Unisys Monash IT Summer School 2001

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Introduction

The third Unisys Monash IT Summer School was held in January 2001, following the first in January 1999, and the second in January 2000. The IT Summer School is a six day residential camp organised by the Faculty of Information Technology (FIT) for secondary school students about to enter Year 11.

The program is advertised to all Victorian secondary schools. Each school is invited to nominate two of their high achieving students, who may or may not be interested in studying IT at university or pursuing a career in IT. Each year sixty students are selected to participate. The selection aims for an equal mix of gender, government and private school students, and metropolitan and country school students.

The students live in the halls of residence at the Clayton campus of Monash University and partake in a program of activities designed to show them various aspects of IT and the range of IT undergraduate courses available to them in the Faculty of Information Technology courses. The IT Summer School also aims to give them a "taste" of university life. A major focus of this program is an IT related project that students work on for a total of 20 hours during the week. In 2001, staff in four Schools within FIT designed, developed and presented the following projects:

1. Programming with Java and Blue J: Students learn to write computer programs in Java. During the week the students write a number of small programs, and for the main activity they work in small groups to design and develop a game in Java.

2. Online Jukebox: Students build an online "Jukebox" using Web database integration and Web authoring tools, and graphics software.

3. Building a Smart House: Students work with hardware and software to design and build a computer controlled dolls house called a "Smart House".

4. Playing the Stock Market: Students learn approaches to analysing and predicting the financial market to aid in management of investments. They use computers to analyse actual financial data and use data mining techniques to look for trends.

Details of the 2001 IT Summer School may be found at:
http://www.infotech.monash.edu.au/summerschool/2001/index.html

At the start of the 2000 Summer School students completed a pre Summer School survey that was used to determine students' interest in IT, intentions of studying IT at school and at tertiary level, and intention of pursuing a career in IT. A post Summer School survey was used to gauge any changes in these measures. All Summer School attendees, a total of 63 students, participated in the study. A report of the results of these surveys can be found at:

http://cerg.csse.monash.edu.au/reports/TechReports.html

These surveys were modified and used again at the third Summer School in 2001. A copy of the pre Summer School 2001 survey form can be found at:

http://cerg.csse.monash.edu.au/reports/ITSS_2001_pre_survey.pdf

A copy of the post Summer School 2001 survey form can be found at:

http://cerg.csse.monash.edu.au/reports/ITSS_2001_post_survey.pdf

The following is a report of the results of the pre and post surveys for the IT Summer School 2001.

Student Profile

Project Groups

All students who attended the IT Summer School participated in the study (n=63). The students were allocated to the project groups as follows:

Table 1. Number of students in project groups

Project Title	Number of students
Smart House	15
Stockmarket	16
Jukebox	16
BlueJ Programming	16

Demographic Profile

Table 2 shows the numbers of students in each project group classified according to gender, type of school attended and school location.

Table 2. Project groups by gender, school type and school location

Project	Gender		School type		School location	
	Female	Male	Government	Private	Metropolitan	Country
Smart House	7	8	7	8	6	9
Stockmarket	8	8	8	8	8	8
Jukebox	7	9	9	7	9	7
BlueJ Programming	8	8	8	8	7	9
Total	30	33	32	31	30	33

Usage of Computers

Only two of the 63 students at the Summer School did not have access to a computer at home, and these were both female.

For the following questions students were asked to rate how much they use computers for various activities. NR is used to indicate the number of non responses given to the question.

Time spent using computers

The students were asked how much time they spent, on average, using computers each week. Their responses are given in Table 3.

Table 3. Time spent using computers

Question	Mean hours	SD
How many hours per week, on average, do you use a computer for schoolwork? (n=55)	6.9	6.7
How many hours per week, on average, do you use a computer for activities other than schoolwork? (n=60)	9.4	9.9

Independent groups *t*-tests were used to determine any differences in the means obtained for the time students spent using computers for schoolwork and for other activities for each classification of gender, type of school attended, or location of school.

The huge standard deviations indicate wide variations in the time students spent using computers. A significant difference was found between the country students ($M = 5.1$, $sd = 5.0$) and the metropolitan students who spent more hours per week ($M = 8.7$, $sd = 7.8$) using computers for schoolwork ($t(53) = 2.0$, $p < 0.05$).

Use of computers for schoolwork

The students were asked how much use they made of computers for schoolwork at school and at home. Their responses are shown in Table 4. A 7-point Likert scale was used, where 1 indicates no use and 7 indicates lots of use.

