the observed variables. A correlation matrix is a rectangular array of the correlation coefficients of the variables with each other. Factors (dimensions) are extracted from the correlation matrix based on the correlation coefficients of the variables. Then, the factors are rotated in order to maximize the relationship between the variables and some of the factors. In general, the number of dimensions or factors is much smaller than the number of original variables. Factors or dimensions are also sometimes referred to as latent variables to distinguish them from the observed variables.

Additionally, it is possible to compute factor or dimension scores for use in subsequent analyses. As well, the reliability of dimensions, which generally include a number of items, can be tested. The results of the initial exploratory factor analysis are included as Appendix D1.

The first year, 2003-04, established the factor structure; this year we wanted to establish its consistency. In factor analysis, confirmatory analysis is used to test the consistency of the structure. The 2003-04 factor structure included eight dimensions arising from the original set of variables. Confirmatory factor analysis (Coughlin, 2005; Pedhazur & Schmelkin, 1991) was applied to the 2004-05 data set using the 2003-04 structure. Confirmatory factor analysis is used when a particular factor structure has been specified, in which the researcher designates the variables to load on each factor – in this case the factor structure arising from the 2003-04 SEPS.

The analysis proceeded through several steps. First a global test of the fit of the original factor model to the new data set was undertaken. The original factor model was re-estimated using the original data set again forcing eight factors, using principal axis factoring with a promax rotation and a maximum likelihood estimation method. The data set had missing data (some of the individual questions had large numbers of non-responses). The chi-square and degrees of freedom were calculated and the model was then applied to the second data set. Table 1 provides the results.

Table 1.

	SEPS 2003-04	SEPS 2004-05	$\Delta\chi^2$
χ^2	1169.7	1275.8	106.1
df	622	622	0

¹ Research and Planning would like to thank Ashley Blackman for his advice and guidance on the statistical procedures.

Appendix D - Technical Overview of Analytic Techniques continued

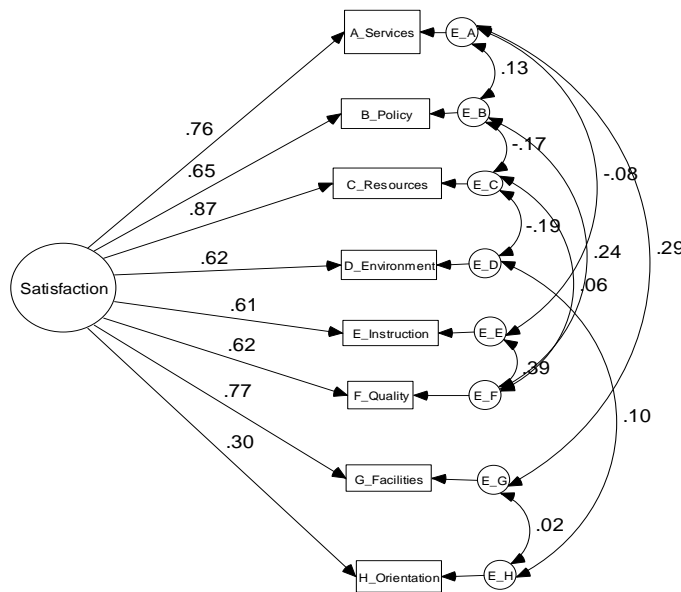
This meant the model was rejected, that is, the original model did not fit the second data set. In order to proceed, the two data sets were explored using multinomial logistic regression to help identify why they are different. Seven questions (or variables) showed a difference. Compared to 2003-04, the responses to questions 25, 28, 32, 38, 41, 45 and 53 were more positive (or less negative) in 2004-05. Combined, these variables have a reliability alpha .72 and this set of variables showed a significant difference from 2003-04 to 2004-05. While the model would still be rejected, removing the variables that changed removed most of the variability.

The last stage of the analysis conducted the confirmatory factor analysis using structural equation modeling (SEM)² with AMOS³. Figures 1 and 2 illustrate the factor structure model for the 2003-04 (2003 in the figure) SEPS and for 2004-05 (2004 in the figure) in its final form, allowing correlated error terms⁴.

This means⁵ that we can have confidence in applying the original factor structure to the 2004-05 survey results. In other words, the original eight dimensions still work with the 2004-05 SEPS findings.

Figure 1. Factor Model for the 2003-04 SEPS.

Satisfaction model based on principal axis factor analysis
 2003 GFI .991
 Chisq=31.236 df=20 p=.052



² SEM is a multivariate statistical analysis technique that encompasses and extends standard statistical methods such as regression, factor analysis, and simultaneous equations and analysis of variance. It is largely a confirmatory and not an exploratory technique. SEM is used to test hypotheses about the relationships between observed and latent variables. Using SEM it is possible to explore factor models (Coughlin, 2005). The goal of structural equation modeling (SEM) is to compare a covariance matrix generated from a particular sample with a covariance matrix generated by a hypothesized model.

