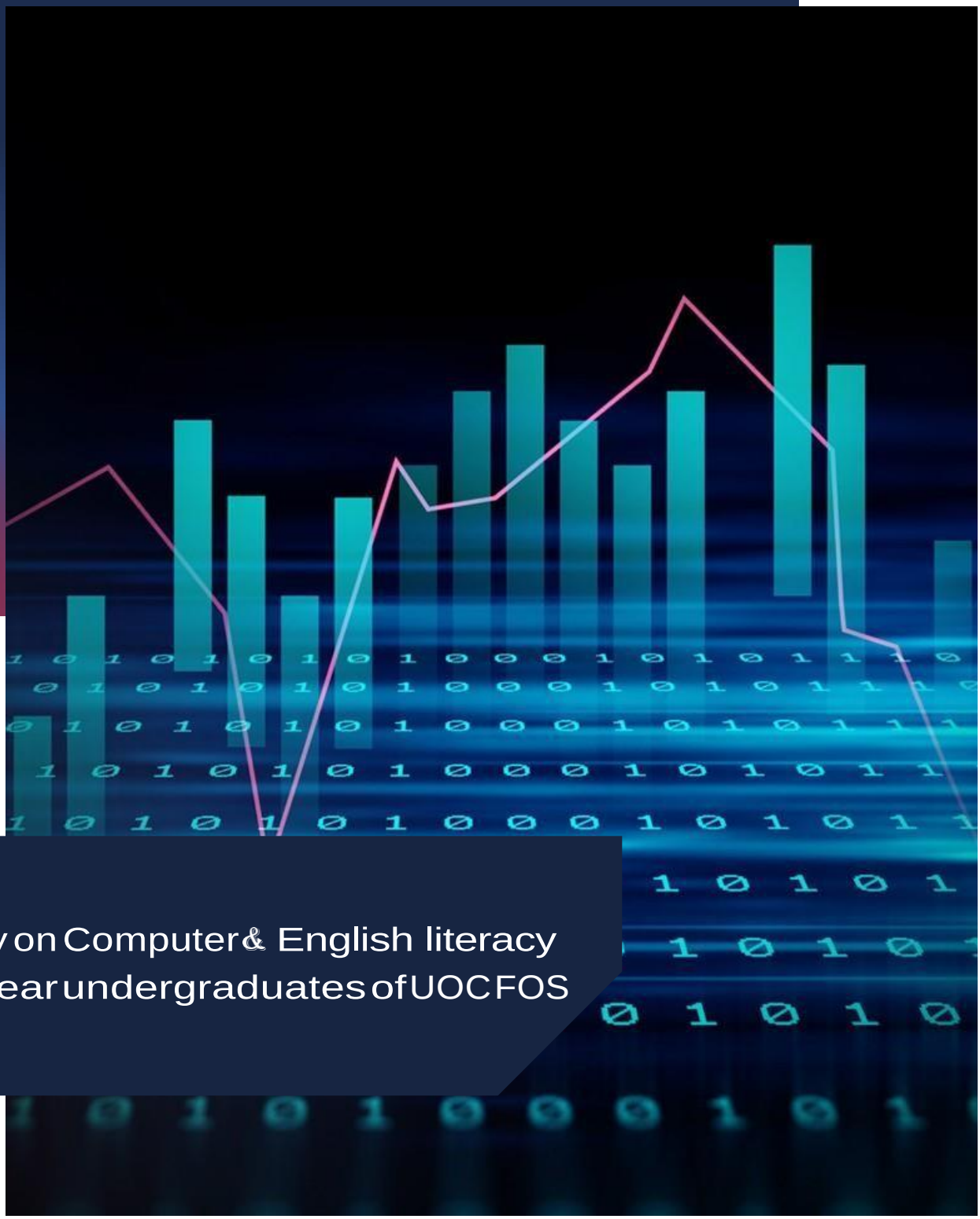

A Study on Computer & English literacy of 1st year undergraduates of UOC FOS

IS 3005 – Statistics in Practice I

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Group 1 – B

01 Abstract

The intention of this study was to get an idea about basic computer, computer programming and English literacies of 1st year undergraduates in university of Colombo, Faculty of science. When it comes to university education computer and English skills play a major role. It was noticed that most of the undergraduates have faced difficulties in academics due to lack of computer and English skills. Therefore, the main objective of this study was to find out factors that were considered had an impact on their literacy levels in these areas and to see whether majority of the undergraduates have these difficulties in above mentioned areas.

An online questionnaire was distributed via WhatsApp groups to collect data from the undergraduates and 252 were responded. Data visualization methods, reporting methods and hypothesis testing were used in the analysis. Firstly, a descriptive analysis was conducted to identify the distribution of variables, to get insights of the data set and to identify the association among variables. Thereafter, an inferential analysis was conducted by performing Chi-square tests while considering two variables at a time to test the validity of the results obtained in the descriptive analysis. The results obtained from the study are as follows. Parental education level and province had an impact on basic English literacy. How long a computer has been used influenced basic computer literacy. On the other hand, a computer course that has been followed or not had no effect on basic computer literacy. Most of the undergraduates are much more familiar with MS Word compared to MS Excel and PowerPoint. Gender has no influence on basic computer programming skills but university study stream and how the programming skills have been obtained (Self-study/ By following a course or both) has an impact on their computer programming skills.

