

REFERENCES

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Appendix (i)

Questionnaire for Students

Personal Information

1. Age (years):

2. Gender: Male Female

3. Parental Education:

	Father	Mother
(i) Below Ordinary level	<input type="checkbox"/>	<input type="checkbox"/>
(ii) Ordinary Level	<input type="checkbox"/>	<input type="checkbox"/>
(iii) Advanced Level	<input type="checkbox"/>	<input type="checkbox"/>
(iv) Degree or Higher Degree	<input type="checkbox"/>	<input type="checkbox"/>
(v) Professional	<input type="checkbox"/>	<input type="checkbox"/>
(vi) Other (Specify)	-----	-----

4. Parental Occupation:

Father: Mother:

Tick the relevant box.

	Father	Mother
(i) No employment	<input type="checkbox"/>	<input type="checkbox"/>
(ii) Self-employment	<input type="checkbox"/>	<input type="checkbox"/>
(iii) Business	<input type="checkbox"/>	<input type="checkbox"/>
(iv) Clerical or Technical	<input type="checkbox"/>	<input type="checkbox"/>
(v) Teacher or Lecturer	<input type="checkbox"/>	<input type="checkbox"/>
(vi) Executive (Managerial)	<input type="checkbox"/>	<input type="checkbox"/>
(vii) Other (Specify)	-----	-----

5. (a) Place of living:

(b) Distance to the school:

6. Mode of transport:

(i) On foot

(ii) Private vehicle

(iii) Public transport

(iv) Bicycle

7. Marks obtained for Mathematics in the last exam:

8. How often do you use the following libraries?

SL = School Library, **PL** = Public Library, **BL** = British Council Library

OL = Other Library

	SL	PL	BL	OL
(i) Everyday	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
(ii) Once a week	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
(iii) Twice a week	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
(iv) Three times a week	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
(v) More than three times a week	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
(vi) Never	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Purpose:

Duration:

9. What type of co-curricular activities did you undertake?

	Yes	No
(i) Sports	<input type="checkbox"/>	<input type="checkbox"/>
(ii) Clubs	<input type="checkbox"/>	<input type="checkbox"/>
(iii) Associations	<input type="checkbox"/>	<input type="checkbox"/>
(iv) Scouting/Guiding	<input type="checkbox"/>	<input type="checkbox"/>
(v) Others (Specify)	-----	

Learner-related factors

10. How easily do you pick the explanations given by your teacher in the Mathematics class?

(i) very quickly

(ii) moderately

(iii) slowly

11. Three approaches to learning are given below. State your order of preference indicating 1, 2 and 3 in the boxes given.

(i) Learning by listening to the teacher

(ii) Learning by visual experience

(Seeing pictures, Diagrams, Objects, Power- Point presentation etc.)

(iii) Learning by doing things

12. (a) Do you enjoy learning Mathematics?

yes no

(b) Give reasons for your answer.

.....

.....

School-related factors

13. (a) Do you think that the time allocated for Mathematics in the class timetable was using fully?

yes no

(b) Give reasons for your answer.

.....
.....

14. Do you undertake the following Mathematics- related activities?

If 'yes' write in order of preference by indicating 1, 2, 3, ... in the boxes given below.

	Yes	No	Order of preference
(i) Clubs	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
(ii) Camps	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
(iii) Excursions	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
(iv) Competitions	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
(v) Exhibitions	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Explain the activities briefly with results obtained:

.....

If 'no' give reasons:

15. Which of the following persons supported you to improve your performance in Mathematics? Indicate the priority order by writing 1,2,3,4 in the boxes.

- (i) Teacher at school
- (ii) Tuition teacher
- (iii) Friends
- (iv) Family members

16. (a) Did you like the way in which your teacher taught you Mathematics?

yes no

(b) Give reasons for your answer.

.....

17. What support did you get from your Mathematics Teacher

(a) to overcome your weaknesses in learning Mathematics

.....

(b) to develop your abilities further in Mathematics

.....

(c) When did you get this support?

(i) Within the school time (ii) Outside the school time

18. What encouragement did the management of the school provide you for better learning in Mathematics? Tick the relevant cages given below.

Strongly Agree = **SA** Agree = **A** No Idea = **NI** Disagree = **D**
Strongly Disagree = **SD**

	SA	A	NI	D	SD
(i) Getting the teacher to the class in time	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
(ii) Making sure that the students were there in the class for learning	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
(iii) Getting teachers to conduct school tests and release marks without delay	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
(iv) Encouraging the students to participate in co-curricular programmes.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
(v) Supervising the teachers in their day to day teaching	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
(vi) Encouraging the students to use school facilities such as library and computers	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
(vii) Others (specify)					

Home-related factors

19. What support did you get from your parents in improving your standard in Mathematics? Tick the relevant cages given below.

- (i) Persuading me to attend school regularly
- (ii) Assisting in homework
- (iii) Purchasing text books, past papers and any other audio, video
and electronic facilities
- (iv) Providing time, adequate space, furniture and quiet environment for
learning at home
- (v) Meeting expenses for Mathematics-related school activities
- (vi) Participating in parent-teacher meetings convened by the school
- (vii) Providing encouragement on the basis of test results
- (viii) Organising extra school support (tuition) where necessary

20. What support did you get from the following groups?

- (a) Elder brother(s) and sister(s)
.....
- (b) Friends
.....

Appendix (ii)

Questionnaire for Teachers

Personal Information

1. Gender: Male Female

2. Experience:

	Local Syllabus	International Syllabus
Subjects taught		
Course taught		

3. (a) Are you interested in co-curricular activities?

yes no

(b) If 'yes' tick the relevant cages given below.

(i) Sports

(ii) Clubs

(iii) Associations

(iv) Scouting

(v) Others (Specify)

Interview Schedule:

4. (a) Do you enjoy teaching Cambridge (Ordinary Level) Mathematics?

yes no

(b) If 'no' give reasons for your answer.

.....

5. How have you identified the learners in terms of Mathematics performance?

State answers as a percentage.

Percentage %

- (i) High achiever
- (ii) Average achiever
- (iii) Low achiever

6. Out of the three types of the learners given below to which type do you cater to?

State your responses in priority order by indicating 1, 2 and 3 in the given boxes.

- (i) Auditory learner (those who learn by listening)
- (ii) Visual learner (those who learn by seeing)
- (iii) Tactile learner (those who learn by doing)

7. (a) Do you think that the time allocated in the class timetable is adequate to cover the Cambridge (Ordinary Level) Mathematics syllabus?

yes no

8. (a) Do you think that you make optimal use of the time allocated?

yes no

(b) Give reasons for your answer.

.....

9. What co-curricular activities (clubs, camps, Mathematics games, puzzles, etc.) have you undertaken to make learning of Mathematics interesting to your students? Present your answer below in order of preference.

.....

10. How have the co-curricular activities mention in (5) above facilitated your students' performance in mathematics?

.....

11. What method(s) do you apply to teach Mathematics?

	Yes	No
(i) Lecture	<input type="checkbox"/>	<input type="checkbox"/>
(ii) Lecture discussion	<input type="checkbox"/>	<input type="checkbox"/>
(iii) Lecture demonstration	<input type="checkbox"/>	<input type="checkbox"/>
(iv) Use of charts and graphs	<input type="checkbox"/>	<input type="checkbox"/>
(v) Activities where the students have to explore and find out for themselves.	<input type="checkbox"/>	<input type="checkbox"/>
(vi) Problem solving exercises	<input type="checkbox"/>	<input type="checkbox"/>
(vii) Cross word puzzles	<input type="checkbox"/>	<input type="checkbox"/>
(viii)Others (specify)		

12. (a) Are you happy with the teaching methods you have used?

yes no

(b) Give reasons for your answer.

.....

(c) What suggestions would you make to improve your current methods?

.....

13. (a) What type of remedial approaches do you adopt to improve Cambridge (Ordinary Level) Mathematics Examination results?

.....

(b) Have you found them effective?

yes no

(c) Give reasons for your answer.

.....

14. (a) Do you think that your students like the remedial measures you used?

yes no

(b) Give reasons for your answer.

.....
.....

15. What types of test were given to evaluate the performance in Mathematics?

(e.g. Unit tests, Activity based tests, term tests, homework, etc.)

.....

16. (a) What support did you get from the school management to improve the performance in Mathematics?

.....
.....

(b) Are you happy with the support you received?

yes no

(c) Give reasons for your answer.

.....

17. What additional resources you expect from the management to improve the performance of Mathematics?

.....

18. (a) What type of encouragement did you received from your parents to improve performance in Mathematics of your students?

.....

(b) Are you happy with the encouragement you received from the parents?

yes no

(c) Give reasons for your answer.

.....

19. (a) Do you pay individual attention to the students?

yes no

(b) If 'no' the reason(s) could be

(i) Lack of time

(ii) Broadness of the syllabus

(iii) Too many students

(iv) Others (Specify)

Appendix (iii)

Questionnaire for School Management

Personal Information

1. Gender: Male Female

2. Designation:

3. Experience as a school head:

(Principal/Deputy principal/Sectional head/Supervisor)

4. Experience as a school teacher:

Interview Schedule:

5. What support did you provide the students to perform better in Cambridge (Ordinary Level) Mathematics? State your priority order by indicating 1,2,3,... in the boxes given below. (use the same rank where necessary)

(a) In case of teacher absenteeism assigning relief work

(b) Getting the teacher to the class in time

(c) Making sure that the students were there in the class for learning

(d) Providing facilities (library, computer laboratory, etc.) and to use the facilities

(e) Encouraging the students to participate in co-curricular activities

(f) Getting the teachers to conduct school tests and release marks without delay

(g) Giving feedback of the test to the students

(h) Attending to the welfare of the students in instances such as illness and family problems

(i) Others (specify):

6. What support did you provide the teachers to improve the results of Cambridge (Ordinary Level) Mathematics Examination?