³ AMOS is a structural equation modeling software distributed by SPSS

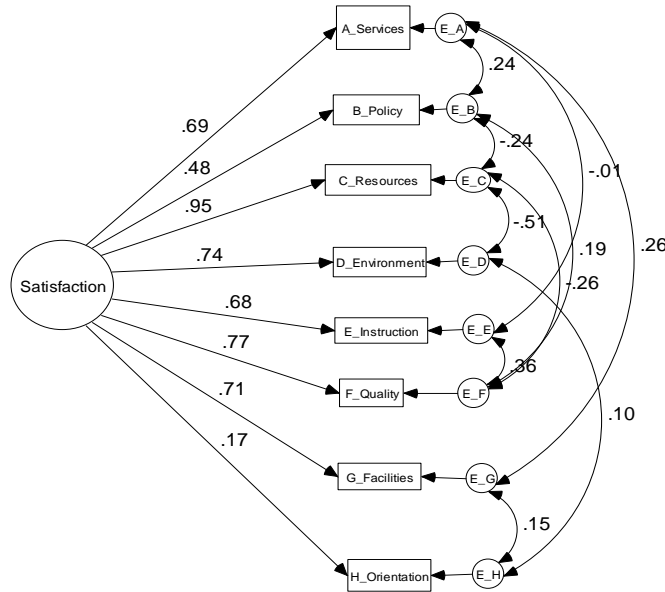
⁴ Correlated error terms refers to situations where knowing the residual of one variable helps in knowing the residual associated with another variable. The correlation of error terms may and should be explicitly modeled in SEM. In SEM, the researcher must model error as well as the variables. It makes particular sense in this instance in that the variables are correlated with each other.

⁵ For example, the goodness-of-fit (GFI) index should be at .90 or greater to have the model considered as adequate (Schumacker & Lomax, 1996).

Appendix D - Technical Overview of Analytic Techniques continued

Figure 2. Factor Model for the 2004-05 SEPS.

Satisfaction model based on principal axis factor analysis
 2004 GFI .991
 Chisq=31.236 df=20 p=.052



The reliability scores of the eight dimensions for the 2004-05 SEPS data set are illustrated in Table 2.

Table 2. Factors Extracted from the Student Evaluation of Program Survey 2004-05.

Dimension	Reliability ⁶	Number of Items
Overall Program Quality	.839	6
Quality of Orientation	.660	2 ⁷
Quality of familiarization to College policies	.886	5
Quality of the welcoming, inclusive college environment	.802	7
Quality of Instruction	.877	4
Quality of program resources	.852	6
Quality of College Facilities	.842	6
Quality of College Services	.914	7

These reliability scores are very similar to the scores from the 2003-04 SEPS, excepting Orientation, which is somewhat lower.

⁶ Cronbach's alpha measures how well a set of items (or variables) measures a single unidimensional latent construct. When data have a multidimensional structure, Cronbach's alpha will usually be low. Cronbach's alpha is not a statistical test - it is a coefficient of reliability (or consistency). The acceptable range is normally considered to be between .7 and 1.0 (Nunnally, 1978).

⁷ Velicer and Fava (1998) argue that factors should have at least three variables, however, if the original variables are best interpreted as a pair and the intent is to develop the underlying dimensions it makes sense to use only two.

Appendix D1 - Exploratory Factor Analysis Results from the 2003-04 SEPS

The first step in exploratory factor analysis is to assess whether or not the data set is appropriate for factor analysis. SPSS 13.0 was used to conduct the analysis. The overall factor analysis was evaluated through the Kaiser-Meyer-Olkin (KMO) and Bartlett's Tests. The KMO measures the sampling adequacy which should be greater than 0.6 for a satisfactory factor analysis to proceed (Tabachnik & Fidell, 2001). The Bartlett's test⁸ of sphericity examines whether there are adequate intercorrelations between the items to use factor analysis and it should be significant ($p \leq .05$).

