APPLIED COMPUTING, MATHEMATICS
AND STATISTICS GROUP
Division of Applied Management and Computing

Introductory Programming at Lincoln University: Attributes of successful students revisited

Jim Young, Eriko Kamukubo-Gould, Theresa McLennan
and Sue Clemes

Research Report No:99/13
October 1999

ISSN 1174-6696

RESEARCH
REPORT

LINCOLN
UNIVERSITY
Te Whare Wānaka O Aoraki

Applied Computing, Mathematics and Statistics

The Applied Computing, Mathematics and Statistics Group (ACMS) comprises staff of the Applied Management and Computing Division at Lincoln University whose research and teaching interests are in computing and quantitative disciplines. Previously this group was the academic section of the Centre for Computing and Biometrics at Lincoln University.

The group teaches subjects leading to a Bachelor of Applied Computing degree and a computing major in the Bachelor of Commerce and Management. In addition, it contributes computing, statistics and mathematics subjects to a wide range of other Lincoln University degrees. In particular students can take a computing and mathematics major in the BSc.

The ACMS group is strongly involved in postgraduate teaching leading to honours, masters and PhD degrees. Research interests are in modelling and simulation, applied statistics, end user computing, computer assisted learning, aspects of computer networking, geometric modelling and visualisation.

Research Reports

Every paper appearing in this series has undergone editorial review within the ACMS group. The editorial panel is selected by an editor who is appointed by the Chair of the Applied Management and Computing Division Research Committee.

The views expressed in this paper are not necessarily the same as those held by members of the editorial panel. The accuracy of the information presented in this paper is the sole responsibility of the authors.

This series is a continuation of the series "Centre for Computing and Biometrics Research Report" ISSN 1173-8405.

Copyright

Correspondence

This paper represents work to date and may not necessarily form the basis for the authors' final conclusions relating to this topic. It is likely, however, that the paper will appear in some form in a journal or in conference proceedings in the near future. The authors would be pleased to receive correspondence in connection with any of the issues raised in this paper. Please contact the authors either by email or by writing to the address below.

Any correspondence concerning the series should be sent to:

The Editor
Applied Computing, Mathematics and Statistics Group
Applied Management and Computing Division
PO Box 84
Lincoln University
Canterbury
NEW ZEALAND

Email: computing@lincoln.ac.nz

Introductory programming at Lincoln University: Attributes of successful students revisited

Jim Young, Eriko Kamukubo-Gould,
Theresa McLennan and Sue Clemes

Applied Management and Computing Division
Lincoln University
Canterbury, New Zealand

Email: young2@lincoln.ac.nz, mclennan@lincoln.ac.nz

Abstract

The introductory programming class at Lincoln University, New Zealand, was surveyed for a second time in 1998. Linear regression models were then used to determine student attributes associated with achievement in this class. Students who expect to get high marks are more likely to achieve than those with lower expectations, and older students are more likely to achieve than younger students. Gender has no direct association with achievement but female students have on average lower marks than male students. Females are on average younger and have lower expectations than males.

1. Introduction

Many overseas studies report a low and decreasing proportion of women in computer science subjects at tertiary institutions. In general, New Zealand studies support these findings and report low participation rates and a high drop out rate for women in computer science subjects (Toynbee, 1993a; Toynbee, 1993b; Ryba & Selby, 1995; Brown, Andreae, Biddle & Tempero,1996; and Andreae, Biddle, Brown, Gale & Tempero, 1998).

Brown et al (1996) report that at Victoria University women made up only 20% of the 1994 introductory programming class and that only 40% of them (compared with 68% of men) passed at a level that allowed them to continue on to more advanced programming subjects. Brown et al (1996) suggest that the low percentage of females in the class is partly because female students have had less experience with computers than males. They also note that female students tend to be older than males, females are less likely to speak English as their first language and females are less confident of their ability to do well in computing subjects.

Staff at Victoria initiated a number of strategies to make the subject more "female friendly". These initiatives were not as successful as hoped (Andreae et al, 1998). Women continue to make up only about 20% of the introductory programming class and the proportion of women who either fail or drop the subject is consistently higher than the proportion of men. For example, in the 1997 class, 50% of women either failed or dropped out compared with only 33% of men.

Ryba and Selby (1995) report that women are under-represented in computing subjects at the University of Waikato and Waikato Polytechnic. For example, women made up only 26% of the 1994 programming methods class at the University of Waikato. Ryba and Selby (1995) find that women achieve at the same level as men but women have a higher drop out rate from those key subjects required in order to major in computer science or information technology. They also note that women are less confident than men of their ability to do well in computing subjects.