State your order of preference inserting 1, 2, 3, ...

- (a) Providing teachers curricular materials (Syllabus, Text books, Past papers, etc.) to help them preparing for their classes
- (b) Making provisions to teachers to develop learning-teaching material
- (c) Helping teachers to plan and implement Mathematics-related co-curricular activities.
- (d) Suggesting improvements to the test items prepared by the teachers
- (e) Supervise the teachers in their day to day teaching
- (f) Providing teachers with feedback to minimize their weaknesses and to improve their strengths
- (g) Organizing staff development programmes
- (h) To improve the motivation of teachers by organizing teacher-welfare activities
- (i) Others (specify).....

Appendix (iv)

Questionnaire for Parents

1. What support did you give the child to improve his/her attendance?

- (i) Confirming the importance of education
- (ii) Providing better transport facilities
- (iii) Providing opportunities for the child to take part in school events that interest him/her
- (iv) Minimizing the home events that disturb the learning of the child
- (v) Finding accommodation near the school
- (vi) Others:
.....

2. Who checks the homework assignments completed by your child?

- (i) You yourself
- (ii) Family members assigned by you
- (iii) Outsider assigned by you

3. How often do you check the homework?

- (i) Everyday
- (ii) Once a month
- (iii) Occasionally
- (iv) Never
- (v) Others (specify)

4. What support did you give your child to be successful in the following Mathematics related activities?

(i) Making equipments to facilitate the learning of Mathematics:

.....

(ii) Clubs and Associations for Mathematics:

.....

(iii) Educational excursions planned for Mathematics:

.....

(iv) Competitions:

(v) Exhibitions:

(vi) School projects:

(vii) School magazines:

(viii) Others (specify):

5. What additional support did you give your child on the basis of his/her test results?

(i) By providing relevant reading materials

(ii) By providing audio/video materials

(iii) By providing relevant electronic materials

(iv) By organising extra help from tutors

(v) By organising assistance from family members neighbours and peers

(vi) By accommodating elders and peers who can provide support for
the child

(vii) Waking up the child for studies and providing of suitable food items

(viii) Others (specify):

6. What support did you give the child to facilitate his/her studies at home?

- (i) By providing a quiet environment
- (ii) By providing a separate room
- (iii) By providing suitable furniture
- (iv) By ensuring adequate ventilation and light
- (v) Opportunities to telephone others in need of assistance
- (vi) Opportunities to listen to/watch relevant educational programmes
on radio/television

7. How often do you attend the parent-teacher meetings organised by the school?

- (i) Regularly
- (ii) Occasionally
- (iii) Never

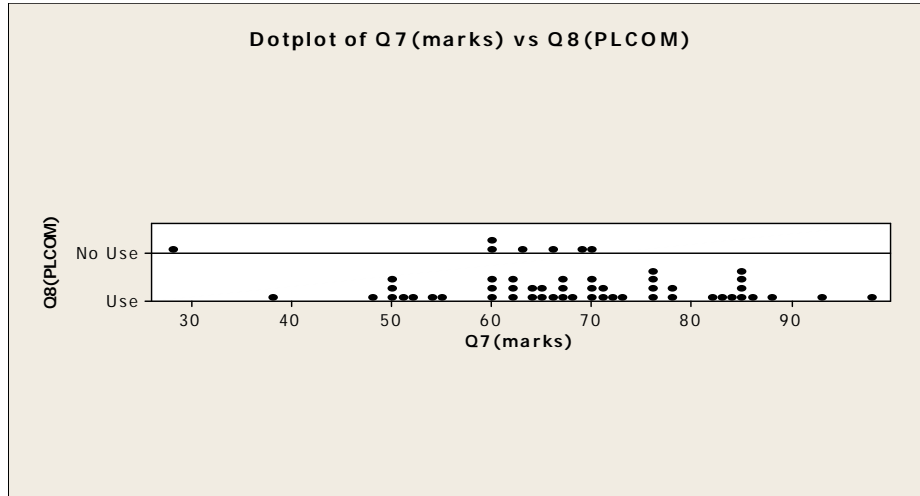
8. How do you make use of the parent-teacher meetings you attend?

- (i) By making the teacher aware of the academic difficulties faced by
the child
- (ii) By talking to the teacher to find out the progress of the child
- (iii) Finding out the extra support that the school can provide to improve
the progress the child
- (iv) Making arrangement for out of school help when necessary
- (v) Others (specify):

Appendix (v)

Public Library Utilisation

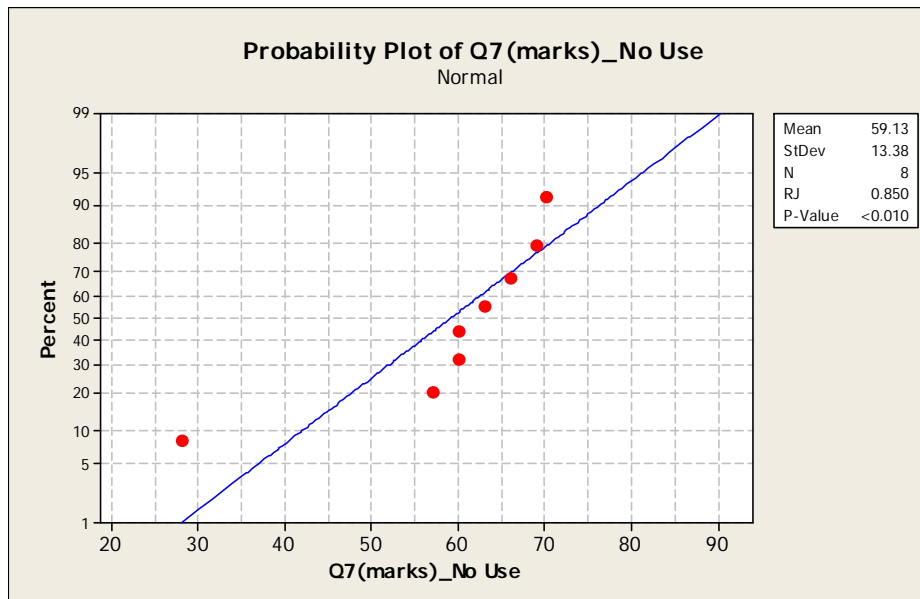
Public Library Non Utilisation vs Utilisation

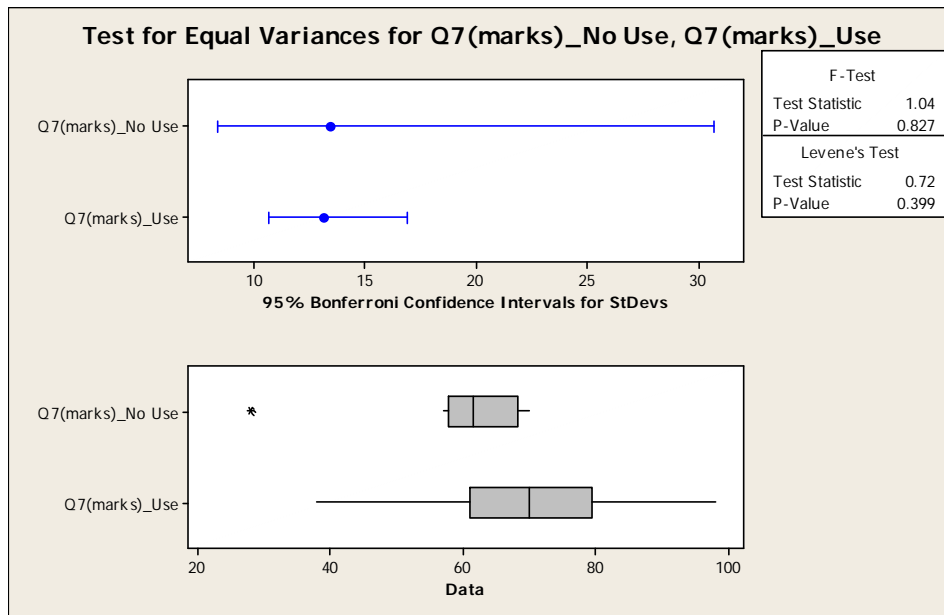
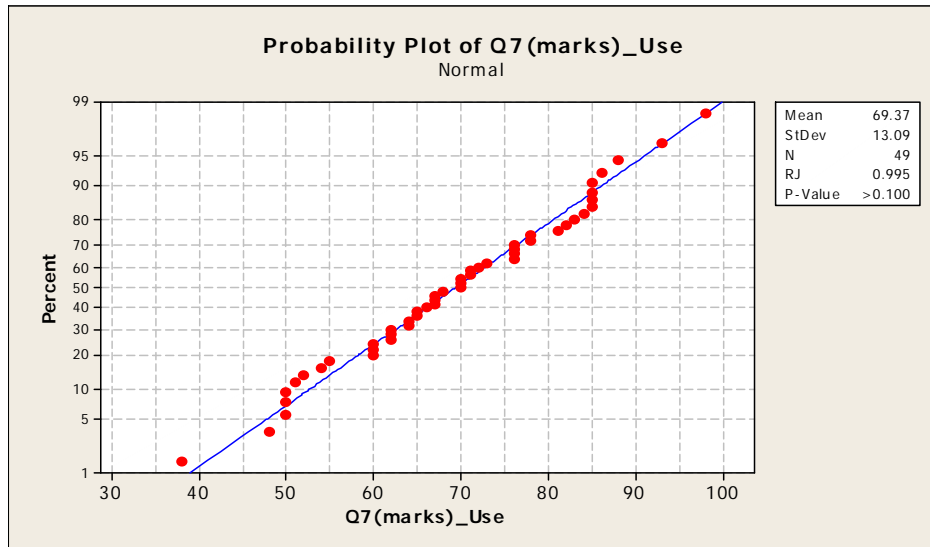


