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"Exploring The Impact Of Social Media Usage On Students' Academic Achievement In Mathematics."

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Abstract:

The current study focused on the impact of social media usage on students' academic achievement in mathematics. The descriptive study was based on two research hypotheses using an unknown senior secondary student population. One hundred and twenty-one pupils from Avinash Junior College in Secunderabad were selected randomly. A four-point Likert rating system, which was part of the self-developed "Influence of Social Media on Academic Achievement in Mathematics" tool, was used to gather the students' opinions regarding social media usage and mathematical academic achievement. We used t-test and other statistical measures including the Product Moment Correlation Coefficient (1) to determine the type of relationship between social media usage and math academic success and (2) to find the relationship between students' actual usage of social media and their opinions on social media usage. The study discovered that social media's addictive qualities have a detrimental effect on students' academic achievement. A lack of time management leads students to spend more time on social media, which negatively impacts their mathematical performance. There is a negative correlation between students' actual usage of social media and their opinions on social media usage. So, students are unable to implement what they think actually about social media due to its attractiveness. Ultimately they are diverting towards too much usage of social media though they know the fact that it spoils their academic scores in mathematics. From random samples from the unknown population, it was found that the average usage of social media by senior secondary students is 132 minutes and the average mark in math tests is 72. Also, we found that the majority of students are spending on Instagram, YouTube, WhatsApp, and Google search engines. The present research results suggest that all educational institutions should establish regulations that limit or monitor students' use of social media, with parental involvement. Additionally, the government should monitor cyberspace and prohibit websites that are harmful to students' mental health.

Keywords: academic performance, influence, social media, mathematics, senior secondary or intermediate students.

Introduction:

Social media is a modern tool that enhances education, socio-economic, political, science, and technological development through Information and Communication Technologies (ICT). It has become the most popular information-sharing app in the 21st century, building on the ideological and technological foundations of Web 2.0. It allows the creation and exchange of user-generated content. Social networking sites are public web-based services that allow users to create personal profiles, connect with others, and send and receive messages. However, high usage among students has negatively impacted their study time, grammar, and spelling. Social media is considered the fastest-growing web application in the 21st century, but it is primarily used for socializing activities rather than academic growth. Technology has both positive and negative effects on society, including social media's ability to improve connectedness and communication among individuals and corporations. Social media platforms like WhatsApp, telegram, Facebook, Twitter, Instagram, and Snapchat etc are used to interact with friends, but their impact on academic achievement in Mathematics is our topic of study. Students are increasingly using mobile phones for social networking, causing distractions in classrooms and affecting their studies and writing. The introduction of Android-powered mobile phones has increased participation in social media, allowing users to create, develop, and strengthen their social ties. Social media can be classified into six categories: collaborative projects, blogs and microblogs, content communities, social networking sites, virtual game worlds, and virtual second worlds. Popular platforms include Facebook, Google+, LinkedIn, Twitter, microblogging, media-sharing networks, and video sharing. This trend has raised concerns for researchers who believe in knowledge and skill acquisition. Nalwa and Anand (2003)¹ suggested that internet addiction can lead to poor academic performance. Karpinski's (2009)² research showed that social media users devote less time to studies and have lower academic grades. Social media platforms like Facebook and WhatsApp are a major distraction for the current generation, with studies showing a correlation between academic performance and dependency. Some studies argue that social networks distract students from learning and instead focus on non-educational activities. The majority of students are getting lower grades in mathematics, and other subjects due to texting, chatting, and posting status updates. Internet addiction among students will negatively impact academic performance and emotional attributes. Moon, A.L.(2011)³ reports an alarming rate of social networking obsession among undergraduates, who spend excessive time on Facebook, Twitter, and other social media platforms. This excessive use can distract students from other activities like education and career pursuits. Morahan-Martin and Schumacher (2000)⁴ define social media addiction as excessive internet use and failure to control it. Bello (2012)⁵ warns that unchecked social media could further harm the collapsing education standards in cities. The study by Young (2006)⁶ found that internet use significantly impacts students' academic performance. Social media usage in higher education offers advantages such as enhancing relationships, improving learning motivation, offering personalized course material, and developing collaborative abilities. Social media usage enhances students' flexible learning and promotes various learning styles, including E-learning. However, it can also negatively impact academic performance. Shana (2012)⁷, revealed that students use social networks mainly for friends and chatting. Overall, social media's potential benefits and drawbacks need to be carefully considered. Internet addiction has led to increased usage of social media, resulting in poor academic performance. Addicted student users prioritize internet use for their interests over their academic reasons, leading to lower academic achievements in Mathematics. In Taiwan, Cheng-Fang Yen et al.,(2009)⁸ found that daily mobile phone use was linked to academic difficulty among university students. Our study found that Students of Hyderabad, Telangana state, India spend approximately 2.2 hours per day during college working days on social media.