Lincoln University staff assessed female participation and achievement in their 1994 introductory programming class (Young, McLennan, Johnson, Hutchison & Clemes, 1998; McLennan, Young, Johnson & Clemes, 1998). Lincoln typically has a high proportion of women in its introductory programming class (44% women in 1994). The results of the Lincoln study show that older students are more likely to achieve than younger ones and an intention to major in computing is important with 80% of computing majors passing the subject. Gender has no direct association with achievement but a higher proportion of males (68%) than females (57%) pass the subject because a higher proportion of males than females intend to major in computing. Other factors such as previous exposure to computing at a tertiary level, experience in computing and previous tuition in English have no apparent association with achievement.

Lincoln University staff repeated this study in 1998. The introductory programming class was again surveyed and the data analysed to find student attributes associated with achievement. The results are presented in this report.

2. Methods

2.1 The class studied

In 1998 introductory programming was taught at Lincoln University as the subject COMP102. The class was of similar size (95 students) to the 1994 class (105 students) but with a much lower percentage of women (23% compared with 44% in 1994). About half the students enrolled in the 1998 class intended to major in computing, either by completing a Bachelor of Applied Computing degree or by majoring in computing within a Bachelor of Commerce and Management degree. Most of the other students were commerce students intending to major in other areas. There was a small but significant group of students taking the subject for a certificate of proficiency (COP) rather than for credit towards a degree (Table 10, Appendix 2).

In 1998 the lecturer was male and the tutor female; in 1994 the lecturer was female and the tutor male. In 1998 the subject was taught using Visual Basic; in 1994 the subject was taught using Pascal. In both years basic programming concepts were taught (ifs, loops, procedures and arrays), but in 1998 students were also introduced to interface design and to object oriented concepts (Appendix 3). In both years assessment consisted of practical labs, tests, a major project and the final exam. Students were expected to attend practical labs. These labs were supervised by the tutor with the help of student demonstrators.

In the third week of the semester, the students were given a questionnaire to complete. Students were free to join or leave the class up until this time. Of the 95 students who completed any assessment in the subject, 92 completed the questionnaire (a response rate of 96%). Of the three students who did not complete the questionnaire, one failed the subject and the other two passed (Table 7, Appendix 1).

2.2 Survey data

In the previous study (Young et al, 1998), student achievement was measured by an ordinal variable with four levels (DNS - did not sit the final; F - sat the final but failed; P - sat the final and passed; G - sat the final and passed with good marks). Logistic and ordinal regression models were then used to identify attributes associated with high levels of achievement. This approach ensured that those students who failed to sit the final exam were still included in the analysis even though they did not receive an end-of-year mark. Previously the number of students who did not sit the final and the number who sat but failed were twelve and twenty-three respectively, compared to four and six in this study (Table 6, Appendix 1).

In this study, we exclude the four students who failed to sit the final so that we can measure student achievement using the end-of-year marks. There are two reasons for doing this. First, the logistic and ordinal regression approach used previously would most likely result in unreliable models given so few students in the lower two categories of an ordinal measure of achievement. Second, an ordinal measure of achievement carries less information than an interval measure of achievement. With an interval measure such as end-of-year marks, there is more power to detect attributes that are associated with higher levels of achievement.

The questionnaire (Appendix 4) collected personal information, reasons for taking the course, the student's expectations, previous education and computing experience. In our analysis, we look for associations between end-of-year marks and the following variables:

- Age - a discrete variable: values ranged from 17 to 53 (Question 1);
- Gender - a binary variable taking the value one if the student was male (Question 1);
- Major - a binary variable taking the value one if the student intended to major in computing (Question 1);
- Full - a binary variable taking the value one if the student was a full-time student and taking the value zero if the student was a part-time student;
- COP - a binary variable taking the value one if the student is enrolled in COMP102 for a 'Certificate of Proficiency';
- Expect - a binary variable taking the value one if the student expected to get an A or A+ (Question 4);
- COMP101a – a binary variable taking the value one if the student indicated that they had already taken COMP101[1] (Question 6);
- COMP101b - a binary variable taking the value one if the student indicated that they had already taken COMP101 or were taking this paper concurrently with COMP102 (Question 6);
- Tertiary – a binary variable taking the value one if the student indicated that they had already taken either COMP101 or some other computing paper at a tertiary institution (Question 6);
- Home - a binary variable taking the value one if the student was planning to make use of a home computer (Question 5);
- Maths – a binary variable taking the value one if the student had enjoyed mathematics at school (Question 7);
- English - a binary variable taking the value one if the student had been taught before in the English language (Question 8);
- School - a binary variable taking the value one if the student had used a computer as part of a course at school (Question 9);
- Score_1 - a score representing previous computing experience; the sum of answers in Question 20 for all rows except the last two.
- Score_2 - a score representing previous programming experience; the sum of answers in Question 20 for rows Pascal, Basic and Other programming languages.