Table 4. Usage of computers for schoolwork

Question	Mean	SD
How much use is made of computers at school for schoolwork? (n=61)	4.8	1.5
How much use is made of computers at home for schoolwork? (n=61)	5.6	1.4

Independent groups *t* tests were used to determine any differences in the means obtained for the students' usage of computers when classified according to gender, type of school attended, or location of school. A significant difference was found for school location with metropolitan

students using computers at home for their schoolwork ($M = 6.0$, $sd = 1.6$) more than country students ($M = 5.2$, $sd = 1.5$; $t(59) = 2.3$, $p < 0.05$).

Use of computers for activities other than schoolwork

For the following three questions the students were asked how much use they make of computers for activities other than schoolwork. Their responses are shown in Table 5. A 7-point Likert scale was used, where 1 indicates no use and 7 indicates lots of use.

Table 5. Usage of computers for activities other than schoolwork

Question	Mean	SD
How much do you use computers for communication? (e.g. email, newsgroups, chatting) (n=61)	5.1	1.6
How much do you use computers for games? (n=60)	3.7	1.9
How much do you use computers for general use (e.g. surfing the Internet, hobbies)? (n=60)	5.4	1.5

Independent groups *t* tests were used to determine any differences in the means obtained for the students' usage of computers when classified according to gender, type of school attended, or location of school. The only significant differences ($p <= 0.05$) were found for school location as follows:

- The metropolitan students used computers more for communication ($M = 5.6$, $sd = 1.4$) than the country students ($M = 4.6$, $sd = 1.7$; $t(59) = 2.5$, $p < 0.05$).
- The metropolitan students used computers more for general use ($M = 6.0$, $sd = 1.3$) than the country students ($M = 4.9$, $sd = 1.6$; $t(58) = 2.9$, $p < 0.05$).

The lowest usage of computers was shown for games. The large standard deviation indicates wide variation in the amount of computer usage for this activity.

Prior experience in programming languages

The students were asked what programming languages they had used or studied. Thirty eight percent of the students had experience with one programming language and 41% of the students had experience with more than one language. Thirteen percent of the students had experience with more than two languages and these were all male. There were a high number of non responses to this question (21%) and it is not clear if these students had no programming experience, did not understand the question or just did not answer the question.

Independent groups *t* tests were used to determine any differences in the means obtained for the number of programming languages the students had experience in when classified according to gender. The males had experience with more programming languages ($M = 2.3$, $sd = 1.4$) than the female students ($M = 1.3$, $sd = 0.6$; $t(49) = 3.2$, $p < 0.05$).

Pre and Post Summer School Survey Results for All Students

The pre and post Summer School surveys contained questions to establish students' interest in aspects of IT, study and career plans. By comparing the results for these surveys, any shifts in interest that occurred during the Summer school can be determined.

Students' interest in various aspects of IT

The students were asked in the pre and post Summer School surveys to rate their interest in different aspects of IT. A 7-point Likert scale was used, where 1 indicates low interest and 7 indicates high interest. The results are shown in Table 6. DK is used to indicate the number of students who responded "don't know what the term means" to the question. There was a small number of non responses to these questions in the pre Summer School survey.

Table 6. Students' interests in aspects of IT (pre and post Summer School)

Aspect of IT	Pre Summer School (n=63)			Post Summer School (n=63)			*t*
	Mean	SD	DK	Mean	SD	DK	
Word processing, spreadsheets etc	3.8	1.4	0	3.9	1.6	0	**0.96**
Programming	5.2	1.7	0	5.5	1.6	0	**1.49**
Software development	5.1	1.8	1	5.4	1.8	0	**0.95**
Computer hardware	4.5	1.9	0	4.8	1.9	0	**1.31**
Computer networks	4.5	1.9	1	4.9	1.6	0	**2.38***
Robotics	4.2	1.9	6	4.7	1.7	2	**3.21*****
The Internet (Web or WWW)	6.1	1.4	1	6.0	1.4	2	**1.00**
Artificial intelligence	5.0	1.8	9	5.2	1.7	1	**0.73**
Multimedia (video, sound etc)	5.6	1.4	0	5.8	1.2	0	**1.97**
Virtual reality	5.3	1.6	1	5.6	1.4	1	**1.69**
Software engineering	4.8	1.8	3	4.9	1.6	0	**0.35**
Computer security	3.7	1.8	1	3.9	1.9	2	**0.71**
E Commerce	3.4	1.7	10	4.0	1.9	2	**4.13*****
System analysis and design	3.9	1.8	6	4.3	1.8	1	**1.49**
WAP mobile phones	3.5	1.8	12	3.6	1.8	8	**0.59**
Data bases	3.4	1.5	4	3.8	1.7	1	**2.55***