Eventually, according to the study respondents had suggested that it would be better if undergraduates were given English, computer, computer programming knowledge and skills through a course or a workshop before the academics starts.

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List of Figures and tables

02 Introduction

Computer and English literacy are two most important areas in the modern world. Computer and English skills play a major role in university studies and most importantly, verbal, and written ability in English is mandatory in many industries.

In Sri Lankan school education, there is no priority for computer-related areas, and it focuses on English just as a subject. The majority of the students learn in Sinhala medium for 13 years but when it comes to university education everything is conducted in English medium.
Basic computer literacy is also essential for academic activities in university nowadays like report writing, presentations etc. But the problem is in our school education system those skills are not properly taught.
Computer programming has become a basic requirement for acquiring many jobs these days. Even though it has become a key feature in many industries, school education system in Sri Lanka has not paid attention to those modern practices and applications.

Our study was conducted among 1st-year undergraduates of faculty of science of university of Colombo for the academic year 2021/2022.

There are 3 main areas that have been considered in this study.

1. Basic English Literacy
2. Basic Computer Literacy
3. Basic Programming Knowledge

Objectives

1. To check whether if the parents'/guardians' education has an influence on English literacy.
2. To investigate if the students from western province have a higher English literacy compared to other provinces.
3. To check whether there is an association between basic computer literacy and how long the computer has been used.
4. To find out which Microsoft office package has a higher understanding level among undergraduates.
5. To figure out how basic computer literacy is associated with whether they have followed a computer course or not.
6. To determine how basic Programming knowledge is associated with Gender, University Study Streams, and how they have obtained their programming skills.

03 Data

Data was collected from 1st year undergraduates through an online questionnaire. 252 responses were obtained with no missing values and no duplicates. There were 29 variables, and 14 variables were used for the analysis.

SPSS software has been used for the analysis.

KeyNew	Gender	Province	Zscore	UniStream	EduLvl	Computer	ComputerUsage	OLICT	ICTGrade	Computer Course	SelfStudy	MS Word	MSExcel	MSPowerpoint	ComRate
2	Male	Western Province	1.4200	Bio	A/Levels	Yes	more than 3 years	No		No	Yes	Very g...	Good	Good	Good
17	Female	Western Province	1.5105	Bio	A/Levels	Yes	Less than one year	No		No	Yes	Good	Good	Good	Average
18	Male	Western Province	1.3171	Bio	Degree	Yes	more than 3 years	No		Yes	Yes	Very g...	Very good	Very good	Very good
19	Female	Western Province	1.6200	Bio	Higher	Yes	more than 3 years	Yes	A	Yes	Yes	Very g...	Very good	Good	Good
25	Male	Western Province	1.6931	Bio	Diploma	Yes	more than 3 years	No		Yes	Yes	Very g...	Very good	Very good	Average

ProCourse	ProSelfStudy	ProLanguage	ProRate	OLgrade	ALgrade	EngLit	EngLitGrade	EngCourse	ECCourse	ULectures	Unotes	Uexams	EngRate
No	Yes	Python	Good	C	C	No		Yes	Average	Satisfactory	Fair	Fair	Good
No	No	None	Very weak	A	A	Yes	A	No	Weak	Very good	Satisfactory	Satisfactory	Good
Yes	Yes	Python	Average	A	B	No		Yes	Average	Fair	Poor	Satisfactory	Good
No	Yes	Python;C#	Average	A	A	No		No	Good	Very good	Very good	Very good	Good
No	No	None	Very weak	A	A	No		Yes	Good	Satisfactory	Satisfactory	Very good	Average

Variable name	Variable description
Gender	The gender of the student (Male, Female)
Province	The province student from (Western, Southern, North…)
UniStreamv	The stream student follows in the university (Physical, ISMF, Bio, MB)
EduLvl	- The highest education level of a parent or guardian (O/Levels or Below, A/Levels, Diploma, Degree or Higher)
ComputerUsage	How long the student has been using a computer (Less than year, 1-3 years, more than 3 years)
ComRate	Computer literacy rate (Very good, Good, Average, Weak, very weak)
MSWord	MS Word skill level (Very good, Good, Average, Weak, very weak)
MSPowerPoint	MS PowerPoint skill level (Very good, Good, Average, Weak, very weak)
MSExcel	MS excel skill level (Very good, Good, Average, Weak, very weak)
ProCourse	Whether the student has followed any programming course or not (Yes, No)
SelfStudy	Whether the student has done any self-study for Programming (Yes, No)
ProgrammingRate	Programming literacy rate (Very good, Good, Average, Weak, very weak)
O/LGrade	The grade student has obtained for O/L English (A, B, C, S, W)
EngRate	English literacy rate (Very good, Good, Average, Weak, very weak)

Table 1: Variable Description

04 Methodology

This is a large data set that contains data from 252 undergraduates. Therefore, data visualization technique was used. Data visualization is a technique that is used to communicate insight from data through visual representation. For this analysis pie charts, bar charts, and stack bar charts were used. Exploratory data analysis was conducted first, and then Inferential analysis was conducted.