All of these predictor variables were used in the previous study, except the variables 'Full', 'COP', and 'COMP101b'. Variables 'Full' and 'COP' were derived from the University's official records.

Each of these 'predictor variables' is summarised in Appendix 2, either by its correlation with achievement if quantitative (Table 9, Appendix 2) or by average achievement for each category if qualitative (Table 10, Appendix 2). Details of the four students excluded from the analysis of survey data are in Table 8 (Appendix 1). These students were excluded because they did not sit the final exam and therefore they did not receive an end-of-year mark. All four students are older than the median

[1] COMP101 is an introductory computing subject, and a core subject in Bachelor of Applied Computing and Bachelor of Commerce and Management degrees.

age (22); all are full-time students; all are male; all have high expectations; all have been taught before in the English language and all have done or are doing COMP101.

2.3 Linear regression

We used PROC REG in SAS to fit linear regression models with end-of-year mark as the continuous response variable. Both forward and backward model selection methods were used with the effect of each predictor measured by its partial (or type II) sums of squares. Partial sums of squares measure the increase in residual variation when a predictor variable is removed from a model that contains all other predictor variables (SAS, 1990).

Overall model fit was measured by an adjusted R^2 statistic. R^2 measures the proportion of the variation in end-of-year marks that is explained by the linear regression model. Since adding even an unnecessary predictor to a model increases the R^2, the adjusted R^2 'corrects' the R^2 statistic, reducing it by an amount that increases as the number of predictor variables in the model increases (Wonnacott & Wonnacott 1985).

3. Results

Linear regression suggests that achievement is associated with three predictor variables: 'Expect', 'English', and 'Comp101b' (Table 1). Both forward and backward model selection methods give the same model (Table 1). Parameter estimates (Table 1) indicate that students with high expectations, students not previously taught in English and students who had not taken COMP101 previously do better in the COMP102 paper.

Table 1 Linear regression model for end-of-year mark in COMP102: Model 1

Parameter	Estimate	SE	Type II SS	p-value
Intercept	85.7	5.2	42769	0.000
Expect	9.2	2.8	1703	0.001
English	-10.1	4.4	821	0.024
Comp101b	-10.4	3.4	1500	0.003
Adjusted $R^2 = 0.25$				

Previously, increasing age and high expectations were among attributes associated with higher levels of achievement (Young et al, 1998). Table 2 shows a linear regression model with the student's final mark as the response variable and with high expectation and age as predictor variables. Both predictor variables are significant and as before, increasing age and high expectations are associated with a higher level of achievement.

Table 2	Linear regression model for end-of-year mark in COMP102: Model 2			
Parameter	Estimate	SE	Type II SS	p-value
Intercept	56.5	5.6	17467	0.000
Expect	9.2	3.0	1645	0.003
Age	0.5	0.2	798	0.034
Adjusted $R^2 = 0.17$				

The adjusted R^2 statistics are 0.25 and 0.17 for the first and second models respectively and these statistics show that the first model (Table 1) is a better fit to the survey data than the second model (Table 2). However, this difference between adjusted R^2 statistics is not large, and all these predictor variables seem to be correlated to some degree. For example, students with high expectations tend to be older than those with low expectations; those students not previously taught in English and those who have not previously taken COMP101 also tend to be older (Table 3). In terms of representing underlying reasons for higher achievement, the second model seems a more sensible model than the first. However, neither model explains a high proportion of the variability observed in the end-of-year marks.

Table 3	Average end-of-year mark and average age for the three predictor variables of Model 1			
Predictor variable		Number	Average end-of-year mark	Average age
Expect	Yes	39	78.7	26.1
	No	46	67.8	22.5
English	Yes	77	71.6	23.7
	No	10	79.6	30.2
COMP101b	Yes	69	69.7	23.6
	No	22	80.2	27.2

Residual plots for both models (Figure 1 and Figure 2) show a consistent pattern. Both models underestimate the end-of-year mark for those with high marks and over-estimate the end-of-year mark for those with low marks. Clearly there are factors that affect achievement that we have not been able to identify.

