Investigating the Relationship Between MSN Messenger Usage and GPA.
IB Mathematical Studies Paper
Internal Assessment
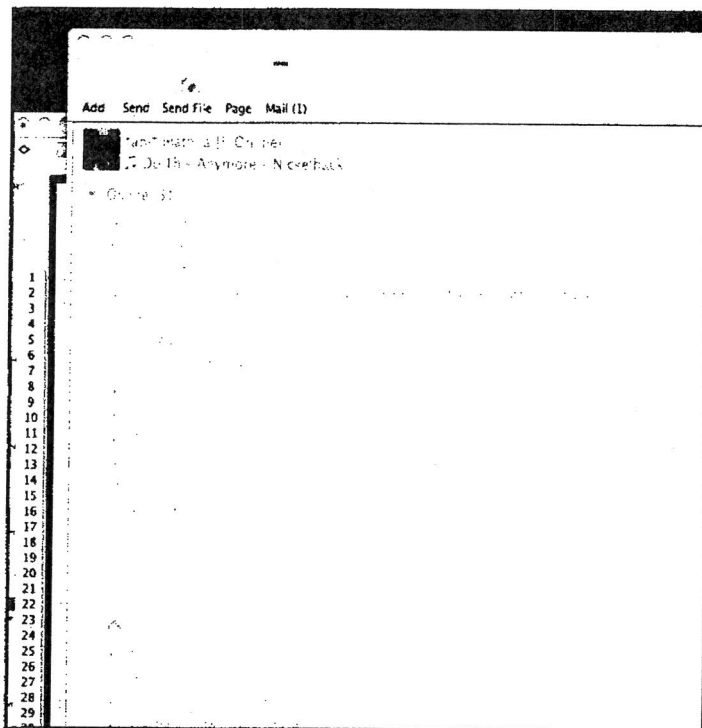
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Introduction

To many, getting homework done is a task in itself. Juggling between four applications, eating and watching TV may be less effective than concentrating intensely for a good hour and getting everything done. However, adults and teachers seem to target one popular application as the main perpetrator to distraction.

MSN messenger is a program adolescents use to talk to their friends instantaneously, provided the friend is signed on to the program as well. Being "online" now connotes being on MSN and being available to the general population for conversation.

It seems that, as the popularity of MSN rises, the social lives of teenagers come to depend upon it. Many parents and teachers have denounced the tool as overly distractive as it literally has the potential to allow you to speak to any of your friends at any given time.

The question thus arises as to whether or not this application has any relationship with a teenager's results in school. Is this communicative device too accessible, too easy?

Personal Expected Outcome

The ideology of free will leads me to believe that willpower and responsibility are enough to overcome the temptation of MSN and a curiosity behind the validity of my theory is the motive behind this investigation. However, and it may be that the effort expended upon keeping oneself un-distracted is less effective as one becomes more available.

Statement of the Task

This project will aim to determine the relationship between cumulative GPA (as a measure of performance in school) and the degree to which one uses MSN, if at all.

> **Note:** I chose to test dependence of GPA and not SAT scores, as the act of doing one's homework is the most probable act affected by MSN. Many high scorers on the SAT may not even do their homework and it is generally understood that effort in school and standardized test scores are not necessarily related.

Eighty 11th and 12th grade students will be asked two questions, one regarding their MSN habits and the other their GPA.

> Note: I chose to only interview 11th and 12th grade students as these students are the most likely to necessitate full concentration on their work. A student with a less challenging workload is not forced to put in as much effort.

They will have the option to either be "Online" during their homework, or "Away/Busy". A student who does not use MSN or does not sign on during their homework will be instructed to choose the "Offline" option.

The cumulative GPA of each individual will be classified into one of three categories, specified below.

High   3.6 or higher

Medium   3.0 to 3.5

Low   2.9 or lower

Table 1 **Definition of Categories**

A relationship between the variables will be determined using the **chi-squared test** and will conclude with a statement regarding MSN use and how it affects one's results in school.

Methodology

This is the process followed in order to find any sign of relationship between the two variables.