Recoding Variables

The recording was used to re-order the existing variables. Recording can be done in two ways in SPSS. Those are recoded into different variables and recorded into the same variable. Recoding into different variables creates new variables without modifying the original variable and also this is used to merge categorical variables and create new variables.

Chi-Square Test of Independence

The Chi-Square test of independence has been used to test whether there is a significant association between two categorical variables. This is a nonparametric test that utilizes a contingency table to analyze the data. The assumptions of the Chi-Square test include the two variables should be categorical, there can be two or more categories for each variable, independence of observations, expected frequencies for each cell should be at least one and expected frequencies should be at least 5 for the majority (80%) of the cells.

Hypothesis

H0: There is no association between the two variables

H1: There is an association between the two variables

Decision rule: Reject H0 if p-value $\leq \alpha$

05 Data Analysis

Univariate Analysis

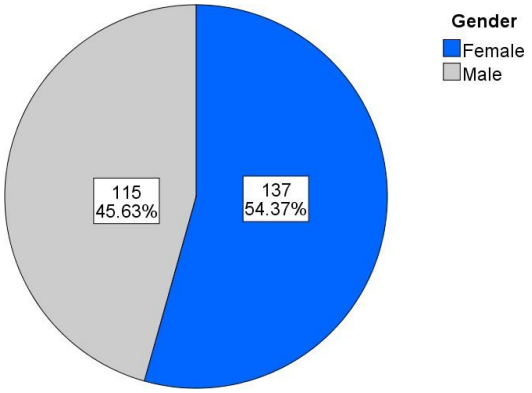

Figure 1: Pie Chart of Gender

Distribution of Gender

Figure 1 illustrates the distribution of gender among the 1st year undergraduates.

It is clearly visible that female undergraduates are leading the pie chart over male counterparts. Out of 252 undergraduates, there are 137 females and 115 males. So, this plot mainly emphasizes that 54.37% of undergraduates are females and 45.63% are males.

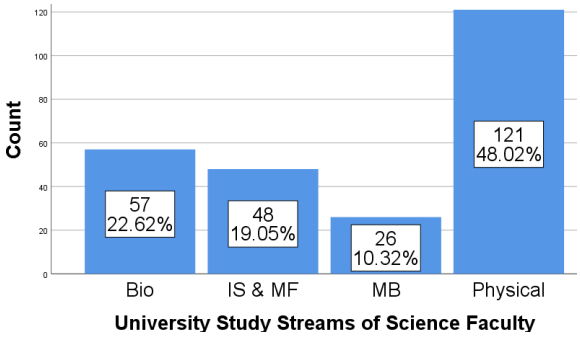

Figure 2: Bar Chart for Stream

Distribution of University Study Streams

Figure 2 provides information about the counts and percentages of streams among 1st-year undergraduates.

It is shown that 48.02% of the respondents are from physical science stream. It is important to notice at this point that nearly half of the respondents are from the physical science stream. The other 51.98% of respondents are from bio, MB, and ISMF streams.

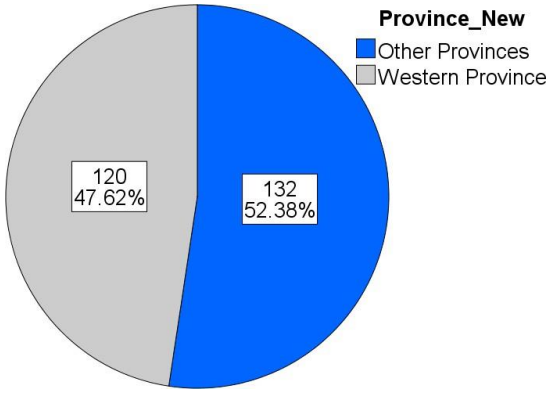

Figure 3: Pie Chart for Distribution of Province

Distribution of Province

Figure 3 illustrates the distribution of provinces undergraduates are from. It is clearly visible that 47.62% of undergraduates are from the western province and the other 52.38% are from other provinces. Here nearly half of the respondents are from the western province.