Figure 1: Residual plot for Model 1 (see Table 1)

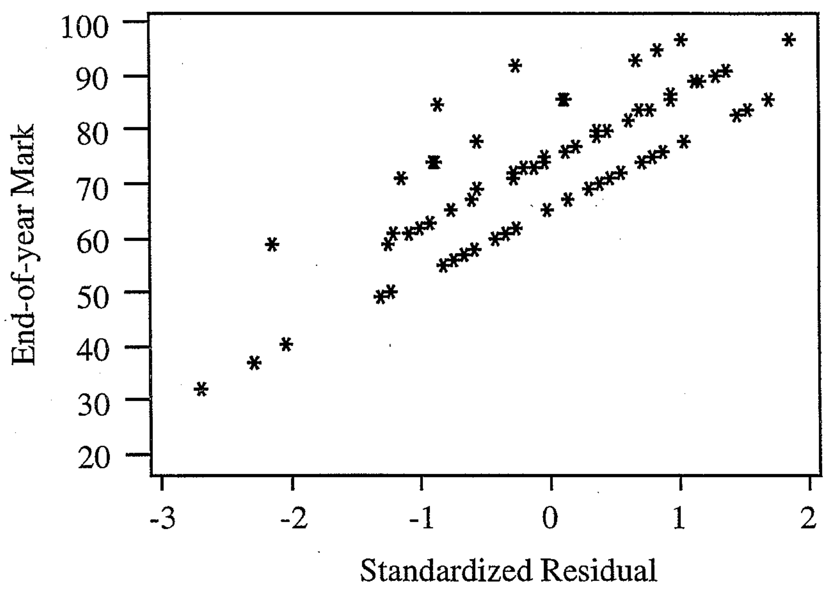
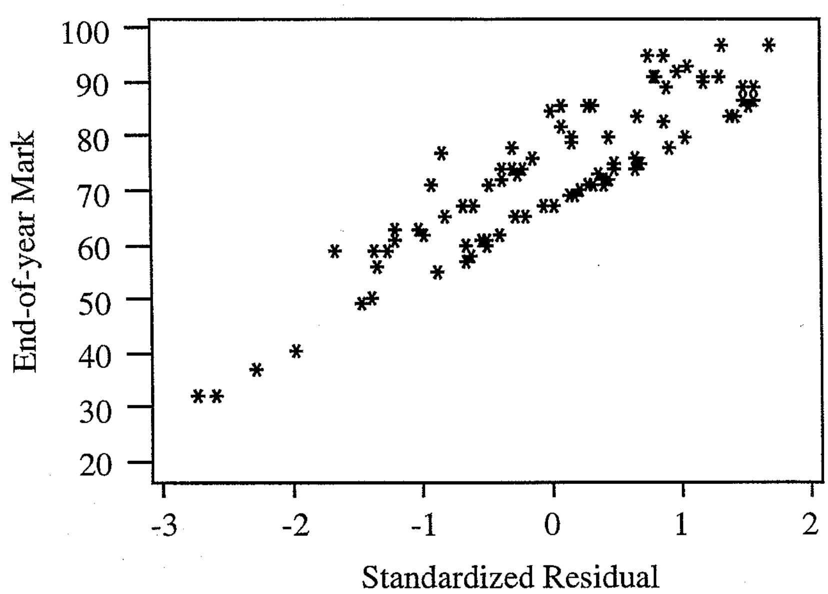


Figure 2: Residual plot for Model 2 (see Table 2)