For the factor analysis of the SEPS, the results (Table D1) indicate a satisfactory analysis:

Table D1. KMO and Bartlett's Test Results for SEPS 2003-04 Factor Analysis

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.944
Bartlett's Test of Sphericity	Approx. Chi-Square	11753.541
	df	946
	Sig.	.000

The steps in factor analysis are to select an extraction method for the correlations from the matrix and a rotation method to maximize the loadings of the items into a factor. Examining the correlations among the many survey items in the Student Evaluation Program Survey (SEPS) for 2003-04 revealed that there was a significant correlation among various sub-groups of questions. There are two main extraction methods, principal components analysis or common factor analysis (there are several specific techniques). Two strategies were used in conducting the exploratory factor analysis. First, principal component analysis (PAC)⁹ with a varimax¹⁰ rotation was used for the analysis of the forty-four questions, all of which were attitude-type questions with a four point¹¹ agree – disagree scale. Factors are extracted in order and the first factor accounts for the largest amount of variability and the second factor the second most and so on. The factors were initially selected based on the scree plot¹² (included as Figure 1) and included all factors with an eigenvalue (the variability of a factor)¹³ greater than one. This yielded seven factors. Then the selected factors were rotated through a varimax routine to yield separate uncorrelated factors or dimensions. Factor loading¹⁴ were at a minimum of .30¹⁵. Subsequently, the derived factors were examined in relation to the original set of questions and a further analysis was conducted to achieve eight dimensions, which seemed to be more interpretable for the original question items. The scree test and the eigenvalue-greater-than-one criteria are meant to act as guides in determining factors; what is more important is to have a set of

⁸ A test statistic used to examine the hypothesis that the variables are uncorrelated. It is used to test the suitability of a correlation matrix for factor analysis by examining if the data contain sufficient correlations to warrant analysis (i.e., whether the correlation matrix (variance/covariance matrix) is an identity matrix). If the obtained chi square value is significant, then the correlation matrix to be analyzed is non-random and is suitable for factor analysis.

⁹ Principal components analysis (PCA) is a form of factor analysis. It involves a mathematical procedure that transforms a number of (possibly) correlated variables into a (smaller) number of uncorrelated variables called *principal components*. The first principal component accounts for as much of the variability in the data as possible, and each succeeding component accounts for as much of the remaining variability as possible.

¹⁰ A *variance maximizing (varimax) rotation* is a method for rotating axes of a plot such that the eigenvectors remain orthogonal (that is uncorrelated) as they are rotated. These rotations are so that the axes are rotated to a position in which the sum of the variances of the loadings is the maximum possible. This type of rotation is called *variance maximizing* because the purpose of the rotation is to maximize the variance (variability) of the factor (the "new" variable), while minimizing the variance around the new variable. It assumes uncorrelated factors.

¹¹ It may be argued that a four point scale is not continuous, however, factor analysis is very robust and it is not uncommon to use factor analysis with four point scales.

¹² A scree plot is a plot of the eigenvalue for each factor; generally, a criterion for selection of factors is that all factors are retained with eigenvalues in the sharp descent part of the plot before the values level off.

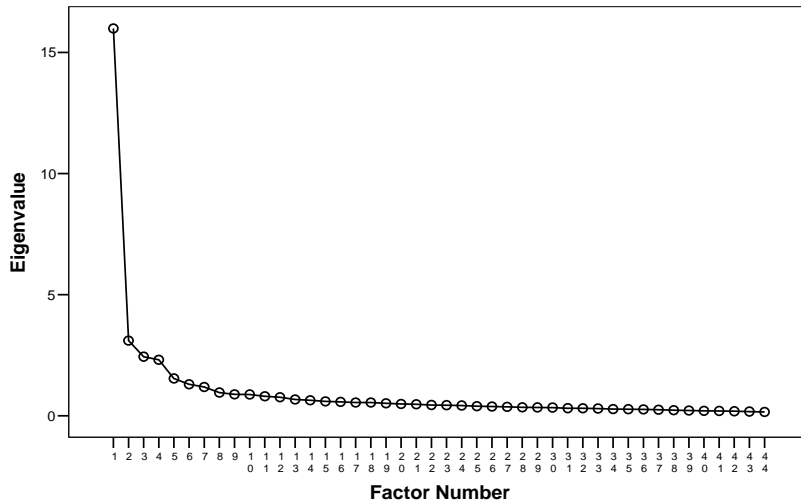
¹³ An eigenvalue is the standardized variance associated with a particular factor.

¹⁴ A factor loading expresses the correlation of an item with a factor.

¹⁵ A general rule of thumb is that factor loadings greater than .30 are considered to be useful. This is just a guideline and may need to be adjusted, for example, as the sample size and the number of variables increase, the criterion may need to be adjusted slightly downward and it may need to be adjusted upward as the number of factors increases (see Hair, et. al., 1998).