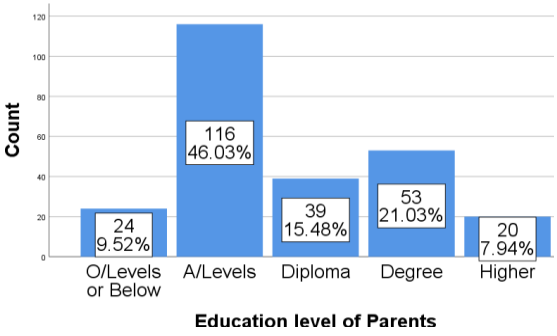

Figure 4: Bar Chart for Parental Education Level

Distribution of Parental Education Level

Figure 4 provides the information about the counts and percentages of parental education levels of 1st year undergraduates.

The categories represent the education levels as O/levels or below, A/levels, diploma, and degree or higher. It is shown that the majority of parents have done A/levels. The number of parents having college degrees is higher than the number of parents with diplomas. The least number of parents have either O/level or below education or higher education.

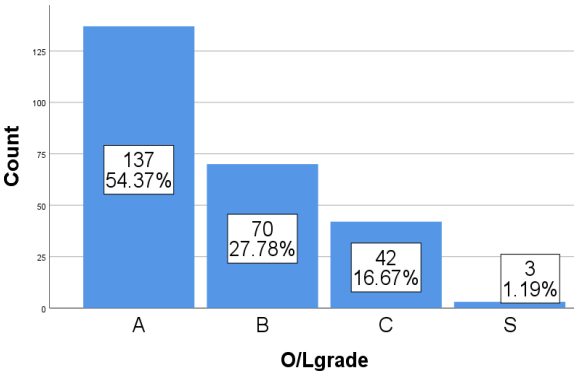

Figure 5: Bar Chart for O/L English Grade

Distribution of O/L English Grade

Figure 5 provides information about the counts and percentages of O/level English grades among the 1st year undergraduates.

The categories represent the grades A, B, C and S respectively. According to the shown figure, 54.4% of undergraduates have obtained A grades and the rest have obtained B, C, and S respectively. It is important to notice at this point that nearly more than half of the respondents have obtained A grades. The least number of respondents have obtained S grades. The number of respondents who have obtained B grades is higher compared to the number of students with C grades.

Analysis for Objectives

- To check whether if the parents'/guardians' education has an influence on English literacy

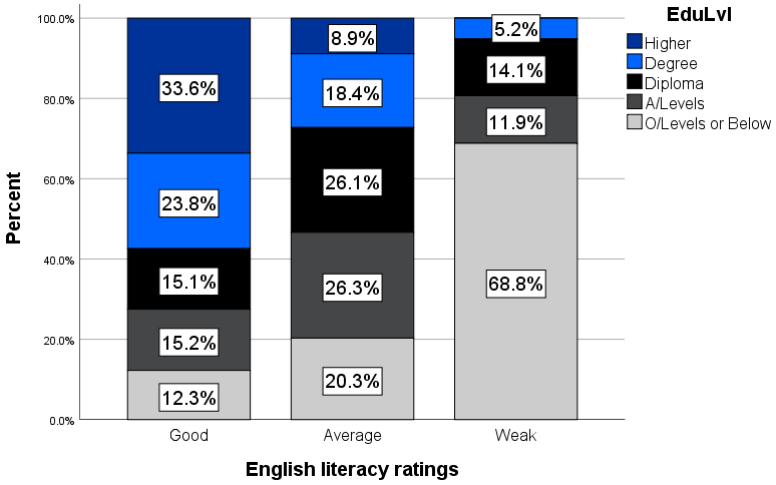

Figure 6: Stacked Bar Chart for English Literacy Rate Vs Parental Education Level

The figure 6 resumes the English literacy rate of 1st year undergraduates according to their parental education levels.

The least number of students who are in the 'Good' subcategory belong to O/L or below parental education level. The majority of the students who are in the 'Weak' subcategory also belong to O/L or below parental education level. Slightly similar number of students were in the average subcategory belong to diploma or below parental education level. The least number of students in average subcategory belong to higher parental education level.

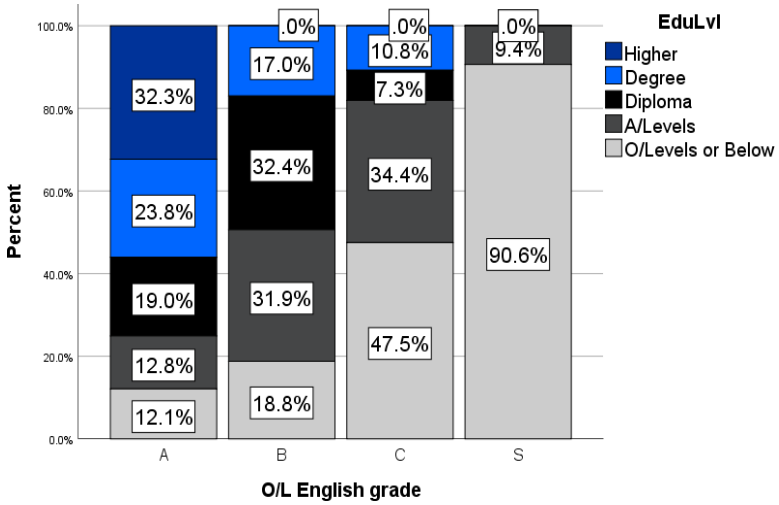

Figure 7: Stacked Bar Chart for O/L English Grade Vs Parental Education Level

The figure 7 resumes the O/level English grades of 1st year undergraduates according to their parental education levels.