Descriptive Statistics: Q7(marks)

Variable	Q8(PLCOM)	N	N*	Mean	StDev	Minimum	Q1	Median	Q3
Q7(marks)	No Use	8	0	59.13	13.38	28.00	57.75	61.50	68.25
	Use	49	0	69.37	13.09	38.00	61.00	70.00	79.50

Variable	Q8(PLCOM)	Maximum
Q7(marks)	No Use	70.00
	Use	98.00





Two-Sample T-Test and CI: Q7(marks)_No Use, Q7(marks)_Use

Two-sample T for Q7(marks)_No Use vs Q7(marks)_Use

	N	Mean	StDev	SE Mean
Q7(marks)_No Use	8	59.1	13.4	4.7
Q7(marks)_Use	49	69.4	13.1	1.9

Difference = mu (Q7(marks)_No Use) - mu (Q7(marks)_Use)

Estimate for difference: -10.2423

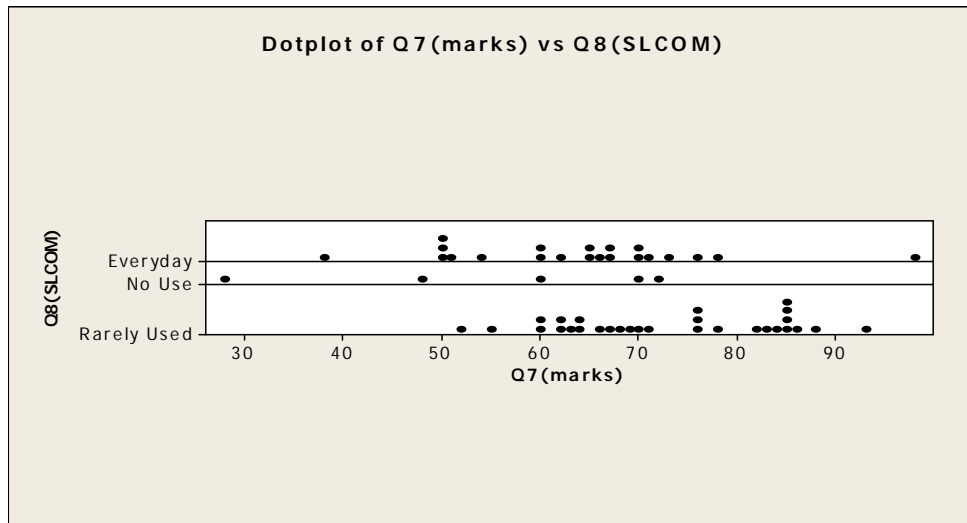
95% CI for difference: (-20.2743, -0.2104)

T-Test of difference = 0 (vs not =): T-Value = -2.05 P-Value = 0.046 DF = 55

Both use Pooled StDev = 13.1275

School Library Utilisation

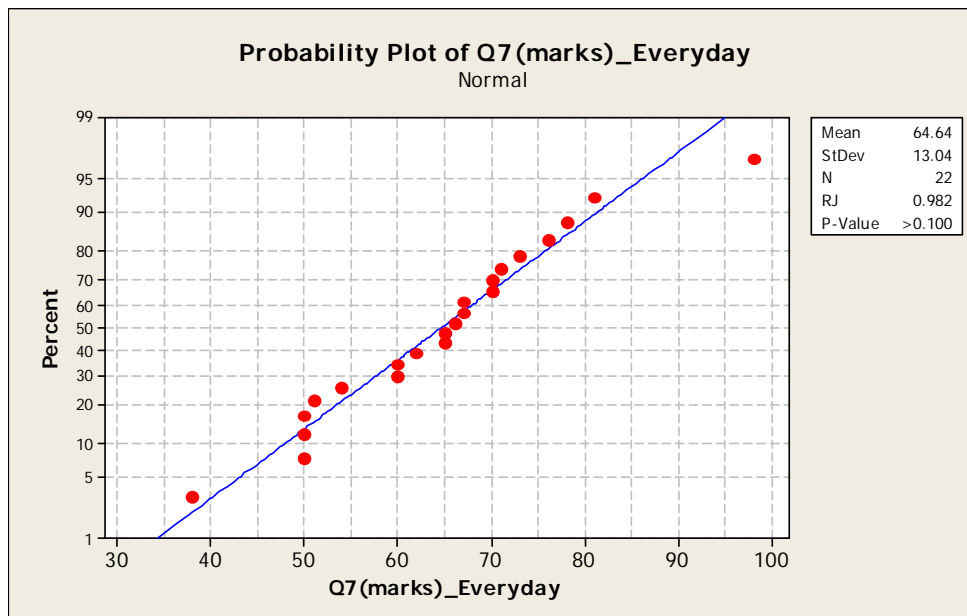
School Library Daily use vs Non Utilisation vs Rarely Used

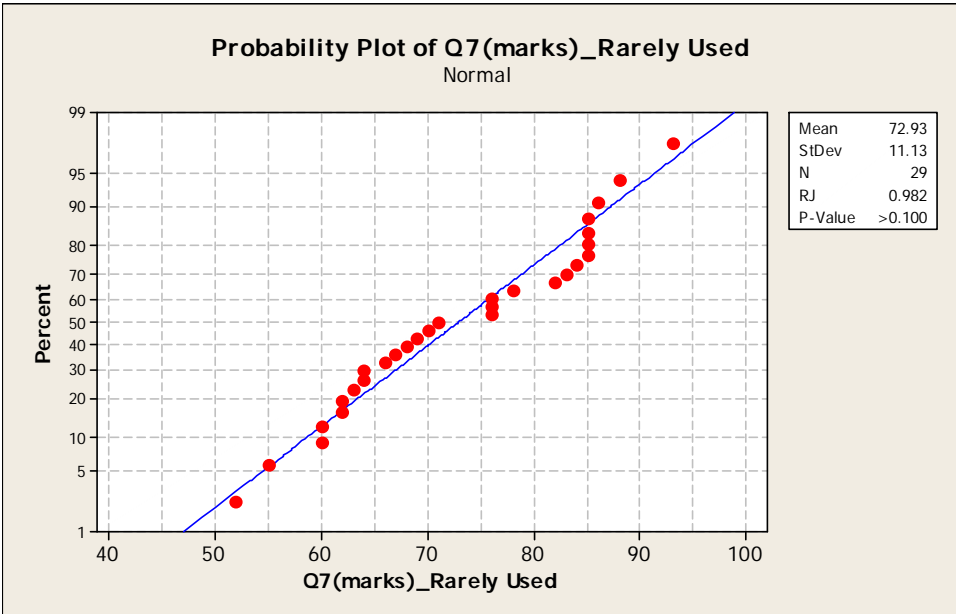
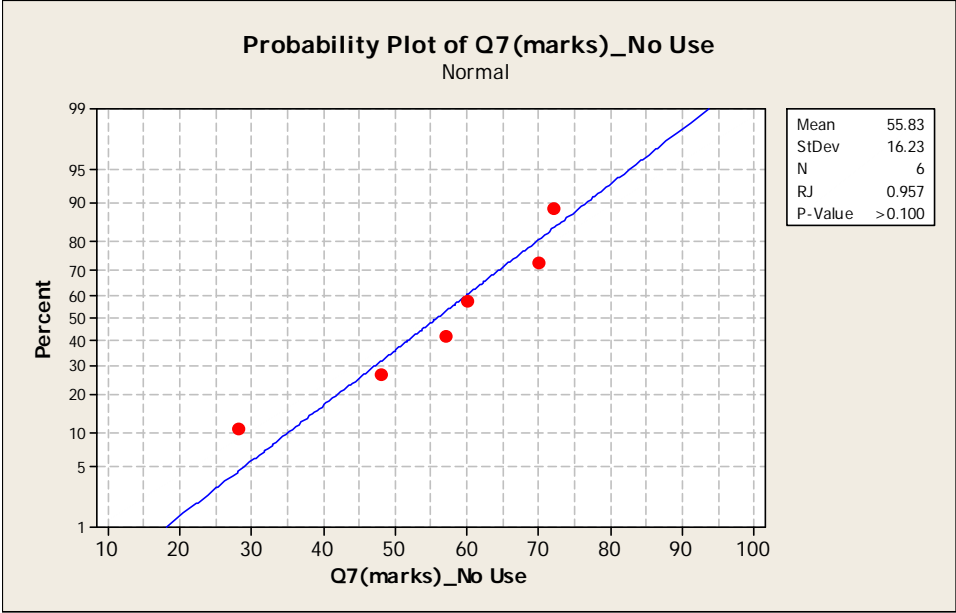