*** = p < 0.05**
**** = p < 0.01**
***** = p < 0.005**

Pre and post Summer School interest in aspects of IT

Before and after the Summer School the students showed most interest in:

- The Internet (Web or WWW)
- Multimedia (video, sound etc)
- Virtual reality
- Programming

Before the Summer School the students showed least interest in:

- E Commerce
- Data bases
- WAP mobile phones
- Word processing

After the Summer School the students showed least interest in:

- WAP mobile phones
- Data bases
- Computer security
- Word processing

Paired *t*-tests were used to determine any differences in the means obtained for the interest ratings in the pre and post surveys. There were significant increases in students' interest in: computer networks, robotics, e commerce and data bases, as indicated in Table 6.

There were no differences in interest for any other aspects of IT. It is also interesting to note that for the post Summer School survey there were large decreases in the number of "don't know" responses given for e commerce, artificial intelligence and robotics. This may be because students gathered some knowledge about these aspects of IT during the Summer School.

Shifts in interest in IT based on gender, school type and location

Paired *t*-tests were used to determine any differences in the means obtained for the interest ratings for each aspect of IT in the pre and post surveys when students were classified according to gender, type of school attended, or location of school. These revealed significant increases in interest ($p < 0.05$) for each classification as follows:

- male students showed an increase in interest in robotics, E commerce and data bases
- female students showed an increase in interest in multimedia and E commerce
- government school students showed an increase in interest in system analysis and design, and data bases
- private school students showed an increase in interest in computer hardware, computer networks, robotics and E commerce
- metropolitan students showed an increase in interest in robotics and E commerce
- country students showed an increase in interest in computer networks, robotics, multimedia, virtual reality and E commerce

There were no decreases in interest for any aspect of IT. And the number of "don't know" and non responses decreased for most questions.

Factor analysis of students' interest in IT

The interest ratings of the various aspects of IT, pre and post Summer School, were analysed using a factor analysis. This is a method used to determine a latent variable structure that could account for intercorrelations between items. The factor analysis method performed used a Principal Axis Factoring extraction and a Varimax rotation with Kaiser normalisation.

Pre Summer School

A factor analysis of the pre Summer School interest ratings for each aspect of IT yielded five factors with eigenvalues greater than 1.0. A scree test was used to verify the likelihood of five factors present in these results. A scree test is performed by plotting a graph of eingenvalues against the factor numbers. The point at which the curve of the graph levels out indicates the number of true factors that are present in the data. The scree test graph produced in this case showed a levelling out occurring after the fifth factor, supporting a solution with five factors.

Examination of the variable loadings for five factors indicated clear loadings on single factors for each aspect of IT except for robotics, which loaded over two factors. The lowest salient variable loading was 0.435. The factor structures and variable loadings are shown in Table 7.

Table 7. Variable loadings for the pre Summer School IT interest ratings (rotation converged in 10 iterations)

Factor	Aspect of IT	Loading
Software	Software engineering	.844
	Software development (e.g. writing computer games, business applications)	.751
	Programming	.743
	Computer security	.589
Hardware and systems	Computer networks	.772
	Computer hardware (building or designing)	.759
	System analysis and design	.653
	Robotics	.648
Distributed computing	The Internet (Web or WWW)	.781
	Multimedia (video, sound etc)	.719
	WAP mobile phones	.637
	E Commerce	.435
Futuristic computing	Virtual reality	.734
	Artificial intelligence	.689
	Robotics	.513
Applications	Word processing, spreadsheets etc	.847
	Data bases	.540

Post Summer School

A factor analysis of the post Summer School interest ratings for each aspect of IT yielded four factors with eigenvalues greater than 1.0. A scree shows a levelling out occurring after the fourth factor, indicating it is reasonable to interpret the results for a solution with four factors.

Examination of the variable loadings for the four factor solution indicate interpretable results with clear loadings on single factors for each aspect of IT, except for multimedia which loaded weakly over two factors and was therefore not included. The lowest salient variable loading was 0.443. The factor structures and variable loadings are shown in Table 8.