The majority of the students who have obtained A and B grades belong to degree or higher parental education level. On the other hand majority of the students who have obtained C and S grades belong to O/L or below parental education level.

Chi-Square Tests

	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	33.348[a]	6	.000
Likelihood Ratio	27.051	6	.000
N of Valid Cases	252		

a. 2 cells (16.7%) have expected count less than 5. The minimum expected count is 1.11.

Table 2: Chi-square test for English Literacy Rate and Parental Education Level

From table 2 since p value (0.0) is less than 0.05, H_0 should be rejected under 5% significance level. Therefore at 5% level of significance, there is enough evidence to conclude that there is an association between English literacy rate and Parental education level.

	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	49.290[a]	8	.000
Likelihood Ratio	56.926	8	.000
N of Valid Cases	252		

a. 2 cells (13.3%) have expected count less than 5. The minimum expected count is 3.57.

Table 3: Chi-square test for O/L English Grade and Parental Education Level

From table 3 since p value (0.0) is less than 0.05, H_0 should be rejected under 5% significance level. Therefore at 5% level of significance, there is enough evidence to conclude that there is an association between O/level English grade and Parental education level.

- To investigate if the students from western province have a higher English literacy compared to other provinces.

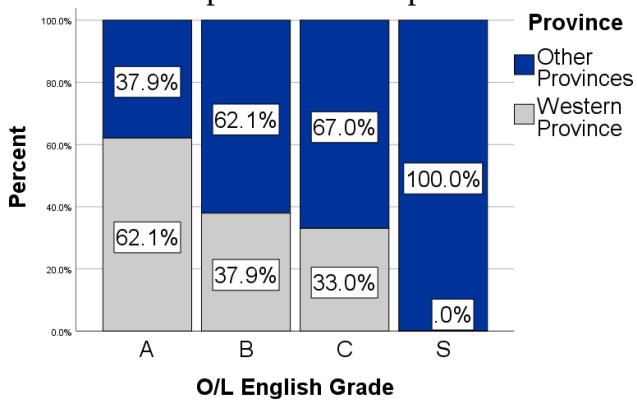

Figure 8: Stacked Bar Chart for O/L English Grade Vs Province

Figure 8 shows how the O/L English language results distribute in the western province and other provinces. The majority of grade A undergraduates are from the western province while the majority of grade B and grade C undergraduates are from other provinces. There are no grade s undergraduates from the western province thus all are from other provinces.

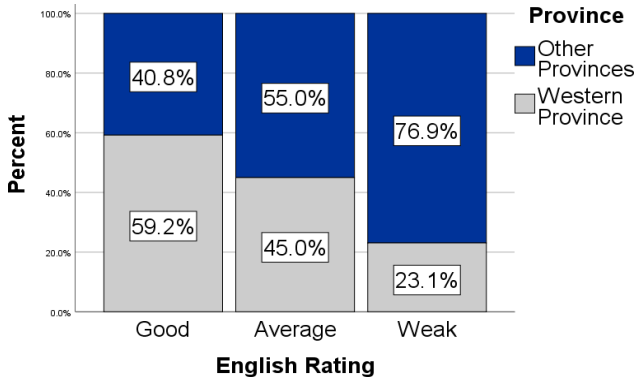

Figure 9: Stacked Bar Chart for English Literacy Rate Vs Province

Figure 9 shows that there is a higher English literacy rate for the western province undergraduates than the other province undergraduates. The average English literacy rate for other provinces is higher than that of the western province. There is a significant increase in weak English literacy rates among other province undergraduates than western province undergraduates.

Chi-Square Tests

	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	18.528[a]	2	.000
Likelihood Ratio	18.859	2	.000
N of Valid Cases	252		

a. 0 cells (.0%) have expected count less than 5. The minimum expected count is 21.43.

Table 4: Chi-square test for O/L English Grade and Province

Chi-Square Tests

	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	8.883[a]	2	.012
Likelihood Ratio	9.168	2	.010
N of Valid Cases	252		

a. 0 cells (.0%) have expected count less than 5. The minimum expected count is 6.67.

Table 5: Chi-square test for English literacy rating and Province

From table 4, the p-value for this test is 0.00 which is less than 0.05, so we reject the H_0. That means there is an association between two variables the grade received for the O/l English language and the province that they lived.

From table 5, 0.012 is the p-value which is get from the chi-square test which is less than 0.05. that means there is an association between two variables English rate and the province they lived.

- To check whether there is an association between basic computer literacy and how long the computer has been used.