Appendix D1 - Exploratory Factor Analysis Results from the 2003-04 SEPS continued

Figure 1. Scree Plot



In addition, a separate analysis was conducted using principal axis factoring (PAF)¹⁶ with a promax¹⁷ rotation. Factor loadings were at a minimum of .40. Initially seven factors were extracted as with the PCA but the factors varied very slightly. The analysis was re-run for eight factors and the results were virtually identical to the PCA. What is reported here derives from the pattern matrix of the principal axis factoring (see Table D3 for the factor loadings). Some researchers (Fabrigar, et. al., 1999; Gorsuch, 1990; Preacher & MacCallum, 2003) suggest that principal axis factoring with an oblique rotation is the preferred method of factor analysis even if principal component analysis is widely used and explained in many texts (for example, Green & Salkind, 2003).

According to the analysis, the forty-four questions can be summarized in eight dimensions, or scales as illustrated in Table D2. The dimensions or scale items were also tested for reliability. Hence, the forty-four items can be summarized in eight dimensions with high reliability.

Table D2. Factors (Dimensions) Extracted from the 2003-04 Student Evaluation of Program Survey.

Dimension	Reliability ¹⁸	Number of Items
Overall Program Quality	.814	6
Quality of Orientation	.721	2 ¹⁹
Quality of familiarization to College policies	.892	5
Quality of the welcoming, inclusive college environment	.794	7
Quality of Instruction	.875	4
Quality of program resources	.856	6
Quality of College Facilities	.869	6
Quality of College Services	.902	7

¹⁶ Principal axis factoring is another common form of factor analysis. It uses squared multiple correlations as the initial estimates of the communalities. The general factor model asserts that there is common factor plus individual idiosyncrasies. Principal component works only with the common factor, whereas principal axis tries to use both. (Principal component treats the individual elements as part of the error term). In theory developing a model that takes into account more of the sources of variability can be useful. As well, with the SEPS data set it is likely that the factors are correlated.

¹⁷ Promax is an oblique rotation such that the vertices can have any angle. It allows factors to be correlated. Its name derives from procrustean rotation because it tries to fit a target matrix which has a simple structure. With the SEPS data set it is likely that the factors are correlated.

¹⁸ Cronbach's alpha measures how well a set of items (or variables) measures a single unidimensional latent construct. When data have a multidimensional structure, Cronbach's alpha will usually be low. Cronbach's alpha is not a statistical test - it is a coefficient of reliability (or consistency). The acceptable range is between .7 and 1.0 (Nunnally, 1978).

¹⁹ Velicer and Fava (1998) argue that factors should have at least three variables, however, if the original variables are best interpreted as a pair and the intent is to develop the underlying dimensions it makes sense to use only two.

Appendix D1 - Exploratory Factor Analysis Results from the 2003-04 SEPS continued

Table D3. Summary of Factor Loadings for Promax, Principal Axis Factoring for the Student Evaluation of Program Survey 2003-04. (Note. Only factor loadings greater than .40 are shown.)

	Factor							
	Program Quality	Quality of Orientation	Policy Awareness	College Environment	Instruction	Program Resources	College Facilities	College Services
Q12						.551		
Q13						.574		
Q14						.720		
Q15						.473		
Q16						.672		
Q17						.590		
Q18								.433
Q19								.447
Q20		.756						
Q21		.904						
Q22		.922						
Q23		.722						
Q24		.747						
Q25				.768				
Q26				.767				
Q27				.830				
Q28				.425				
Q29				.612				
Q30				.482				
Q31				.418				
Q32					.779			
Q33					.844			
Q34					.682			
Q35					.828			
Q36			.677					
Q37			.652					

Appendix D1 - Exploratory Factor Analysis Results from the 2003-04 SEPS continued

Table D3. Continued

	Factor							
	Program Quality	Quality of Orientation	Policy Awareness	College Environment	Instruction	Program Resources	College Facilities	College Services
Q38			.788					
Q39			.821					
Q40			.760					
Q41			.527					
Q42							.658	
Q43							.635	
Q44							.785	
Q45							.723	
Q46							.613	
Q47							.507	
Q48	.571							
Q49	.687							
Q50	.847							
Q51	.729							
Q52	.754							
Q53	.860							
Q54	.818							
Q55	.768							

Table D4. Factor Correlation Matrix

Factor Correlations								
	College Services	Policy Awareness	Program Resources	College Environment	Instruction	Program Quality	College Facilities	Orientation
College Services	1.000							
Policy Awareness	.549	1.000						
Program Resources	.659	.500	1.000					
College Environment	.502	.407	.467	1.000				
Instruction	.416	.410	.518	.402	1.000			
Program Quality	.458	.552	.561	.382	.623	1.000		
College Facilities	.706	.486	.692	.443	.469	.494	1.000	
Orientation	.212	.277	.232	.263	.221	.236	.235	1.000

Appendix D1 - Exploratory Factor Analysis Results from the 2003-04 SEPS continued

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