Table 8. Variable loadings for the post Summer School IT interest ratings (rotation converged in 6 iterations)

Factor	Aspect of IT	
Software	Software development (e.g. writing computer games, business applications)	.899
	Programming	.829
	Software engineering	.677
Hardware	Computer hardware (building or designing)	.782
	Robotics	.767
	Computer networks	.610
	Computer security	.505
Applications	E Commerce	.746
	WAP mobile phones	.657
	System analysis and design	.608
	Data bases	.589
	Word processing, spreadsheets etc	.451
	The Internet (Web or WWW)	.443
Futuristic computing	Virtual reality	.881
	Artificial intelligence	.755

Students' interest in studying IT

The following questions in the pre and post surveys aimed to establish students' interest in studying IT at school and university.

Do you intend to study or have you studied an IT subject for VCE?

In the pre Summer School survey 76.2% of the students (n=61) indicated that they had studied or intended to study an IT subject for VCE. In the post Summer School survey this increased to 81.0% of the students (n=63). This change was tested using McNemar's "repeated measures" change test and shown to be nonsignificant.

In your list of preferences for a university course where would you rank a computing course? (e.g. 1st, 2nd , 3rd …) or "no rank"

Pre Summer School (n=59)		Post Summer School (n=63)	
Mean rank	SD	Mean rank	SD
2.4	2.2	2.1	1.8

At the end of the Summer School students indicated they would give a computing course a higher rank in their university course preferences. This difference was tested using a paired *t*-test and found to be nonsignificant. However there were fewer non responses to this question in the post Summer School survey. Only one student in the group specified "no rank", and this was for both surveys.

What percentage of your university course would you like to be computing studies?

Pre Summer School (n=56)		Post Summer School (n=61)	
Mean percentage	SD	Mean percentage	SD
63.0	28.3	66.8	28.6

At the end of the Summer School students showed more interest in studying IT in their tertiary course. This difference was tested using a paired *t*-test and found to be significant (t (54) = -2.5, $p < 0.05$).

Do you intend to study at Monash University?

Pre Summer School (n=57)			Post Summer School (n=60)		
Yes %	No %	Unsure %	Yes %	No %	Unsure %
39.7	25.4	25.4	69.8	17.5	7.9

At the end of the Summer School more students indicated that they intended to study at Monash and there were fewer undecided and non reponses to this question. The changes for the "Yes" and "Unsure" responses were tested using McNemar's "repeated measures" change test and both were shown to be significant ($p < 0.05$).

Students' interest in a career in IT

The following questions in the pre and post surveys aimed to establish students' interest in IT as a career.

How interested are you in a career in computing?

The students were asked to rate how interested they were in a career in computing. A 7-point Likert scale was used, where 1 indicates no interest and 7 indicates high interest.

Pre Summer School (n=60)		Post Summer School (n=62)	
Interest	**SD**	**Interest**	**SD**
5.4	1.7	5.8	1.6

At the end of the Summer School students showed more interest in IT as a career. This difference was tested using a paired *t*-test and found to be significant (t (58) = -2.5, $p < 0.05$).

What percentage of your work in your future career would you like to involve working with computers?

Pre Summer School (n=60)		Post Summer School (n=60)	
Mean percentage	**SD**	**Mean percentage**	**SD**
66.7	28.6	71.4	26.8

At the end of the Summer School students indicated they would like a higher percentage of their work in their future careers to involve working with computers. This difference was tested using a paired *t*-test and found to be nonsignificant.

Impact of computer usage on course and career choices

The relationships between computer usage and the students' desired percentage of computing in course and career, and interest in a career in computing variables were determined using correlations. The following significant results were obtained.

	Usage of computers		
	Communication	**Games**	**General activities**
Percentage of computing in course	.404	.283	.539
Interest in a computing job	.378	.273	.490
Percentage of computing in job	.472	.205	.566

The relationship of computer usage on the students' intended course and career choices was investigated using regression. Regression is a technique that estimates the linear relationship between a dependent variable and one or more independent variables. Of the three computer usage variables regressed against the course and course choices variables, only the usage of computers for general activities produced a significant impact as follows.

- The computer usage variables regressed against the percentage of computing in course variable produced an R^2 of 0.30 significant at $F = 7.51$ (3,53), $p < 0.05$. The use of computers for general activities produced a significant result ($b = 0.45$, $t = 2.71$, $p < 0.05$).