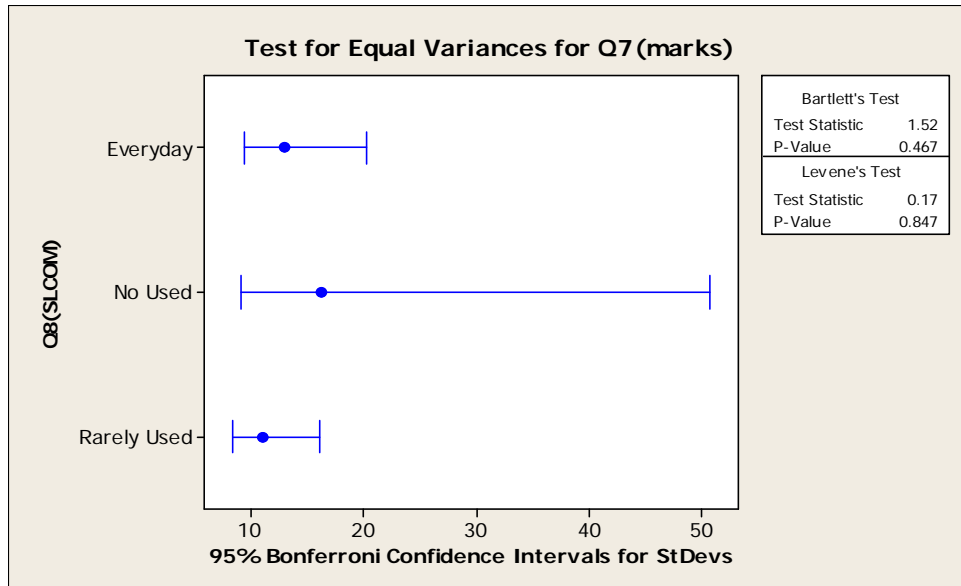
Descriptive Statistics: Q7(marks)

Variable	Q8 (SLCOM)	N	N*	Mean	StDev	Minimum	Q1	Median	Q3
Q7(marks)	Everyday	22	0	64.64	13.04	38.00	53.25	65.50	71.50
	No Use	6	0	55.83	16.23	28.00	43.00	58.50	70.50
	Rarely Used	29	0	72.93	11.13	52.00	63.50	71.00	84.50

Variable	Q8 (SLCOM)	Maximum
Q7(marks)	Everyday	98.00
	No Use	72.00
	Rarely Used	93.00







One-way ANOVA: Q7(marks) versus Q8(SLCOM)

Source	DF	SS	MS	F	P
Q8(SLCOM)	2	1842	921	5.95	0.005
Error	54	8358	155		
Total	56	10200			

S = 12.44 R-Sq = 18.06% R-Sq(adj) = 15.02%

Level	N	Mean	StDev	Individual 95% CIs For Mean Based on Pooled StDev
Everyday	22	64.64	13.04	(-----*-----)
No Used	6	55.83	16.23	(-----*-----)
Rarely Used	29	72.93	11.13	(-----*-----)

48.0 56.0 64.0 72.0

Pooled StDev = 12.44

Tukey 95% Simultaneous Confidence Intervals
All Pairwise Comparisons among Levels of Q8(SLCOM)

Individual confidence level = 98.07%

Q8(SLCOM) = Everyday subtracted from:

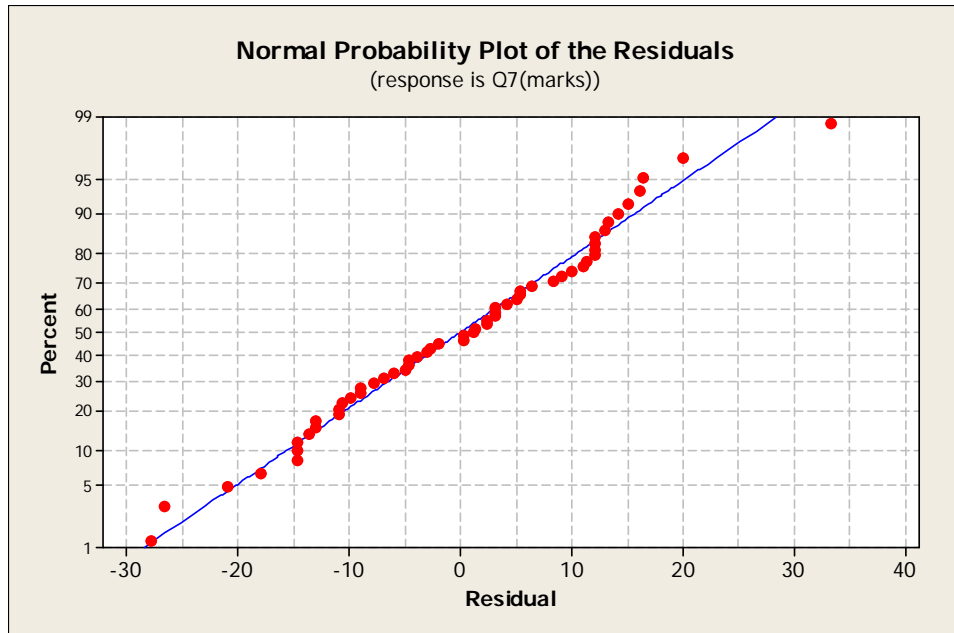
Q8(SLCOM)	Lower	Center	Upper	Individual 95% CIs For Mean Based on Pooled StDev
No Used	-22.62	-8.80	5.01	(-----*-----)
Rarely Used	-0.19	8.29	16.78	(-----*-----)

-16 0 16 32

Q8(SLCOM) = No Used subtracted from:

Q8(SLCOM)	Lower	Center	Upper	Individual 95% CIs For Mean Based on Pooled StDev
Rarely Used	3.64	17.10	30.55	(-----*-----)

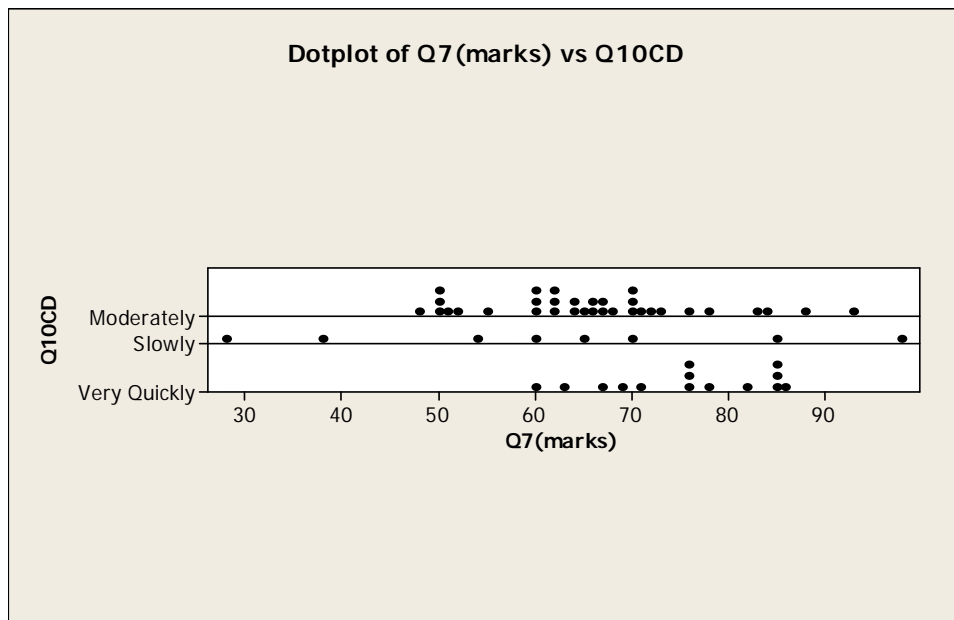
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Appendix (vi)

Grasping Speed

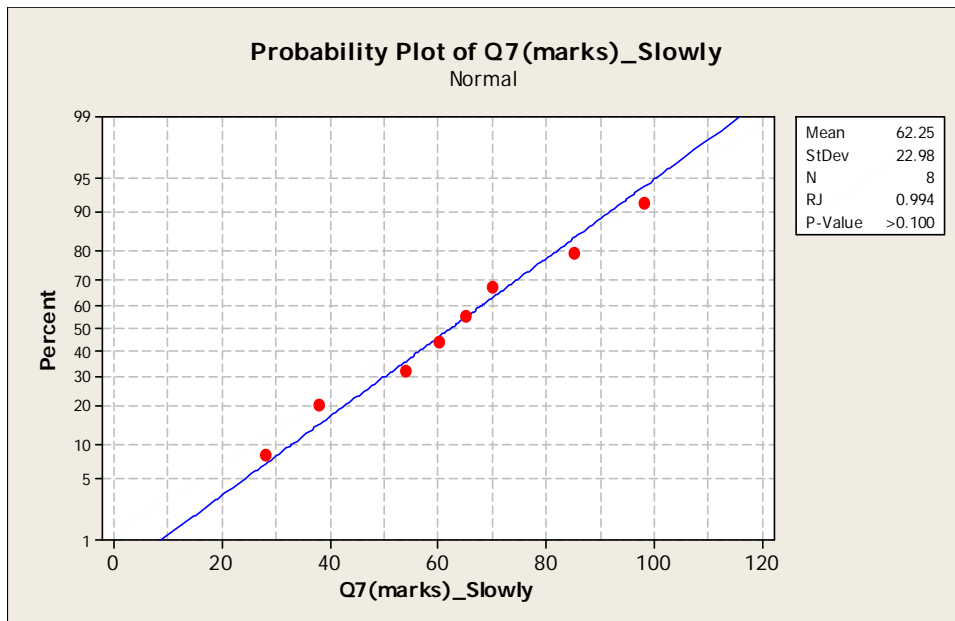
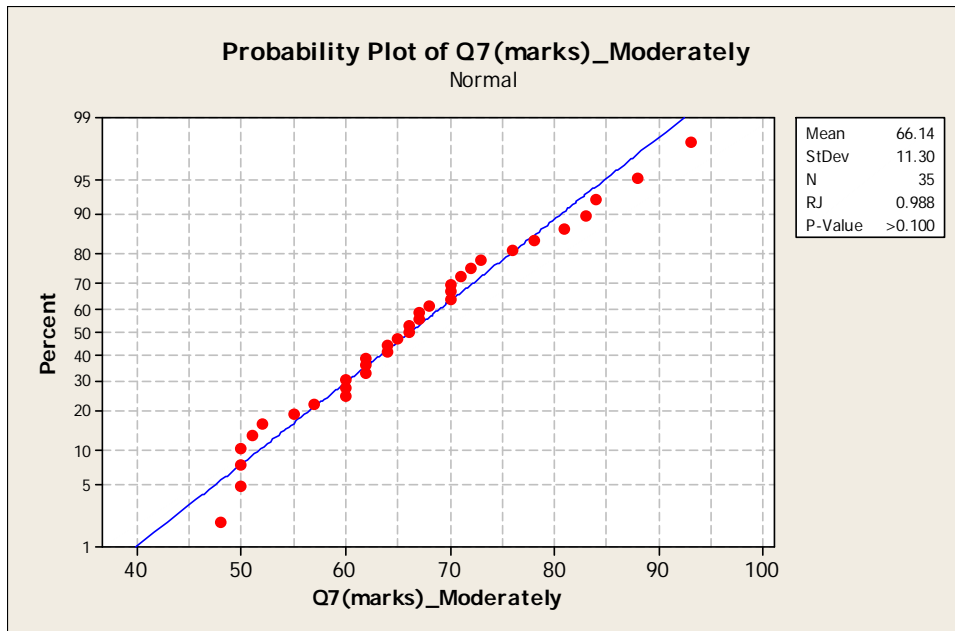
Very quickly vs Slowly **and** Very quickly vs Moderately