- An oral survey of eighty 11th and 12th grade students is taken in order to determine what percentage of the population is online, away/busy and offline while doing their homework. Students are asked the following questions:

1) What is your status on MSN while you do your homework? If you do not use MSN or are not online while you do your homework please reply "Offline."

2) What is your cumulative GPA?

- The cumulative GPA is tallied in one of the three categories (specified above).

- The results are put into a table and evaluated using the chi squared test to determine whether the variables are dependent or independent.

Data Collection

Raw data can be found in Appendix

	Online	Busy/Away	Offline	
Low	11	2	5	18
Medium	10	16	8	34
High	4	9	15	28
Totals	25	27	28	

Table 2 **Data from Survey taken on Messenger Habits**

In total 80 students were surveyed:

-18 students had "Low" cumulative GPAs.

-34 students had "Medium" cumulative GPAs

-28 students had "High" cumulative GPAs

Data Analysis

In order to visualize the results the 3 sets of data collected from the Online, Away/Busy and Offline groups were used to create bar graphs. This was also used as a preliminary tool to visualize a possible relationship between the amount of people in the different GPA categories and the MSN groups.

To verify and accurately obtain an answer as to whether or not one's status on MSN is related to one's GPA, the chi-squared test was implemented.

Observations:

(i) Results: **"Online" group**

A bar graph was created in order to look at the different amounts of people in each GPA category for the individuals who answered "Online". The graph seems to indicate that this group of people had a majority of "Low" GPAs and could therefore signify a relationship between the variables, especially since there were much less people with "High" GPAs. However, equally suggestive graphs from the other groups will be necessary to verify this as well as a conclusive chi-squared test.
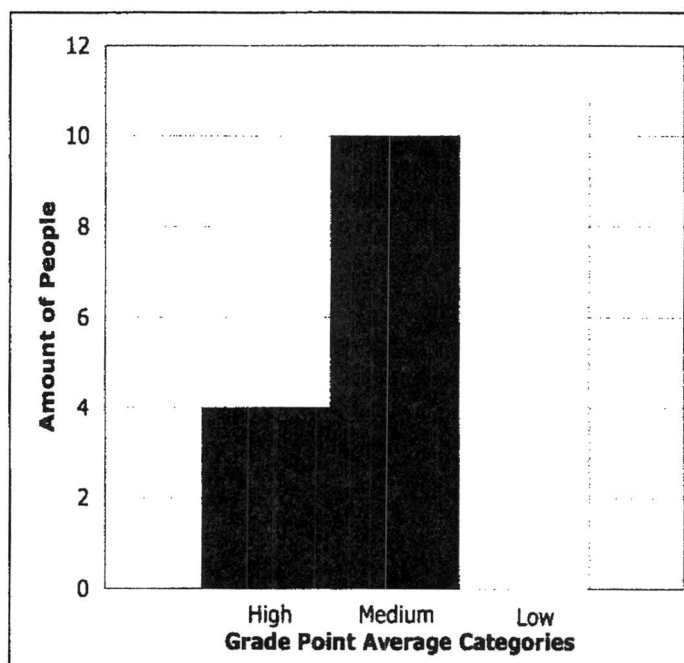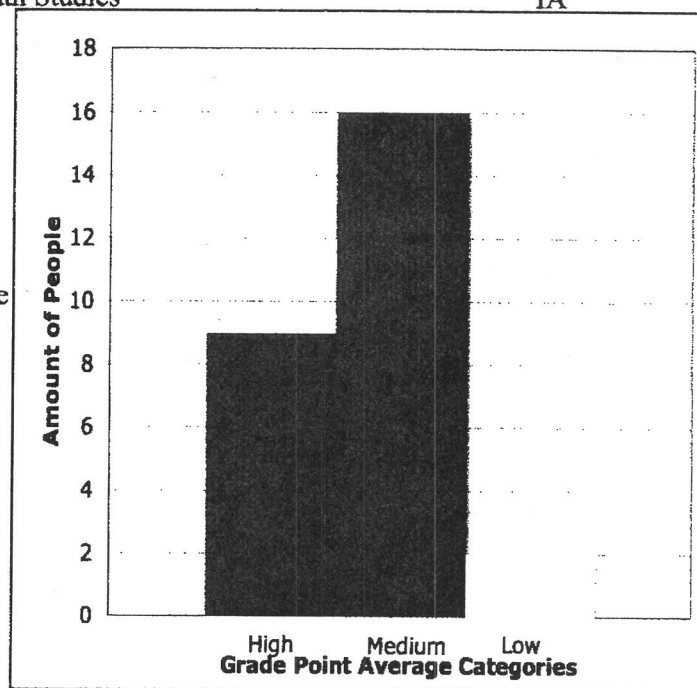