- The computer usage variables regressed against the interest in computing as a career variable produced an R^2 of 0.25 significant at $F = 5.87$ (3,54), $p < 0.05$. The use of computers for general activities produced a significant result ($b = 0.40$, $t = 2.40$, $p < 0.05$).
- The computer usage variables regressed against the percentage of computing in a job variable produced an R^2 of 0.32 significant at $F = 8.06$ (3,52), $p < 0.05$. The use of computers for general activities produced a significant result ($b = 0.46$, $t = 2.80$, $p < 0.05$).

Impact of IT interest on course and career choices

The relationships between the pre Summer School interests in aspects of IT and the students' desired percentage of computing in course and career, and interest in a career in computing variables were determined using correlations. The following significant results were obtained.

	Aspect of IT					
	Program-ming	**Software development**	**Hardware**	**Networks**	**Software engineering**	**Computer security**
Percentage of computing in course	.365	.331	.320	.396	.421	.305
Interest in a computing job	.546	.516	.347	.372	.388	.287
Percentage of computing in job	.475	.428	.350	.477	.405	.419

The impact of interest in aspects of IT on the students' intended course and career choices was investigated using regression. Five of the six interest variables that produced significant correlations with the course and career choices were chosen. One variable, software development, was not used because it was very highly correlated with programming ($r = .855$). Only programming and networks produced a significant impact as follows.

- Interests in IT variables regressed against percentage of computing in course produced an R^2 of 0.26 and a significant ANOVA for residuals ($F = 5.02$ (4,56), $p < 0.05$). An interest in networks produced a significant result ($b = 0.30$, $t = 2.08$, $p < 0.05$).
- Interests in IT variables regressed against interest in a computing career produced an R^2 of 0.34 and a significant ANOVA for residuals ($F = 7.39$ (4,57), $p < 0.05$ An interest in programming produced a significant result ($b = 0.45$, $t = 3.35$, $p < 0.05$).
- Interests in IT variables regressed against percentage of computing in job produced an R^2 of 0.38 and a significant ANOVA for residuals ($F = 6.56$ (5,53), $p < 0.05$. Significant results were produced by an interest in programming ($b = 0.28$, $t = 2.10$, $p < 0.05$) and an interest in networks ($b = 0.38$, $t = 2.80$, $p < 0.05$).

Pre and Post Summer School Survey Results Based on Gender

The pre and post Summer School survey results were analysed to determine any shifts in the interest based on gender.

Students' interest in various aspects of IT

The students were asked in the pre and post Summer School surveys to rate their interest in different aspects of IT. A 7-point Likert scale was used, where 1 indicates low interest and 7 indicates high interest. The pre Summer School surveys results for the male and female students are shown in the table below. DK is used to indicate the number of students who responded "don't know what the term means" to the question. There was a small number of non responses for the pre Summer School survey.

Aspect of IT	Female (n=30)			Male (n=33)			
	Mean	SD	DK	Mean	SD	DK	*t*
Word processing, spreadsheets etc	4.1	1.2	0	3.6	1.5	0	**1.34**
Programming	4.9	1.8	0	5.5	1.6	0	**1.39**
Software development	4.8	1.8	0	5.4	1.8	1	**1.21**
Computer hardware	3.7	1.7	0	5.3	1.7	0	**3.77*** **
Computer networks	4.0	1.7	1	5.0	1.9	0	**2.27***
Robotics	3.8	1.8	4	4.5	2.0	2	**1.45**
The Internet (Web or WWW)	6.0	1.6	1	6.2	1.2	0	**0.52**
Artificial intelligence	5.3	1.8	5	4.8	1.9	4	**1.08**
Multimedia (video, sound etc)	5.6	1.4	0	5.6	1.4	0	**0.02**
Virtual reality	5.3	1.7	0	5.2	1.5	1	**0.37**
Software engineering	4.3	1.8	1	5.3	1.7	2	**2.1***
Computer security	2.9	1.4	1	4.4	1.8	0	**3.30*** **
E Commerce	3.3	1.8	5	3.5	1.7	5	**0.47**
System analysis and design	3.6	1.6	2	4.3	1.9	4	**1.29**
WAP mobile phones	4.0	1.9	7	3.1	1.6	5	**1.87**
Data bases	3.4	1.3	2	3.3	1.6	2	**0.36**

*** = p < 0.05**
**** = p < 0.01**
***** = p < 0.005**

Pre Summer School interest in aspects of IT

At the start of the Summer School both the female and male students showed the most interest in the Internet and Multimedia and the small standard deviations indicate there was agreement in their opinions on this.