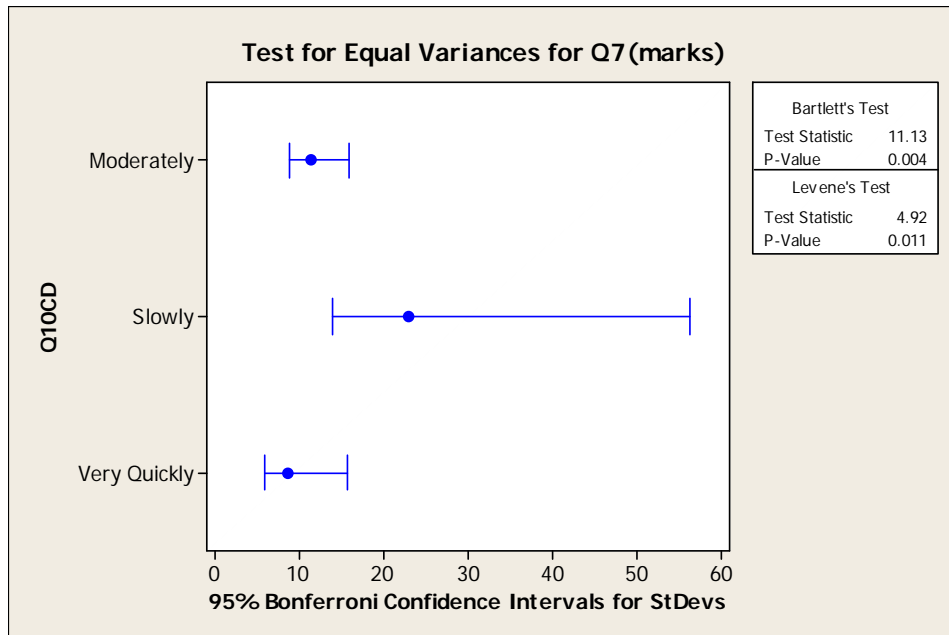
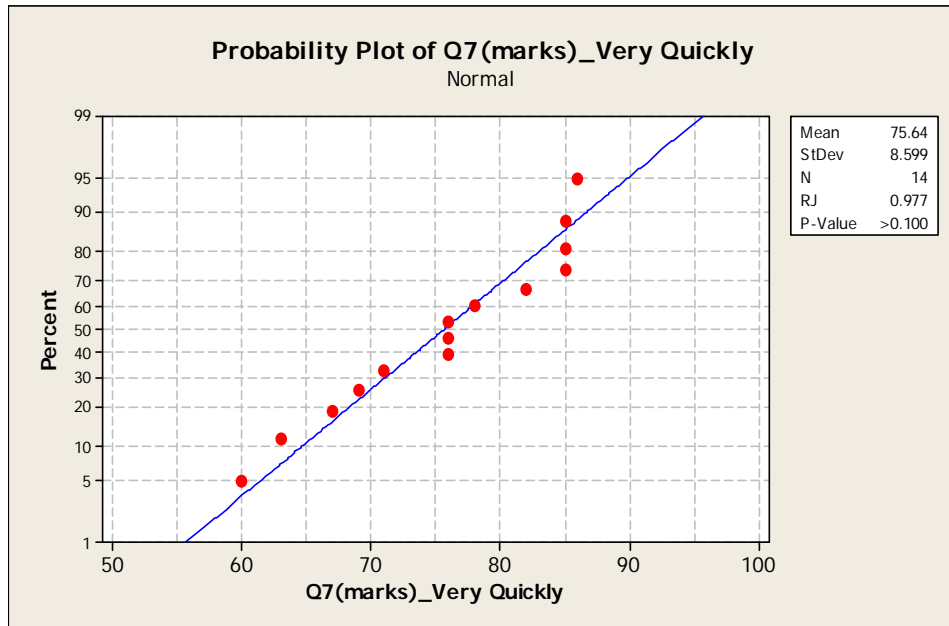


Descriptive Statistics: Q7(marks)

Variable	Q10CD	N	N*	Mean	StDev	Minimum	Q1	Median	Q3
Q7(marks)	Moderately	35	0	66.14	11.30	48.00	60.00	66.00	72.00
	Slowly	8	0	62.25	22.98	28.00	42.00	62.50	81.25
	Very Quickly	14	0	75.64	8.60	60.00	68.50	76.00	85.00

Variable	Q10CD	Maximum
Q7(marks)	Moderately	93.00
	Slowly	98.00
	Very Quickly	86.00





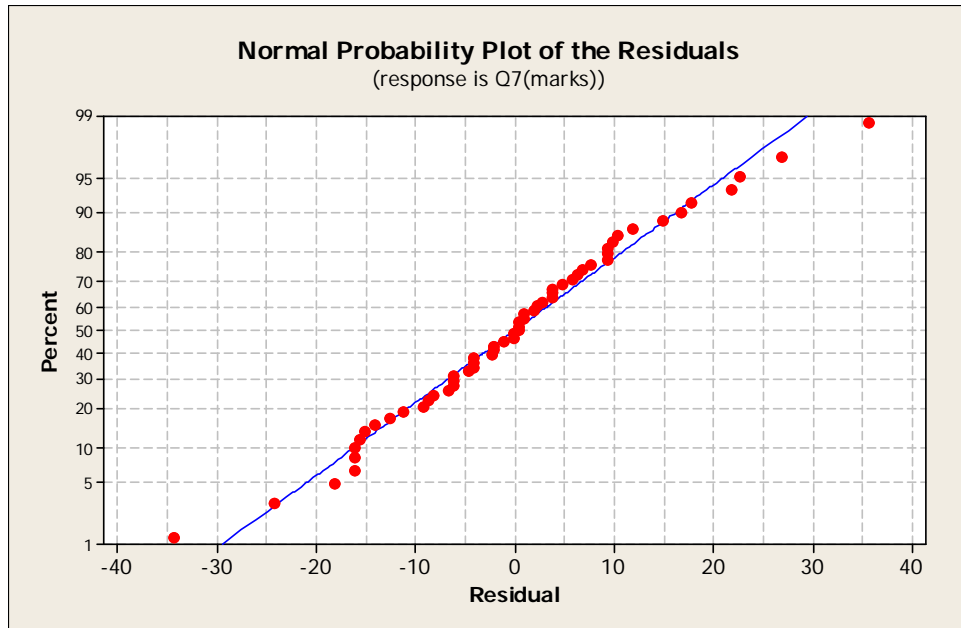
Kruskal-Wallis Test: Q7(marks) versus Q10CD

Kruskal-Wallis Test on Q7(marks)

Q10CD	N	Median	Ave Rank	Z
Moderately	35	66.00	25.9	-1.76
Slowly	8	62.50	23.9	-0.93
Very Quickly	14	76.00	39.6	2.74
Overall	57		29.0	