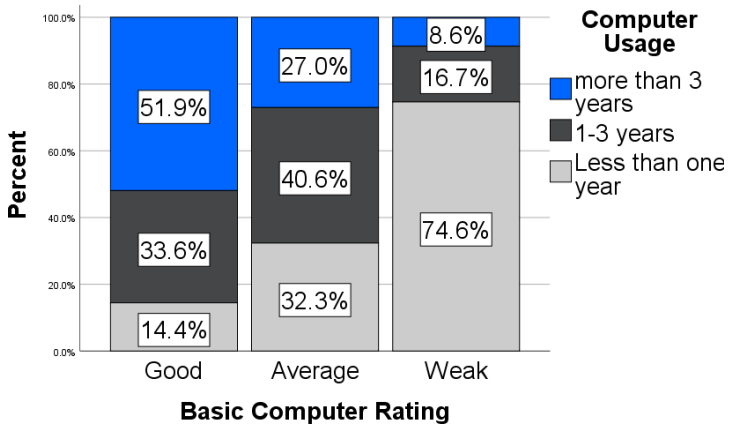

Figure 10: Stacked Bar Chart for Basic Computer Rate Vs Computer Usage

Figure 10 shows the stack bar char of two variables. Most of the undergraduates whose basic computer literacy rate is good used computers for more than 3 years. There is a very low number of undergraduates who have a weak knowledge of basic computer literacy though they used computers for more than 3 years. Most of the weak undergraduates are the ones who used computers for less than a year. The average computer literacy rate is higher among undergraduates who used computers for 1-3 years. There is somewhat of a relationship between the computer literacy rate and the usage period of computers among undergraduates.

Chi-Square Tests

	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	57.844[a]	4	.000
Likelihood Ratio	51.014	4	.000
N of Valid Cases	252		

a. 0 cells (.0%) have expected count less than 5. The minimum expected count is 6.15.

Table 6: Chi-square test for Basic Computer Rate and Computer Usage

From table 6, the p-value for this test is 0.00 which is less than 0.05, so we reject the H_0. That means there is an association between the variable's computer usage time and the basic computer literacy rate.

- Analysis to find out which Microsoft office package has a higher understanding level among undergraduates

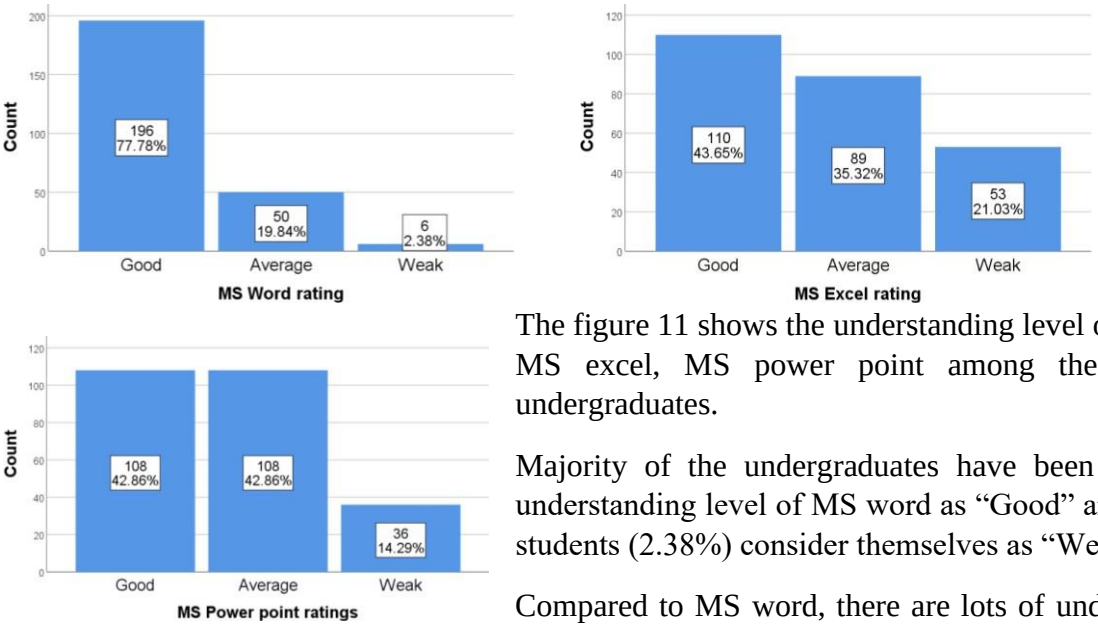

Figure 11: Bar Chart for MS Word, MS Excel, MS Power point Rate

The figure 11 shows the understanding level of MS word, MS excel, MS power point among the first year undergraduates.

Majority of the undergraduates have been rated their understanding level of MS word as "Good" and only few students (2.38%) consider themselves as "Weak".