The female students showed most interest in:

- The Internet (Web or WWW)
- Multimedia (video, sound etc)
- Virtual reality
- Artificial intelligence

and, the least interest in:

- Computer security
- Electronic commerce
- Data bases

The male students showed most interest in:

- The Internet (Web or WWW)
- Multimedia (video, sound etc
- Programming
- Software development

and, the least interest in:

- WAP mobile phones
- Data bases

Differences in initial interest in IT

Independent groups *t*-tests were used to determine any differences in the means obtained for the interest ratings for the male and female students in the pre Summer School surveys. The male students showed significantly more interest in computer hardware, computer networks, robotics, virtual reality and software engineering, than the female students. The results are shown in the previous table.

Shifts in interest in IT

Paired *t*-tests were used to determine any differences in the means obtained for the interest ratings in the pre and post Summer School surveys for the male and female students.

There were significant increases in interest ($p <= 0.05$) as follows:

- The male students showed an increase in interest in robotics (t (29) = -2.5, $p < 0.05$), e commerce (t (26) = -3.3, $p < 0.005$) and data bases (t (54) = -2.5, $p < 0.05$).
- The female students showed an increase in interest in multimedia (t (28) = -2.3, $p < 0.05$) and e commerce (t (22) = -2.4, $p < 0.05$).

There were no decreases in interest for any aspect of IT in the post Summer School survey, and the number of non responses decreased.

Students' interest in studying IT

Do you intend to study or have you studied an IT subject for VCE?

Student group	Pre Summer School		Post Summer School	
	Yes responses %	NR %	Yes responses %	NR %
Female	80.0	3.3	83.3	0
Male	72.7	3.0	78.8	0

In the pre Summer School survey more female students had studied or intended to study IT at school for VCE than the male students. This difference was tested using a two-way Chi square test and found to be nonsignificant. An interesting result considering that the female students showed significantly less or the same interest than the male students, in five of the 16 aspects of IT, as shown in the previous section.

At the end of the Summer School both male and female students expressed more interest in studying IT for a VCE subject. This change was tested using McNemar's "repeated measures" change test and shown to be nonsignificant.

In your list of preferences for a university course where would you rank a computing course? (e.g. 1st, 2nd, 3rd …)

Student group	Pre Summer School			Post Summer School		
	Mean rank	SD	NR %	Mean rank	SD	NR %
Female	2.6	1.9	10.0	2.3	1.8	0
Male	2.2	2.4	9.1	1.8	1.9	0

At the start of the Summer School male students showed more interest in studying IT in their tertiary course than the female students. This difference was tested using an independent groups *t*-test and found to be nonsignificant.

At the end of the Summer School students indicated they would give a computing course a higher rank in their university course preferences. This difference was tested using a paired *t*-test and found to be nonsignificant.

What percentage of your university course would you like to be computing studies?

Student group	Pre Summer School			Post Summer School		
	Mean percentage	SD	NR %	Mean percentage	SD	NR %
Female	57.6	30.2	3.3	60.2	30.8	3.3
Male	67.7	26.3	18.2	72.8	25.6	3.0

At the start of the Summer School the males indicated that they would like more IT in their university course than the female students. This difference was tested using an independent groups *t*-test and found to be nonsignificant.

At the end of the Summer School the male students showed more interest in studying IT. This difference was tested using a paired *t*-test and found to be significant (t (28) = -2.5, $p < 0.05$).

The number of non responses for the male students also decreased.

Do you intend to study at Monash University?

Student group	Pre Summer School				Post Summer School			
	Yes %	No %	Unsure %	NR %	Yes %	No %	Unsure %	NR %
Female	36.7	30.0	26.7	6.7	76.7	13.3	6.7	3.3
Male	42.7	21.2	24.2	12.1	63.6	21.2	9.1	6.1

At the start of the Summer School the male students indicated more intention to study at Monash. This difference was tested using a three-way Chi square test and found to be nonsignificant.

At the end of the Summer School more of both the male and female students indicated that they intended to study at Monash and there were fewer undecided and non reponses to this question. The changes for the "Yes" and "Unsure" responses were tested using McNemar's "repeated measures" change test and shown to be significant ($p < 0.05$).

Students' interest in a career in IT

How interested are you in a career in computing?

A 7-point Likert scale was used, where 1 indicates no interest and 7 indicates high interest.