H = 7.62 DF = 2 P = 0.022

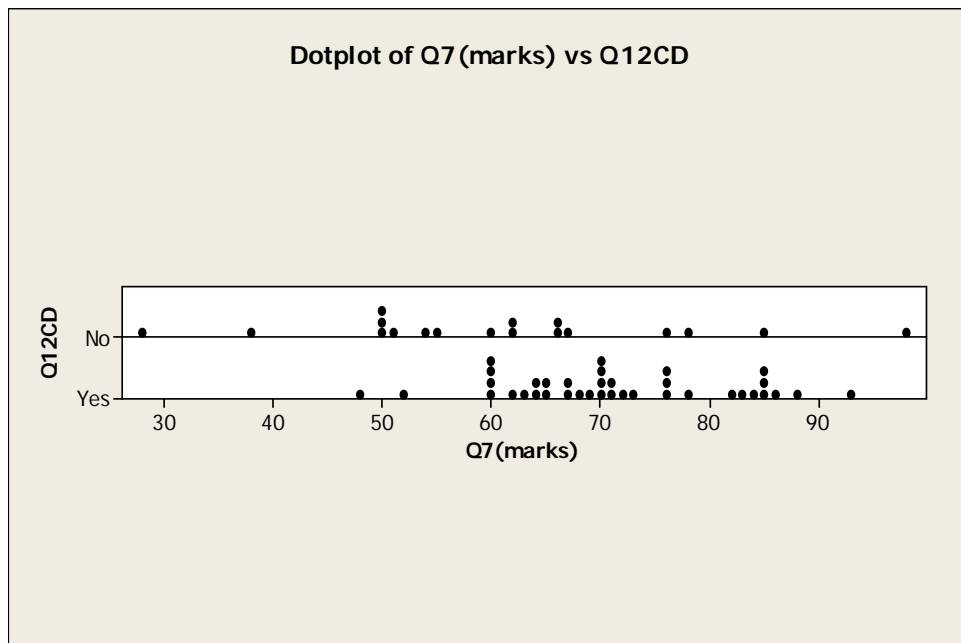
H = 7.64 DF = 2 P = 0.022 (adjusted for ties)



Appendix (vii)

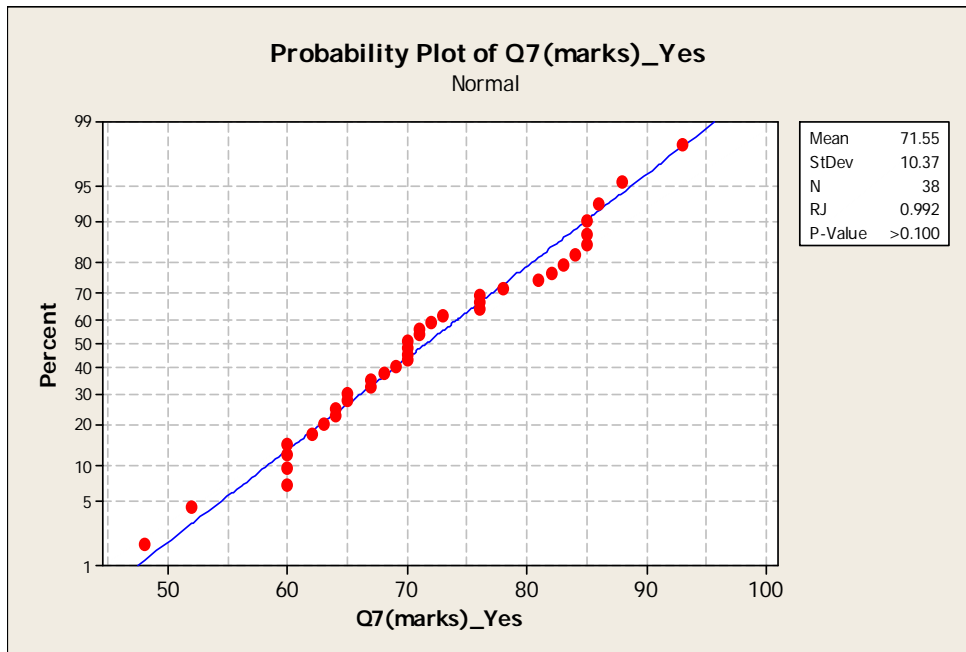
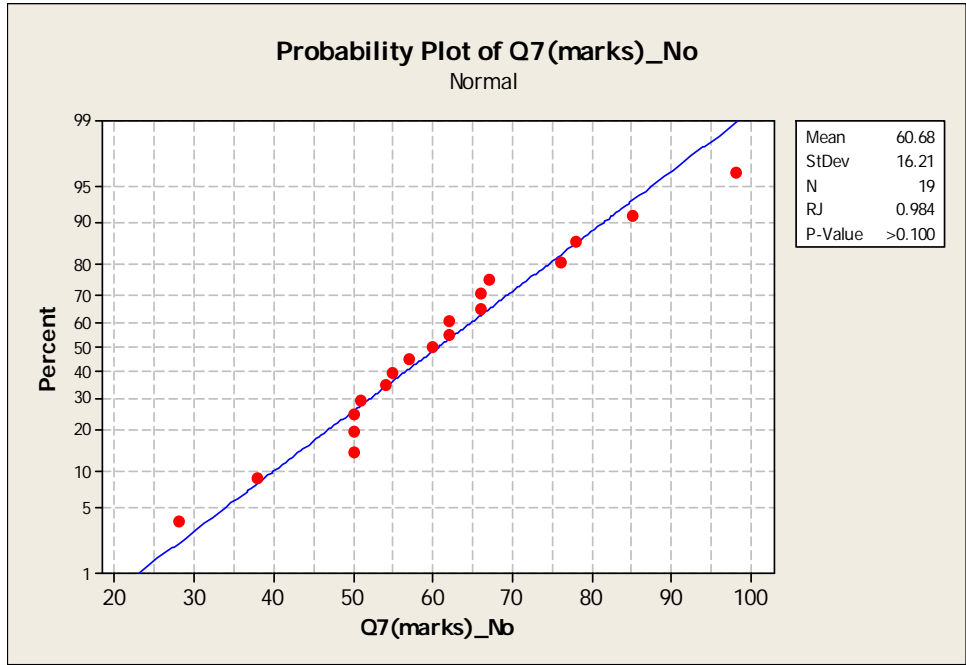
Enjoyment derived in Learning Mathematics

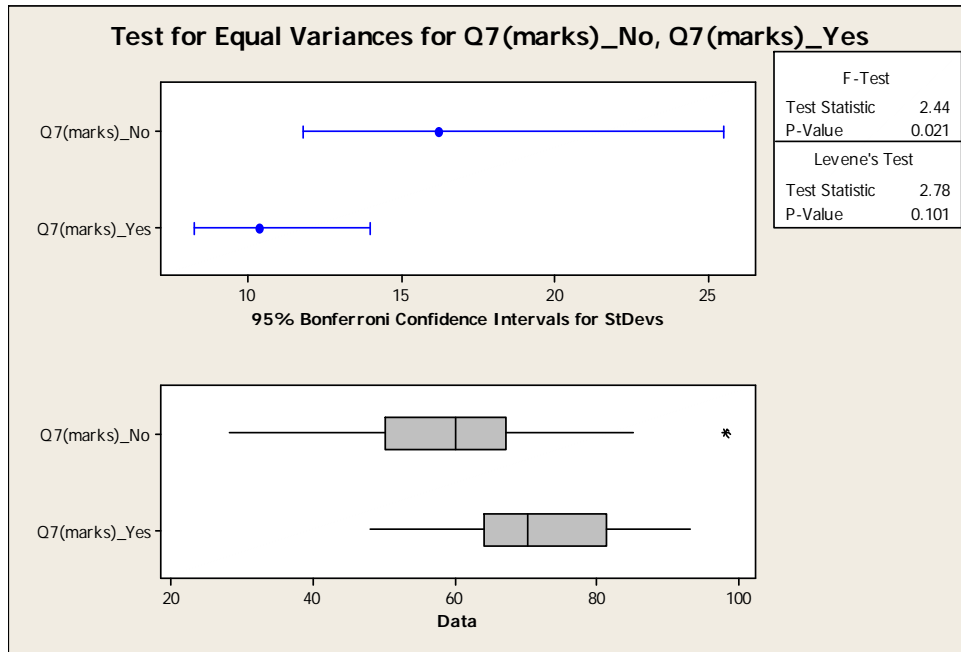
Non Enjoyment vs Enjoyment in learning Mathematics



Descriptive Statistics: Q7(marks)

Variable	Q12CD	N	N*	Mean	StDev	Minimum	Q1	Median	Q3	Maximum
Q7(marks)	No	19	0	60.68	16.21	28.00	50.00	60.00	67.00	98.00
	Yes	38	0	71.55	10.37	48.00	64.00	70.00	81.25	93.00





Two-Sample T-Test and CI: Q7(marks)_No, Q7(marks)_Yes

Two-sample T for Q7(marks)_No vs Q7(marks)_Yes

	N	Mean	StDev	SE Mean
Q7(marks)_No	19	60.7	16.2	3.7
Q7(marks)_Yes	38	71.6	10.4	1.7

Difference = μ (Q7(marks)_No) - μ (Q7(marks)_Yes)

Estimate for difference: -10.8684

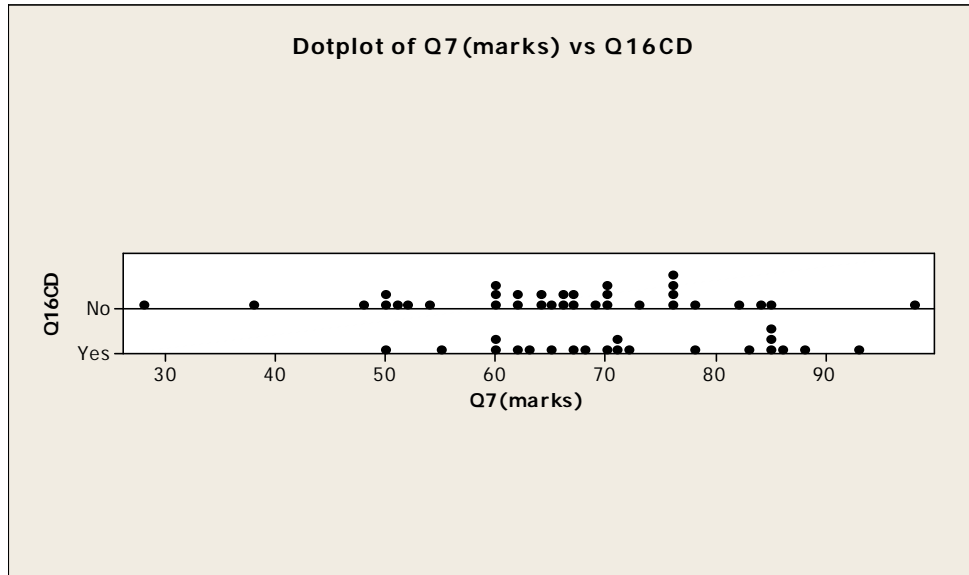
95% CI for difference: (-19.2728, -2.4640)