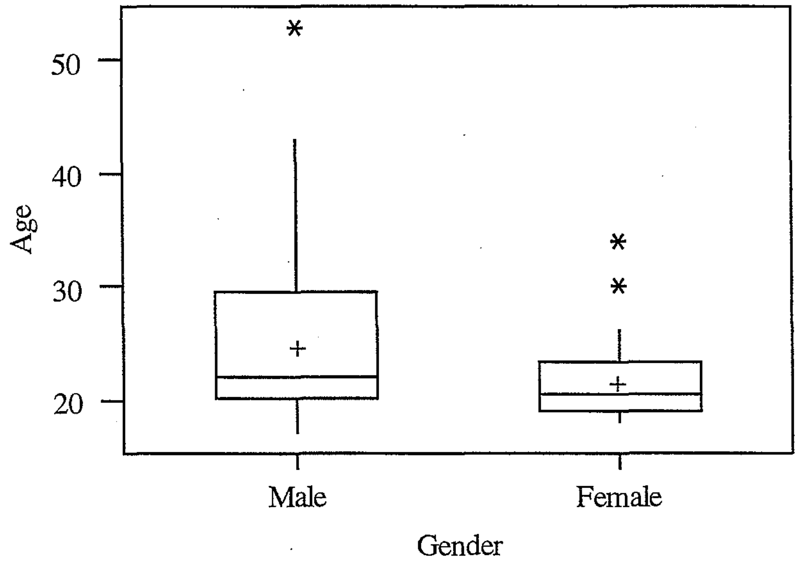


4. Discussion

Ordinal regression of the 1994 data suggests that higher levels of achievement are associated with increasing age and with students who intend to major in computing (Young et al, 1998). Linear regression of the 1998 data suggests that higher levels of achievement are associated with increasing age and with high student expectations. In 1994, introductory programming was taught as COMP201. It is now taught as COMP102, and this change reflects the proper place of the subject within a computing major. The proportion of students taking this subject in their first year at university rather than in their second has increased since 1994. In their first year, students may be less certain of and less committed to their intended major. This is one reason why the expected mark in the subject may now be a better proxy measure of student motivation than whether or not the student intends to major in computing.

Results for both 1994 and 1998 data suggest that older students do better. Studies have shown that mature students are highly motivated and have higher expectations of completing their degree than younger students (Mercer, 1993; Devlin, 1996). Mature students are more likely than traditional students to approach teaching staff and to ask for help when having problems (Roberts & Kelly, 1998). They are also motivated by opportunities to upgrade their skills and hence advance their careers (Richardson, 1994).

Figure 3: Boxplot of age for male and female students
(+ = mean age)



As in the previous study, there is no evidence of a direct association between achievement and gender. However the average end-of-year mark is 74.0% for males and 66.8% for females (Table 10, Appendix 2). There are several reasons for this lower average mark among females. First it is perhaps not surprising that the female students have a lower average mark than the males, simply because they are younger on average. The average age of males is 25; the average age of females is 22 (Figure 3).

Table 4	Gender, age and expected grade			
	Female		Male	
Expected grade	Age <25	Age ≥25	Age <25	Age ≥25
A or A+	1	2	20	16
Other	15	1	25	5

Second, and more disturbing, is that females have lower expectations and lower expectations are associated with lower marks. Only 16% of the females expect to get an A or A+ grade compared with 55% of males (Table 4). Obviously older students are more likely to have higher expectations (Table 4) and on average female students are younger. But even taking into account the difference in average age, females appear to have lower expectations. A logistic regression model (Agresti, 1990) shows that having adjusted for age, gender is still a significant predictor of the probability of having high expectations (Table 5). High expectations are more likely with older students and less likely with female students (Table 5). That female students have lower expectations is consistent with studies at Victoria and Waikato where females were found to be less confident than males. (Brown et al, 1996; Ryba & Selby, 1995).

Table 5	Logistic regression model for expecting an A or A+ [2]			
Parameter	Estimate	SE	Δ LLR [3] (df)	p-value
Intercept	-1.78	1.00		
Age	0.08	0.04	6.4 (1)	0.012
Female	-1.71	0.69	7.8 (1)	0.005
Hosmer – Lemeshow statistic = 6.5 (7 df), p-value = 0.48				

1998 was the first year a computing subject was taught at Lincoln University using Visual Basic. A number of students enrolled in the class because they wanted to learn Visual Basic. They were not taking the subject as part of the usual Applied Computing or Commerce and Management degree. These students are typically part-time, older, male students who work with computers. Not only do they have substantial previous computing experience but they have professional reasons for wanting to achieve at a high level.

The presence of these students at least partially explains some of the unexpected features of the 1998 data. We believe the presence of these students is the reason those who have <u>not</u> taken COMP101 apparently do better in COMP102 (Table 1). These students are part of the reason why the average age for males is higher than that for females, expectations are higher for males than females, and the average mark for males is higher than the average mark for females. These students are a factor in the relatively low percentage of females in the class in 1998 (23% compared with 44% in 1994) and part of the reason why expected mark seems to be a better proxy measure of student motivation than whether or not the student intends to major in computing.

[2] The probability of expecting an A or A+ grade can be predicted from model parameters using equation 4.7 in Agesti (1990).

[3] ΔLLR is the decrease in the log likelihood ratio when a parameter is added into a model already containing the parameters on rows above it.

Initially, it seems extraordinary that not having been taught in English at school is associated with higher achievement (Table 1). As discussed, these students are older (Table 3) and might therefore be expected to do better. In addition, these students of overseas origin may have special motivating reasons for wanting to do well in this subject such as re-training for a new career in computing.