Graph 1 Data Collected from People "Online"

(i) Results: "Busy or Away" group

A bar graph was created in order to look at the different amounts of people in each GPA category for the individuals who answered "Busy or Away". The graph seems to indicate that this group of people had a majority of "Medium" GPAs and could therefore signify a relationship between the variables. The noticeably low results for "Low" GPA could be indicative that the "Busy or Away" status is significant in increasing one's performance in school. There is also a higher number of students in this group in the "High" GPA category, which could signify that as availability decreases, performance in school increases.

Graph 2 **Data Collected from People "Busy/Away"**

(i) Results: "Offline" group

A bar graph was created in order to look at the different amounts of people in each GPA category for the individuals who answered "Offline". The graph seems to indicate that this group of people had a majority of "High" GPAs and could therefore signify a relationship between the variables. In fact, this graph seems to be an approximate inverse of the "Online" group's graph and could therefore signify a possible relationship between GPA and availability on MSN.
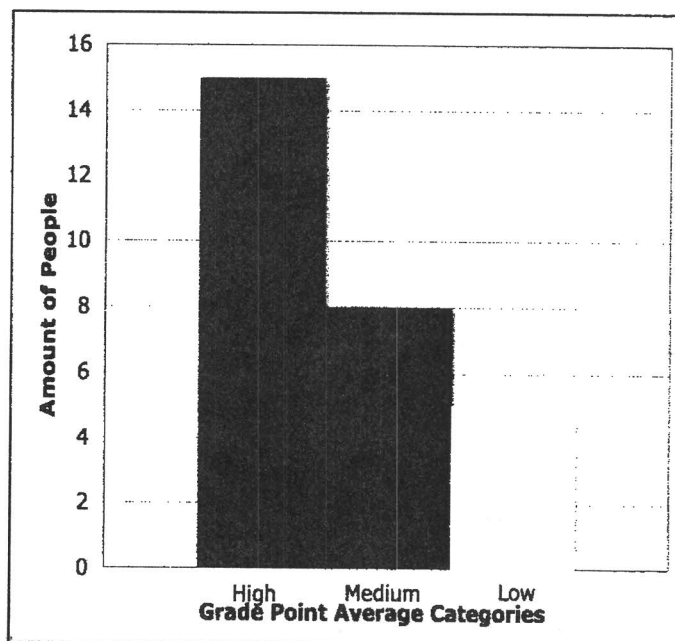
Graph 2 **Data Collected from People "Offline"**

Despite the persuasive results in the bar graphs, a chi-squared test is still necessary in order to confirm that there is a relationship between the two variables, GPA and MSN usage.

Chi-Squared Calculation

(H_O)Null hypothesis: GPA and MSN usage are independent variables.

(H_A)Alternate hypothesis: GPA and MSN usage are dependant variables.

Degrees of freedom= (rows – 1)(columns – 1) = (3-1)(3-1)= **4 df**

Level of significance: **5%**

Critical value: **9.49**

Rejection inequality: if x^2_{calc} > critical value, then reject H_O

	Online	Busy/Away	Offline	
Low	11	2	5	18
Medium	10	16	8	34
High	4	9	15	28
Totals	**25**	**27**	**28**	80

Table 3 **Observed data**

Calculate the expected data:

	Online	Busy/Away	Offline
Low	18x25/80	18x27/80	18x28/80
Medium	34x25/80	34x27/80	34x28/80
High	28x25/80	28x27/80	28x28/80

Table 4 **Calculation for expected data**

	Online	*Busy/Away*	*Offline*
Low	5.625	6.075	6.300
Medium	10.625	11.475	11.900
High	8.750	9.450	9.800

Table 5 **Expected results**

To calculate chi-squared the above calculations must be plugged into this equation.