Student group	Pre Summer School			Post Summer School		
	Interest	SD	NR %	Interest	SD	NR %
Female	5.1	1.9	3.3	5.5	1.7	3.3
Male	5.8	1.6	6.1	6.0	1.4	0

At the start of the Summer School the male students indicated more interest in a career in IT than the female students. This difference was tested using an independent groups *t*-test and found to be nonsignificant..

At the end of the Summer School both male and female students showed more interest in IT. This difference was tested using a paired t-test and found to be nonsignificant.

What percentage of your work in your future career would you like to involve working with computers?

Student group	Pre Summer School			Post Summer School		
	Mean percentage	SD	NR %	Mean percentage	SD	NR %
Female	60.6	30.8	13.3	66.4	28.1	10.0
Male	72.6	25.6	6.1	75.5	25.4	0

At the start of the Summer School the male students indicated that would like more of their career to involve working in IT than the female students. This difference was tested using an independent groups *t*-test and found to be nonsignificant.

At the end of the Summer School both male and female students indicated they would like a higher percentage of their work in their future careers to involve working with computers. These differences were tested using a paired *t*-test and found to be nonsignificant.

Pre and Post Summer School Survey Results Based on Computer Usage

The pre and post Summer School survey results were analysed to determine any shifts in the interest based on whether the students were low or high computer users. This was determined from the average number of hours they spent using computers each week. The median of the number of hours was determined from the frequency distribution. Based on this the low computer users were classified as those who used computers for 10 or less hours per week and the high computer users were those who used computers for more than 10 hours per week.

Students' interest in various aspects of IT

The students were asked in the pre and post Summer School surveys to rate their interest in different aspects of IT. A 7-point Likert scale was used, where 1 indicates low interest and 7 indicates high interest. The pre Summer School surveys results for the low and high computer users are shown in the table below DK is used to indicate the number of students who responded "don't know what the term means" to the question. There was a small number or non responses for the pre Summer School survey.

Aspect of IT	Low users (n=30)			High users (n=30)			*t*
	Mean	SD	DK	Mean	SD	DK	
Word processing, spreadsheets etc	3.8	1.5	0	3.9	1.3	0	**0.01**
Programming	4.3	1.8	0	6.0	1.2	0	**5.48*** **
Software development	4.3	1.9	1	6.0	1.3	0	**5.07*** **
Computer hardware	3.7	1.9	0	5.3	1.6	0	**3.65*** **
Computer networks	3.7	2.0	1	5.4	1.4	0	**3.67*** **
Robotics	3.7	2.0	1	4.8	1.6	5	**2.51***
The Internet (Web or WWW)	6.0	1.2	0	6.2	1.6	1	**1.09**
Artificial intelligence	4.7	1.9	4	5.4	1.8	5	**1.29**
Multimedia (video, sound etc)	5.3	1.4	0	5.9	1.3	0	**0.42**
Virtual reality	4.9	1.7	1	5.6	1.5	0	**1.42**
Software engineering	4.0	1.8	2	5.7	1.4	1	**4.34*** **
Computer security	3.4	1.9	1	3.9	1.6	0	**1.24**
E Commerce	3.2	1.7	6	3.5	1.8	4	**0.62**
System analysis and design	3.2	1.9	4	4.7	1.4	2	**4.18*** **
WAP mobile phones	3.2	1.8	8	3.8	1.8	4	**1.06**
Data bases	2.8	1.4	3	4.0	1.4	1	**2.19***

*** = $p < 0.05$**
**** = $p < 0.01$**
***** = $p < 0.005$**

Pre Summer School interest in aspects of IT

The high computer users showed significantly more interest in:

- Programming
- Software development
- Computer hardware
- Computer networks
- Robotics
- Software engineering
- System analysis and design
- Data bases

Shifts in interest in IT

Paired *t*-tests were used to determine any differences in the means obtained for the interest ratings in the pre and post surveys for the low and high computer users. There were significant increases in interest ($p <= 0.05$) for each classification as follows:

- The low computer users showed an increase in interest in computer hardware (t (29) = -2.4, $p < 0.05$)., computer networks (t (28) = -3.0, $p < 0.01$)., robotics (t (28) = -2.7, $p < 0.05$)., virtual reality (t (28) = -3.4, $p < 0.01$), E commerce (t (23) = -3.7, $p < 0.005$), system analysis and design (t (25) = -3.0, $p < 0.01$, and data bases (t (26) = -2.4, $p < 0.05$).
- The high computer users showed an increase in interest for e commerce (t (24) = -2.1, $p < 0.05$).