Compared to MS word, there are lots of undergraduates who have rated the understanding level of MS excel, MS power point as "Weak". It is approximately 21% and 14% respectively. However, considering all the respondents, nearly half of the undergraduates' understanding level on MS excel and MS power point is "Good". For all 3 packages, MS word, MS excel, MS power point, most of the undergraduates have an understanding level of more than "Average".

- Analysis to figure out how basic computer literacy is associated with whether they have followed a computer course or not

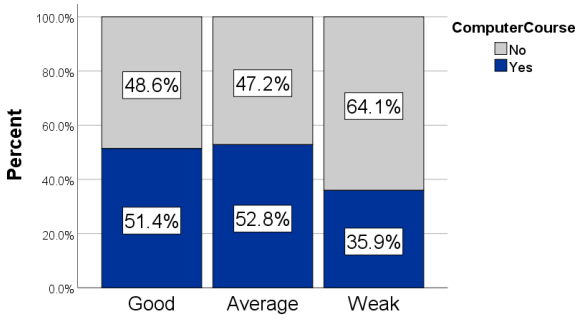

Figure 12: Stacked Bar Chart for Basic Computer Rate Vs Computer Course

The figure 12 demonstrates the understanding level of the first-year undergraduates on basic computer literacy based on a course being done or not.

According to the figure 12, most of the undergraduates who have done some sort of a computer course (like ESoft, BCS) have a higher understanding level of basic computer literacy compared to those who have not. Approximately 64% of the undergraduates who have considered themselves as "Weak" have not done any computer course.

However, there is no clear connection between those two variables because almost half of the undergraduates who have rated themselves as "Good", "Average" have not done any computer course.

Chi-Square Tests

	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	2.798[a]	2	.247
Likelihood Ratio	2.886	2	.236
N of Valid Cases	252		

a. 0 cells (.0%) have expected count less than 5. The minimum expected count is 14.40.

Table 7: Chi-square test for Basic Computer Rate and Computer Course

From table 7, since p-value is not less than 0.05, H_0 is rejected at 5% level of significance.

Therefore at 5% level of significance there is not enough evidence to conclude that there is an association between a undergraduate has done a course or not and their computer knowledge.

- To determine how basic Programming knowledge is associated with Gender, University Study Streams and how they have obtained their programming skills.'

Gender

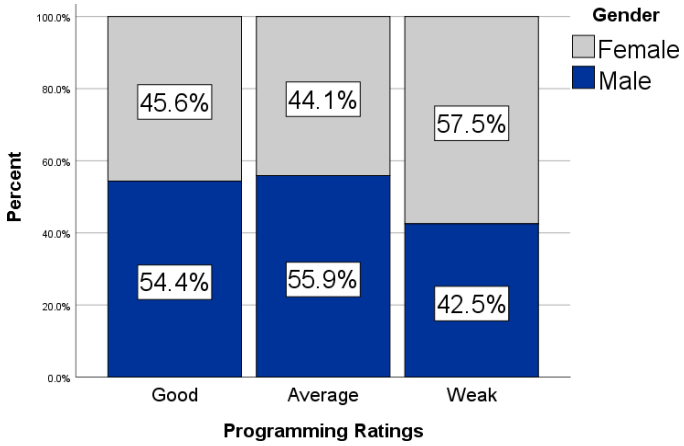

Figure 13: Stacked Bar Chart for Computer Programming Rate Vs Gender

Figure 13 shows how the 1st year rate their programming knowledge based on their gender. It can be seen most of the weak ratings are from female undergraduates and most of good and average ratings are from male undergraduates. (From figure 1 it is shown that number of males and females are roughly same)

University Study Stream

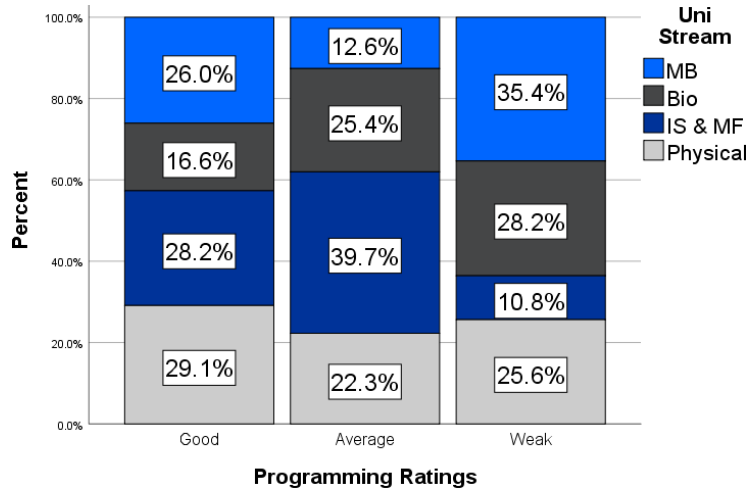

Figure 14: Stacked Bar Chart for Computer Programming Rate Vs University Stream

Figure 14 illustrates the distribution of 1st years programming knowledge ratings between the university streams in science faculty (Bio, MB, Physical, ISMF). According to their ratings most of the weekly rated students are in Bio and MB streams and most of the Good & average rated Students in Physical and ISMF streams.