The four students that didn't sit the final exam (Table 8) were all older than the median age (22). It is tempting to suggest that these older students struggled to meet their own expectations and dropped out rather than fail or obtain a poor grade. This scenario might apply particularly to the two students who had intended to major in computing. Alternatively, as older students, they may have encountered the sort of difficulties older students often face in combining study with work and family commitments.

5. References

Agresti, A. (1990). *Categorical data analysis.* New York: Wiley.

Andreae, P., Biddle, R., Brown, J., Gale, A., & Tempero, E. (1998). CSI retention at Victoria University of Wellington. Presented at WIC98 Fifth Australasian Women in Computing Workshop. Brisbane: University of Queensland.

Brown, J., Andreae, P., Biddle, R., & Tempero, E. (1996). *Women in introductory computer science: experience at Victoria University of Wellington.* (Technical Report CS-TR-96/1), Wellington: Department of Computer Science, Victoria University.

Devlin, M. (1996). Older and wiser?: A comparison of the learning and studying strategies of mature age and younger teacher education students. *Higher Education Research and Development,* 15(1). 51-59.

McLennan, T., Young, J., Johnson, P., & Clemes, S. (1998) Agenda not gender? : Attributes of successful students in an introductory programming class. In *Proceedings of the WIC98 Fifth Australasian Women in Computing Workshop,* (pp. 39-45). Brisbane: University of Queensland.

Mercer, D.L. (1993). Older coeds: predicting who will stay this time. *Journal of Research and Development in Education,* 26(3). 153-163.

Richardson, J.T.E. (1994). Mature students in higher education: I. A literature survey on approaches to studying. *Studies in Higher Education,* 19(3). 309-325.

Roberts, L., & Kelly, P. (1998). Women in IT Courses: The mature aged perspective. In *Proceedings of the WIC98 Fifth Australasian Women in Computing Workshop,* (pp. 51-54). Brisbane: University of Queensland.

Ryba, K., & Selby, L. (1995). *A study of tertiary level information technology courses: how gender inclusive is the curriculum?* Wellington: Ministry of Education.

SAS Institute (1996). *SAS/STAT software: changes and enhancements through Release 6.11.* Cary: SAS Institute.

Toynbee, C. (1993a). Reducing the drop-out rate. *Computing Research News*, 5(2). 2,9,20.

Toynbee, C. (1993b). Hard disk failure: why are women opting out from tertiary computing? In *Proceedings of the Women's Suffrage Centennial Science Conference*, (pp. 29-33). Wellington: Victoria University.

Wonnacott, R., & Wonnacott, T. (1985). *Introductory statistics.* New York: Wiley.

Young, J., McLennan T., Johnson P., Hutchison D., & Clemes S. (1998). *Introductory programming at Lincoln: Attributes of successful students.* (Centre for Computing and Biometrics Research Report No 9801) Lincoln: Centre for Computing & Biometrics, Lincoln University.

6. Appendices

6.1 Appendix 1: Summary of the class studied

Table 6 COMP102 students in 1998 compared to COMP201 students in 1994 (Young *et al* 1998)

		Female		Male		Overall	
		1994	1998	1994	1998	1994	1998
Age	Median	20	21	20	22	20	22
	Interquartile range	19-23	19-23	19-24	20-30	19-23	20-27
	Range	17-43	18-34	18-48	17-53	17-48	17-53
Level of Achievement	DNS	6	0	9	4	15	4
	F	14	3	10	3	24	6
	P	9	4	15	19	24	23
	G	17	15	25	47	42	62
Number in class		46	22	59	73	105	95

Table 7 Students who did not complete a questionnaire

Mark	Grade	Age	Gender
20	E	20	F
89	A+	19	M
66	B	32	M

Table 8 Students excluded from the analysis of survey data because they did not sit the final exam

Age	Full or part time	Gender	Major in Computing	Taught in English	High expectation	Done or doing Comp101
24	Full	M	No	Yes	Yes	Yes
31	Full	M	Yes	Yes	Yes	Yes
23	Full	M	No	Yes	Yes	Yes
33	Full	M	Yes	Yes	Yes	Yes

6.2 Appendix 2: Summary of survey data

Table 9 Correlation between quantitative predictor variables and end-of-year marks

Predictor variable	Correlation	SE	Number
Age	0.29	0.10	91
Score_1	0.04	0.11	88
Score_2	0.03	0.11	88

Table 10 Average end-of-year mark for each category of qualitative predictor variable