(Observed - Expected)^2 / Expected = x^2

$(11 - 5.625)^2 / 5.625 = 5.136$

$(2 - 6.075)^2 / 6.075 = 2.733$

$(5 - 6.3)^2 / 6.3 = 0.268$

$(10 - 10.625)^2 / 10.625 = 0.037$

$(16 - 11.475)^2 / 11.475 = 1.784$

$(8 - 11.9)^2 / 11.9 = 1.278$

$(4 - 8.75)^2 / 8.75 = 2.579$

$(9 - 9.45)^2 / 9.45 = 0.021$

$(15 - 9.8)^2 / 9.8 = 2.759$

x^2 = 16.595

$16.595 > 9.49$ ($x^2_{calc} >$ critical value)

-The null hypothesis is rejected and the alternate hypothesis adopted.

-The variables GPA and MSN status are dependant.

Conclusion

Through utilization of the chi-squared test the affectability of GPA by an individual's usage of MSN was confirmed. There was a definite relationship shown through this equation.

Furthermore, by observing the bar graphs the nature of this relationship is determinable.

- Students who are apart of the "Offline" group tend to have "High" GPA's, with the amount of them receiving "Medium" or "Low" GPA's respectively smaller and smaller.

- Students who are apart of the "Away/Busy" group tend to have "Medium" GPA's, with a partiality to "High" GPA's above "Low" GPAs.

+This shows that, as availability decreases, productivity (in terms of attaining good grades) increases.

-Students who are apart of the "Online" group tend to have "Low" GPA's. These students have the least amount of "High" GPA group members, which proves that as availability increases, so may one's ability to achieve in school.

Because this was conducted on specifically 11th and 12th graders at the

it would be inapplicable to the general population. This conclusion thus applies to the surveyed party, and their peers in 11th and 12th grade at

Appendix

MSN Status	GPA		MSN Status	GPA
OFFLINE	High		OFFLINE	Medium
B/A	Low		ONLINE	Low
B/A	Medium		OFFLINE	Medium
B/A	Medium		OFFLINE	High
ONLINE	Low		OFFLINE	High
ONLINE	Medium		OFFLINE	High
B/A	Medium		OFFLINE	Medium
B/A	High		B/A	Medium
OFFLINE	High		OFFLINE	Low
OFFLINE	Low		ONLINE	High
B/A	High		ONLINE	Medium
B/A	Medium		ONLINE	Low
ONLINE	Low		ONLINE	Low
ONLINE	High		OFFLINE	Low
B/A	Low		OFFLINE	Medium
B/A	Low		OFFLINE	High
ONLINE	Low		B/A	Medium
ONLINE	Medium		B/A	Low
ONLINE	High		B/A	Low
B/A	Low		B/A	High
B/A	Medium		OFFLINE	High
OFFLINE	Medium		ONLINE	Low
OFFLINE	High		ONLINE	Medium
B/A	High		B/A	Medium
ONLINE	Medium		OFFLINE	Low
OFFLINE	High		B/A	Low
B/A	Medium		B/A	High
B/A	High		OFFLINE	High
ONLINE	Medium		OFFLINE	High
ONLINE	Low		B/A	Medium
OFFLINE	Low		ONLINE	Low
B/A	Medium		B/A	Low
ONLINE	Low		B/A	High
ONLINE	Medium		B/A	Medium
ONLINE	Low		ONLINE	Medium
B/A	Medium		OFFLINE	Medium
B/A	Medium		OFFLINE	High
B/A	High		B/A	Medium
OFFLINE	Medium		B/A	High
OFFLINE	High		ONLINE	Medium
OFFLINE	High			
ONLINE	Low			
ONLINE	Medium			
OFFLINE	High			
OFFLINE	Medium			
OFFLINE	Medium			