There were no decreases in interest for any aspect of IT. And the number of non responses decreased.

Students' interest in studying IT

Do you intend to study or have you studied an IT subject for VCE?

Student group	Pre Summer School		Post Summer School	
	Yes responses %	NR %	Yes responses %	NR %
Low users	73.3	3.3	76.7	0
High users	83.3	3.3	83.3	0

In the pre Summer School survey more high computer users had studied or intended to study IT at school for VCE than low computer users. This difference was tested using a two-way Chi square test and found to be nonsignificant.

At the end of the Summer School the low computer users expressed more interest in studying IT for a VCE subject. This change was tested using McNemar's "repeated measures" change test and shown to be nonsignificant.

In your list of preferences for a university course where would you rank a computing course? (e.g. 1st, 2nd, 3rd …)

Student group	Pre Summer School			Post Summer School		
	Mean rank	SD	NR %	Mean rank	SD	NR %
Low users	3.4	2.6	9.1	2.9	2.3	0
High users	1.4	0.7	10.0	1.3	0.5	0

At the start of the Summer School the high computer users indicated that they would rank a computing course higher than the low computer users. This difference was tested using an independent groups *t*-test and found to be significant ($t(54) = -4.8$, $p < 0.005$).

At the end of the Summer School both the low and high computer users indicated they would give a computing course a higher rank in their university course preferences. These differences were tested using paired *t*-tests and found to be nonsignificant.

What percentage of your university course would you like be computing studies?

Student group	Pre Summer School			Post Summer School		
	Mean percentage	SD	NR %	Mean percentage	SD	NR %
Low users	55.6	31.5	3.3	59.0	30.8	3.3
High users	69.8	22.1	10.7	73.3	25.2	3.3

At the start of the Summer School the high computer users indicated that they would like more IT in their university course than the low computer users. This difference was tested using an independent groups *t*-test and found to be significant ($t(53) = 2.5$, $p < 0.05$).

At the end of the Summer School both the low and high computer users showed more interest in studying IT. These differences were tested using paired *t*-tests and the increase for the high computer users was found to be significant ($t(29) = -2.2$, $p < 0.05$).

Do you intend to study at Monash University?

Student group	Pre Summer School				Post Summer School			
	Yes %	No %	Unsure %	NR %	Yes %	No %	Unsure %	NR %
Low users	36.7	20.0	33.3	10.0	73.3	20.0	3.3	3.3
High users	46.7	33.3	16.7	3.3	70.0	13.3	10.0	6.7

At the start of the Summer School the high computer users indicated more intention to study at Monash. This difference was tested using a three-way Chi square test and found to be nonsignificant.

At the end of the Summer School more of both the low and high computer users indicated that they intended to study at Monash and there were fewer undecided and non reponses to this question. The changes for the "Yes" and "Unsure" responses were tested using McNemar's "repeated measures" change test and shown to be significant ($p < 0.05$).

Students' interest in a career in IT

How interested are you in a career in computing?

A 7-point Likert scale was used, where 1 indicates no interest and 7 indicates high interest.

Student group	Pre Summer School			Post Summer School		
	Interest	SD	NR %	Interest	SD	NR %
Low users	4.7	1.9	6.7	5.1	1.8	3.3
High users	6.1	1.3	3.3	6.3	1.2	0

At the start of the Summer School the high computer users indicated more interest in a career in IT than the low computer users. This difference was tested using an independent groups *t*-test and found to be significant (t (57) = 4.4, $p < 0.005$).

At the end of the Summer School both the low and the high computer users showed more interest in IT as a career. These differences were tested using paired *t*-tests and the increase for the high users was found to be significant (t (29) = -2.2, $p < 0.05$).

What percentage of your work in your future career would you like to involve working with computers?

Student group	Pre Summer School			Post Summer School		
	Mean percentage	SD	NR %	Mean percentage	SD	NR %
Low users	58.3	31.5	6.7	61.6	30.3	6.7
High users	73.9	23.4	3.3	79.8	20.6	3.3

At the start of the Summer School the high computer users indicated that would like more of their career to involve working in IT than the low computer users. This difference was tested using an independent groups *t*-test and found to be significant (t (57) = 2.7, $p < 0.05$).

At the end of the Summer School both the low and high computer users indicated they would like a higher percentage of their work in their future careers to involve working with computers. These differences were tested using a paired *t*-test and found to be nonsignificant.