Predictor variable	Category	Average end-of-year mark	SE of difference	Number
Gender	Male	74.0		69
	Female	66.8	3.66	22
Major	Computer major intended	71.1		46
	Other intentions	73.4	3.19	45
Full	Enrolled full-time	71.5		82
	Enrolled part-time	79.0	5.31	9
COP	Enrolled for Cert.of Proficiency	85.0		7
	Not for Cert. of Prof	71.2	5.81	84
Hi_expec	A or A+ expected	78.7		39
	Other grade expected	67.8	2.92	46
	Missing	63.7	.	6
COMP101a	Have sat COMP101	69.4		38
	Haven't sat COMP101	74.3	3.20	53
COMP101b	Have sat or sitting COMP101	69.7		69
	Haven't and are not sitting	80.2	3.56	22
Tertiary	Previous computing paper	72.0		52
	No tertiary computing	74.0	3.04	38
	Missing	20.0	.	1
Home	Will use home computer	72.2		57
	Won't use home computer	74.0	3.23	30
	Missing	59.0	.	4
Maths	Enjoyed maths at school	73.6		47
	Didn't enjoy maths	71.7	3.10	40
	Missing	61.6	.	4
English	Taught in English	71.6		77
	Not taught in English	79.6	4.73	10
	Missing	66.5	.	4
School	Used computers at school	70.7		57
	Didn't use computers	77.0	3.17	30
	Missing	59.0	.	4

6.3 Appendix 3: COMP102 subject outline

COMP102 Computer Programming
Subject Outline 1998

Degree: **BApplComp, BCM, BSc**

Semester: **1**

Examiner: Walt Abell, Room H103, Ext 8040, Email: WHIO/ABELL
Office hours: Monday 2:40–3:30 pm, Tuesday 1:40–2:30 pm

Tutor: Scott Walters, Room H109, Ext 8023, Email: WHIO/WALTERS
Office hours: Monday, Tuesday, Wednesday 10:40 am –12:30 pm,
Friday 10:40–11:30 am

Timetable:

	Room	*Day*	*Time*
Lectures:	C1	Monday	1:40 pm
		Tuesday	12:40 pm
Labs:	S4	Thursday	10:40 am – 12:30 pm
			1:40 – 3:30 pm
Tutorial/Tests:	S4/F206	Friday	11:40 am (see Notes)

Aims:

- To introduce students to programming concepts and techniques, including object-oriented programming and graphical user interface design.
- To give students experience in programming in a visual language.

Objectives:

At the end of the class, students will be able to:

- Develop the logic and user-interface designs for simple programs.
- Express the logic design using flow-charts, pseudo-code or equivalent techniques.
- Use appropriate control structures, procedures and variables to implement a design.
- Select the appropriate visual components to implement a graphical user interface design.
- Use objects, methods and properties correctly in implementing programs.
- Produce well documented and readable program code.
- Develop appropriate test data to validate programs.

Textbook: Programming in Visual Basic 5.0 (Bradley and Millspaugh)
Cost: approximately $65 (with student discount)

Other Reading:

The following books will be available on Restricted Loan at the library.

An Introduction to Programming Using Visual Basic 5.0 (Schneider).

Programming Business Applications with Visual Basic (Burrows and Langford)

Other books on Visual Basic will be available in the Library.

Content:

Week Starting	*Topics*	*Text Chaps*	*Tests and Projects*
Feb 23	Introduction, simple forms, controls and properties, writing code	1	
Mar 2	Other controls (eg option buttons, check boxes), string concatenation	2	
Mar 9	Variables, constants and calculations Val, Format and MsgBox functions	3	
Mar 16	Decision making (If-Then-Else), conditions (eg <, >, and or)	4	Test 1
Mar 23	Procedures and functions, parameters and return values	5	
Mar 30	List and Combo Boxes Looping using Do/For	7	Test 2
Apr 6	String operations, printing	7	
	-- Study Break --		
Apr 27	Arrays (control, variables), more looping using For-each	8	
May 4	Simple files access (sequential only)	9	Test 3
May 11	Database access	10	Project Part 1
May 18	Multiple forms VB Extensions (eg VBA)	5, 12	Test 4
May 25	Catch-up and Review		Project Part 2

Note: As this is the first year that Visual Basic has been taught, the above is a guide only. The date and content of lectures may change.

Assessment:

Item	*Dates*	*Worth*	*No.*	*Total*
Labs	Start in first week (Feb 26) Each lab is due by Wednesday of the following week	2%	9	18%
Project	May 4 – 29	15%	1	15%
Tests	Friday, 1:40 pm Mar 20, Apr 3, May 8, May 22	9%	Best 3 out of 4	27%
Exam	Monday, Jun 8, am	40%	1	40%

Note: Dates are provisional

Notes:

Labs

Lab marks will be gained by completing the lab handout and getting the work checked off by a demonstrator by the due date. Ideally, this should be done during labs or tutorials but, if you need more time, the tutor will check off labs during office hours.