How they have obtained their programming skills

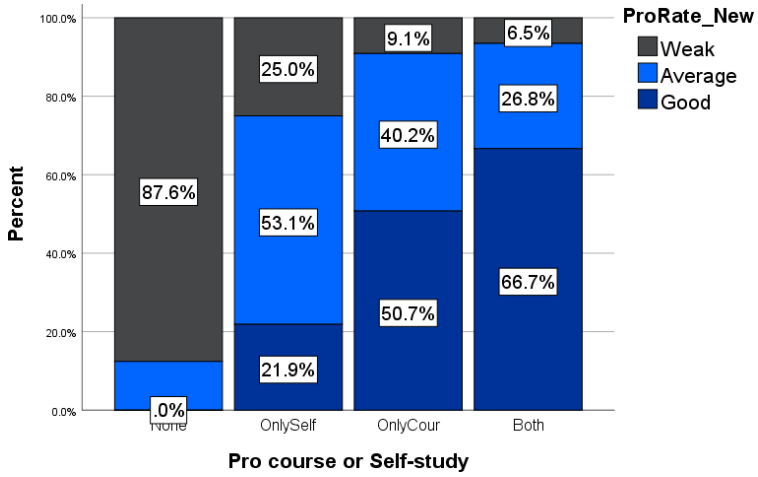

Figure 15: Stacked Bar Chart for how they have obtained their programming skills Vs Computer Programming Rate

According to Figure 15, students who have not done any course or self-study have the most of Week ratings and students who were done both Programming related course and Self-study has the most of good ratings. When comparing the students who were done only self-study with students who were done only Programming course, programing course students have more good ratings and less week ratings.

Chi-Square Tests

	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	4.044[a]	2	.132
Likelihood Ratio	4.065	2	.131
N of Valid Cases	252		

a. 0 cells (.0%) have expected count less than 5. The minimum expected count is 21.90.

Table 8: Chi-square test for Computer Programming Rate and Gender

From table 8 the p value is greater than 0.05, H_0 cannot be rejected under 5% significance level. Therefore at 5% level of significance, there isn't enough evidence to conclude that there is an association between Gender and Programming knowledge level of rating.

Chi-Square Tests

	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	20.311[a]	6	.002
Likelihood Ratio	21.585	6	.001
N of Valid Cases	252		

a. 1 cells (8.3%) have expected count less than 5. The minimum expected count is 4.95.

Table 9: Chi-square test for Computer Programming Rate and University Stream

From table 9 the p value is less than 0.05, H_0 Should be rejected under 5% significance level. Therefore at 5% level of significance, there is enough evidence to conclude that there is an association between University Stream and Programming knowledge level of rating.

Chi-Square Tests

	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	136.849[a]	6	.000
Likelihood Ratio	145.485	6	.000
N of Valid Cases	252		

a. 1 cells (8.3%) have expected count less than 5. The minimum expected count is 2.86.

Table 10: Chi-square test for how they have obtained their programming skills and Computer Programming Rate

From table 10 the p value is less than 0.05, H_0 should be rejected under 5% significance level. Therefore at 5% level of significance, there is enough evidence to conclude that there is an association between how they have obtained their programming skills and Programming knowledge level of rating.

06 Conclusions & Suggestions

Conclusions

- Parental education level has an impact on English literacy level of undergraduates. The chi square test between parental education level and English literacy level also confirms that there is an association between two variables.
- Nearly half of the undergraduates are from Western province it can be observed that those undergraduates have a higher English literacy compared to undergraduates from other provinces. This can also be confirmed by the chi-square test. This can be due to the fact that there are more facilities, exposure to world of work in Western province compared to other provinces.
- How long a computer has been used has a direct impact on Basic Computer literacy of undergraduates. When a computer is used for a long time, undergraduates get used to new features, and applications.
- The majority of the undergraduates are familiar with MS Word compared to MS Excel and PowerPoint.

- There is no relationship between basic computer literacy of undergraduates and whether they have followed a computer course or not. Even though students follow a course they do not get in touch with what they have learned.
- University study stream and how undergraduates have obtained programming skills have an effect on basic programming knowledge however gender has no effect on programming knowledge.

Suggestions

- A study can be conducted for undergraduates who have not performed well in first year first semester exam and investigate whether the factors that has been considered has an effect on their performance level and assist them with seminars and workshops to improve their skills.
- This can be continued with the next year's undergraduates as well and improve the EC course periodically.
- It is better to improve the EC 1001 course in a way it will help understand the lectures better and give some guidance about report writing.
- Undergraduates can be provided with the opportunity to develop their programming skills through frequent seminars and workshops during orientation.
- Have an enhancement course for learning basic computer skills, and try to start these courses before the commencement of the 1st semester, because there is ample time between registration and the commencement of the academic activities

07 References

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