T-Test of difference = 0 (vs not =): T-Value = -2.66 **P-Value = 0.013** DF = 25

Appendix (viii)

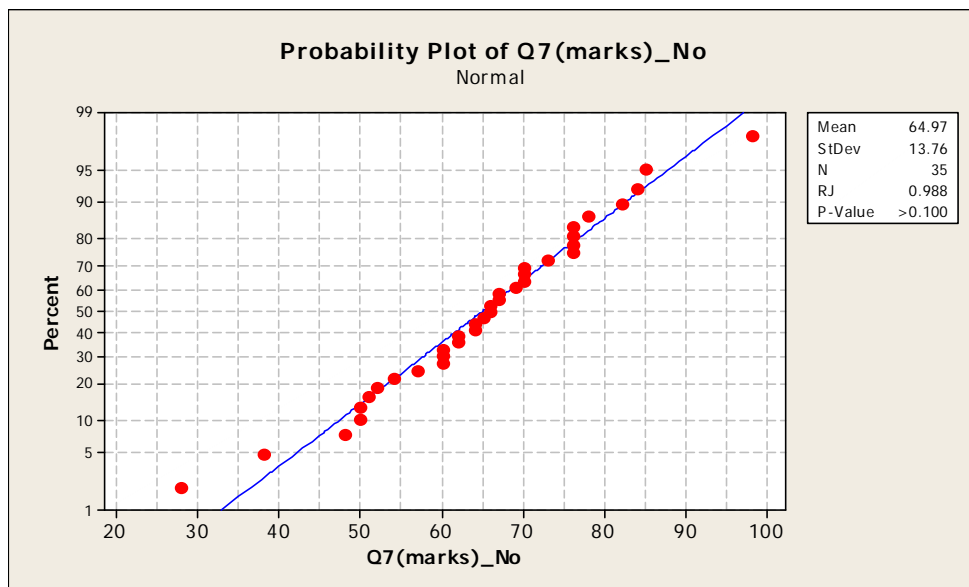
Teaching style

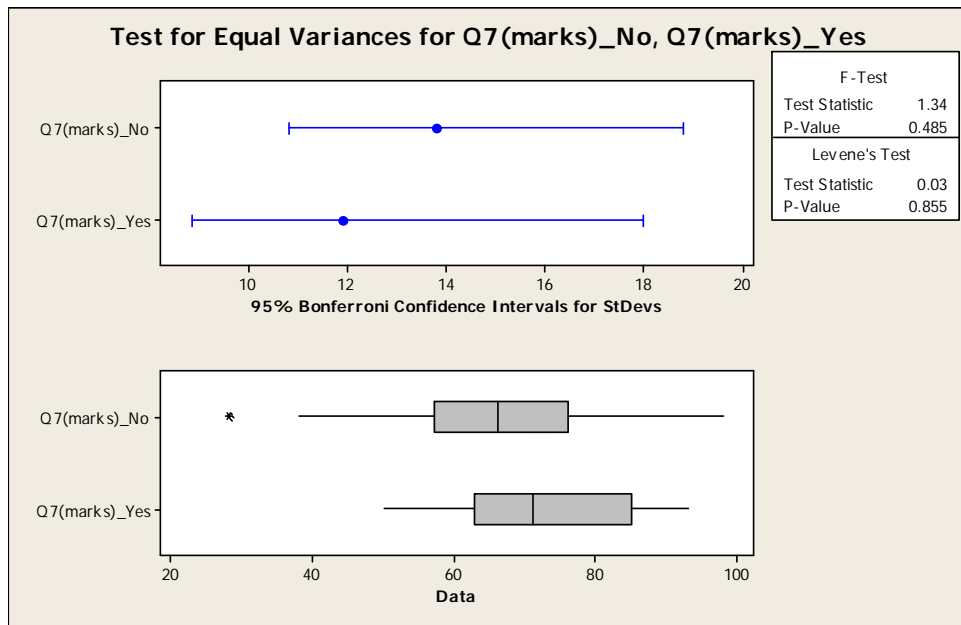
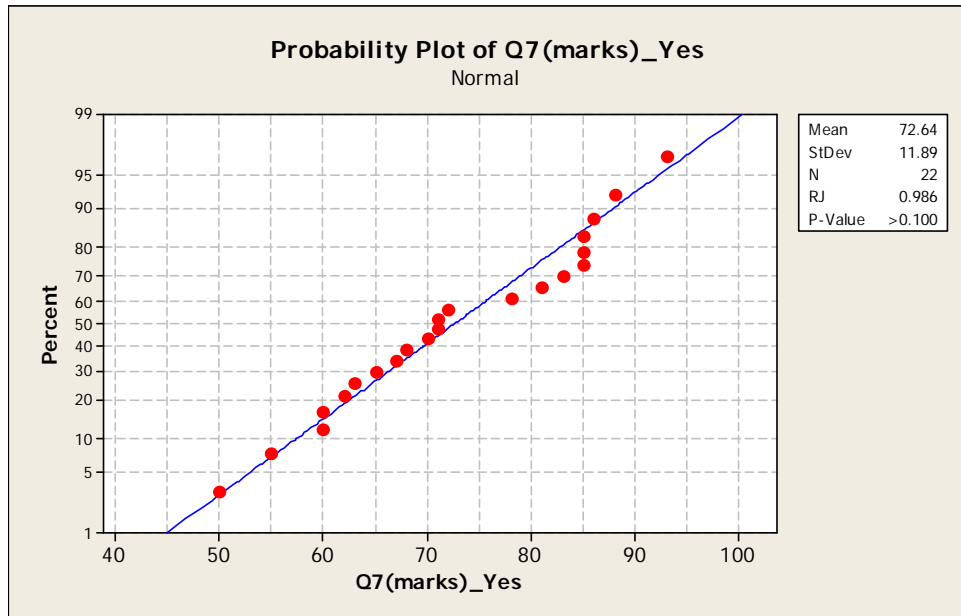
Non Preferred vs Preferred Teaching Style



Descriptive Statistics: Q7(marks)

Variable	Q16CD	N	N*	Mean	StDev	Minimum	Q1	Median	Q3	Maximum
Q7(marks)	No	35	0	64.97	13.76	28.00	57.00	66.00	76.00	98.00
	Yes	22	0	72.64	11.89	50.00	62.75	71.00	85.00	93.00





Two-Sample T-Test and CI: Q7(marks)_No, Q7(marks)_Yes

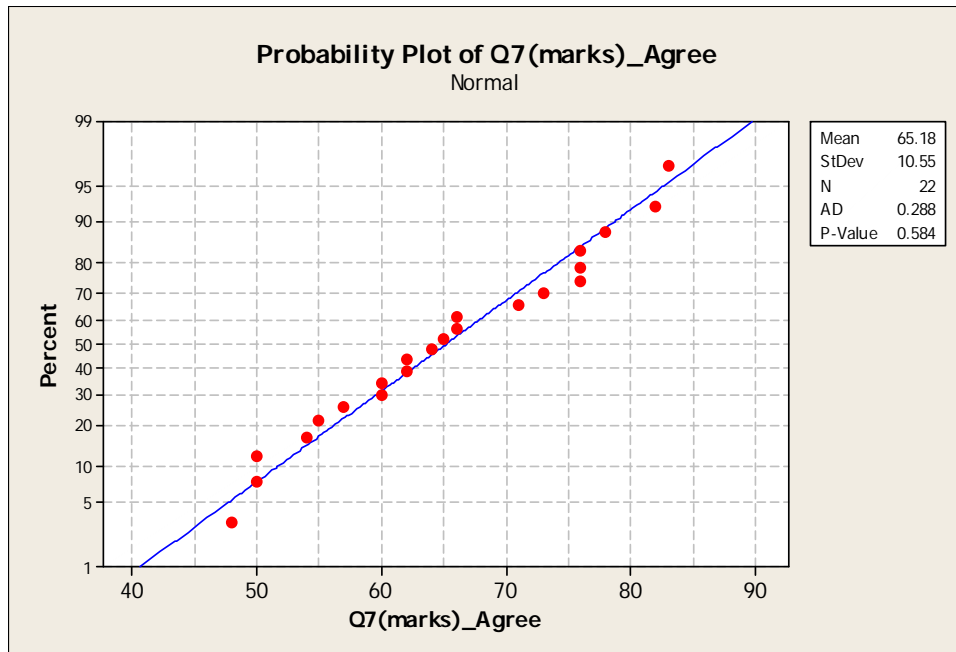
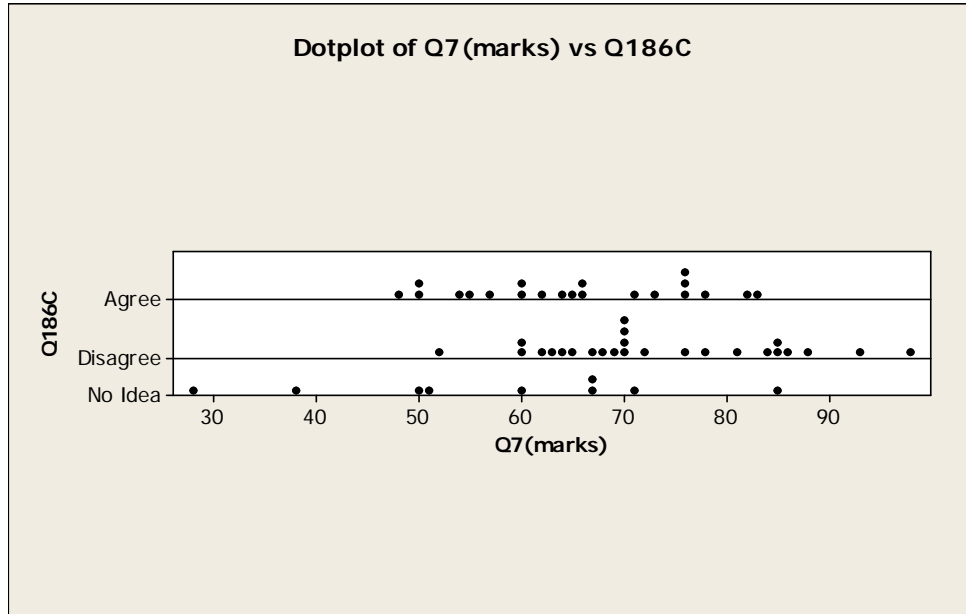
Two-sample T for Q7(marks)_No vs Q7(marks)_Yes