Note labs are normally due by the Wednesday of the week after they are handed out. Extensions will not be granted except in exceptional circumstances.

Project

The project will be done in two parts, one covering the design and the other the implementation of a complete program. The project will be based on material covered in the labs.

Tests

These will be held on four Friday sessions (see Assessment for dates). The tests will be held in a computer lab and will require some written and some programming answers. The tests will cover material from the previous two or three weeks of class work. The best 3 out of 4 test results will contribute to your final mark.

The Friday sessions during which there are no tests will be used for additional lab time and tutorials (eg to practise for the tests). You will be assigned to a specific computer lab for the Friday session. Please be sure you attend the correct lab.

Field Trip Days

Lectures and tutorials may be held if no students in COMP102 will be away on a field trip. Labs will be held regardless of field trips however you may request an extension for a lab if you have to miss it because of a field trip - see the tutor to do this.

6.4 Appendix 4: The questionnaire

COMP102 Class Survey 1998

The information from this survey will be very useful in assessing and improving this subject. *Please note that only summarised information will be published and that you will not be able to be personally identified.*

Walt Abell
Theresa McLennan

Instructions: Circle the appropriate options or fill in the gaps.

1. General

Student ID : ________ Age : ___ Sex : M / F

Course (eg BCM):_______ Likely Major (eg Accounting):_______________

2. Year of University study (circle one):

   1. 1st
   2. 2nd
   3. 3rd
   4. 4th or more

3. What is/are your main reason/s for enrolling in COMP102? (circle one or more)

   a. I want to major in computing.
   b. I thought it sounded interesting.
   c. It would be useful to be able to program.
   d. I think it might improve my job prospects.
   e. I've enjoyed other computing papers.
   f. I needed another subject.
   g. other ______________________________

4. What grade do you expect to achieve in COMP102 ?

   1. A+
   2. A
   3. B
   4. C

5. Are you planning to use a computer at home to help you with the assignments in COMP102 ? Yes / No

6. Many students complete COMP101 before taking COMP102.
   Have you sat a COMP101 final exam before? Yes / No

   If Yes, what was your grade ? _______

   If No, or if you failed, are you sitting COMP101 this semester ? Yes / No

   What other computing subjects have you completed at Lincoln or other tertiary institutes ?

Subject	Grade (eg B+)
____________________	____________
____________________	____________
____________________	____________

7 Rate the following school subjects according to your enthusiasm for them :
(0 = never done, 1 = disliked, 2 = felt neutral, 3 = quite enjoyed, 4 = really loved)
(circle one)

Maths	0 1 2 3 4
Computing	0 1 2 3 4
English	0 1 2 3 4
Science	0 1 2 3 4
History	0 1 2 3 4

8. Did you attend 6th or 7th form in NZ ? Yes / No

If not, were the school subjects you attended generally taught in English ?
Yes / No

9. Were computers available at your school ? Yes / No

If Yes, what was the maximum number of times you used them in any one year at school:
(0 = never, 1 = little, 2 = 10 to 20 times, 3 = nearly every week, 4 = nearly every day)
(circle one)

as part of your school course work ?	0 1 2 3 4
outside scheduled class use ?	0 1 2 3 4

10. How much experience have you had with computers (including games etc)?

1. none
2. little
3 some
4. more than average
5. a lot

If you answered **none** to question 10, finish here. Many thanks for your help.

11. At approximately what age did you first use a computer ? _____

12. Rate the amount of experience you have had with the following applications:
(0 = none, 1 = little, 2 = some, 3 = more than average, 4 = a lot)

DOS	0 1 2 3 4
Pascal	0 1 2 3 4
Basic (older style eg. QuickBasic)	0 1 2 3 4
Visual Basic	0 1 2 3 4
other programming languages	0 1 2 3 4
spreadsheets	0 1 2 3 4
word-processors	0 1 2 3 4
desk-top publishing	0 1 2 3 4
database management packages	0 1 2 3 4
accounting software	0 1 2 3 4
games	0 1 2 3 4
graphics	0 1 2 3 4
bulletin boards or news	0 1 2 3 4
E mail	0 1 2 3 4
Internet or WWW	0 1 2 3 4
other ____________________	0 1 2 3 4
other ____________________	0 1 2 3 4

Thank you very much for completing this survey.