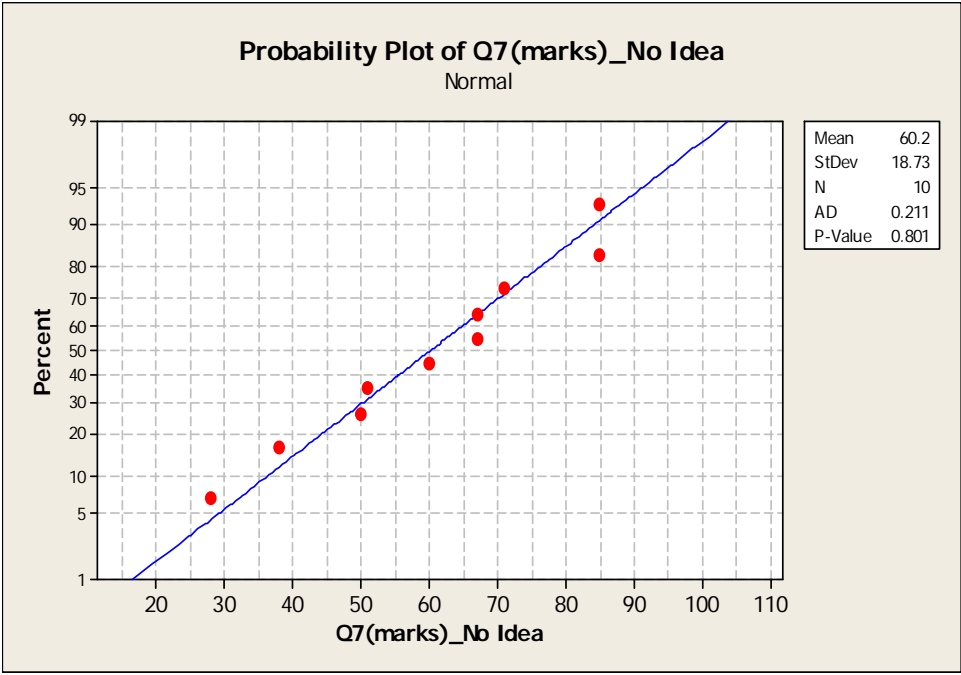
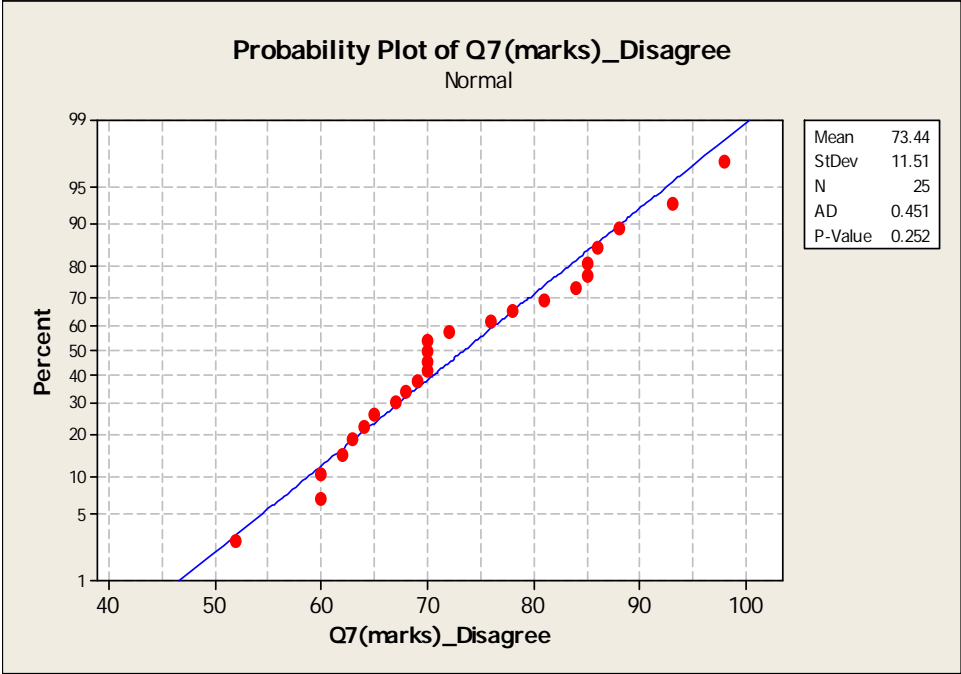
	N	Mean	StDev	SE Mean
Q7(marks)_No	35	65.0	13.8	2.3
Q7(marks)_Yes	22	72.6	11.9	2.5

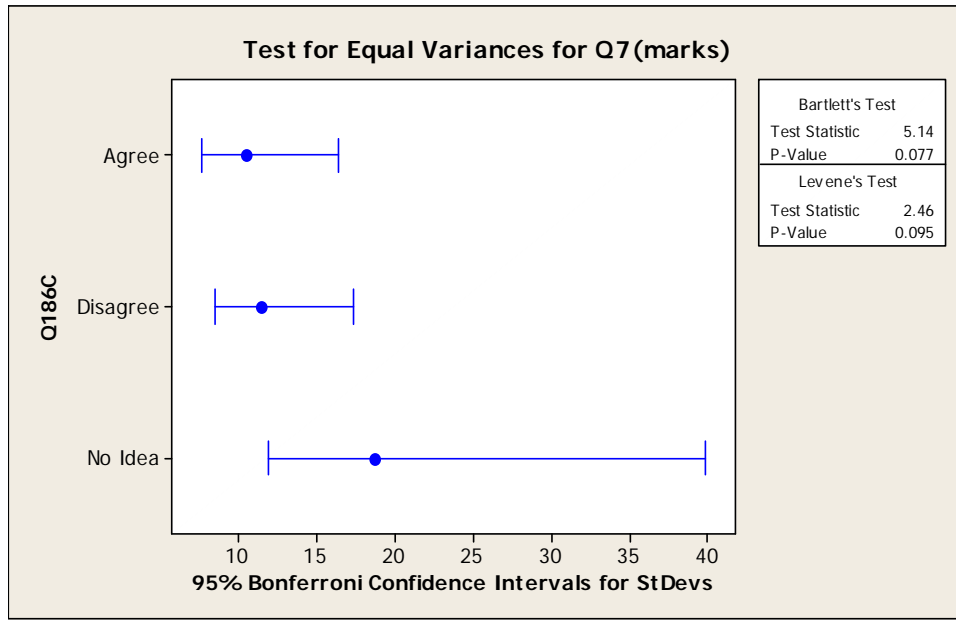
Difference = mu (Q7(marks)_No) - mu (Q7(marks)_Yes)
 Estimate for difference: -7.66494
 95% CI for difference: (-14.79547, -0.53440)
 T-Test of difference = 0 (vs not =): T-Value = -2.15 **P-Value = 0.036** DF = 55
 Both use Pooled StDev = 13.0774

Encouragement vs No Opinion vs No Encouragement from the Management

Students' utilisation of school facilities







One-way ANOVA: Q7(marks) versus Q186C

Source	DF	SS	MS	F	P
Q186C	2	1523	761	4.74	0.013
Error	54	8677	161		
Total	56	10200			

S = 12.68 R-Sq = 14.93% R-Sq(adj) = 11.78%

Individual 95% CIs For Mean Based on Pooled StDev

Level	N	Mean	StDev
Agree	22	65.18	10.55
Disagree	25	73.44	11.51
No Idea	10	60.20	18.73

56.0 63.0 70.0 77.0

Pooled StDev = 12.68

Tukey 95% Simultaneous Confidence Intervals
All Pairwise Comparisons among Levels of Q186C

Individual confidence level = 98.07%

Q186C = Agree subtracted from:

Q186C	Lower	Center	Upper
Disagree	-0.68	8.26	17.19
No Idea	-16.64	-4.98	6.68

-15 0 15 30

Q186C = Disagree subtracted from:

Q186C	Lower	Center	Upper	
No Idea	-24.68	-13.24	-1.80	(-----*-----)

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-15 0 15 30