Statement of the Problem

Social media has spread across the globe, becoming a global institution where access to the Internet is the primary means of information gathering. The emergence of smart phones, Internet data offerings by some telecom companies in India, and social media platforms such as Facebook, WhatsApp, Instagram, and Telegram channels have presented significant barriers to student academic success in India since 2016. Academic concerns about the effects of social media on research have grown since its inception as a result of technological advances and the growth of Internet software. Because of its potential to influence social media, it presents significant barriers to student success at all learning levels. Even in India's cosmopolitan cities like Hyderabad, parents complain that their children spend more time on social media than studying at home. These days students are paying so much attention and interest in social media to the detriment of their studies, for example, they are spending time listening to music, watching YouTube videos for song and movie advertisements, WhatsApp messages, tweets and posting on Facebook etc. Therefore, social media addiction on students' academic performance in mathematics, and students' attitudes towards social media usage are the topics to be investigated in this study.

Hypotheses for Research

To assess the importance of every question posed in this study, the following research hypotheses have been developed.

Hypothesis 1: Students' academic achievement in mathematics is not significantly affected by their use of social media.

Hypothesis 2: There is a slight negative correlation between students' actual usage of social media and their opinions on social media usage.

Methodology of Present Research

The research design adopted a descriptive survey because it examined the influence of social media on the academic performance of students in mathematics in Hyderabad. The population of the study comprised randomly 121 students sample from Intermediate first and second-year students of mathematics backgrounds at Avinash Junior College, Secunderabad. The instrument for the study is a Google form questionnaire on the influence of social media on the academic performance of students in mathematics and students' attitudes towards social media usage. Questionnaires were designed to elicit personal data, their social media usage hours, marks achievement in mathematics in their college internal exams of respondents and students' attitudes towards the influence of social media and academic performance of students in mathematics using the 4-point Likert Scale for frequency with options 1. Strongly Agree (Social media has had a significantly positive influence on my academic performance in mathematics.), 2. Agree (Social media has a somewhat positive influence on my academic performance in mathematics.), 3. Disagree (Social media has a somewhat negative influence on my academic performance in mathematics.) 4. Strongly Disagree (Social media has a significantly negative influence on my academic performance in mathematics). Also, to find the negative influence relation between students' time spent on social media and their academic achievements in mathematics, and to find the relationship between students' actual usage of social media and their opinions on social media usage., we calculated t-tests and other statistical analysis results including Pearson Product Moment Correlation coefficient.

Discussions of the Research Findings:

1. Testing the Hypothesis 1:

Hypothesis 1: Students' academic achievement in mathematics(Y) is not affected by their time spent on social media(X)

Paired T-Test Report

| Variable | Count | Mean | Standard Deviation of Data | Standard Error of Mean | T* | 95.0% LCL of Mean | 95.0% UCL of Mean |
|----------|-------|----------|----------------------------|------------------------|--------|-------------------|-------------------|
| X | 121 | 131.5703 | 74.67718 | 6.788834 | 1.9799 | 118.1288 | 145.0117 |
| Y | 121 | 72.23141 | 21.50727 | 1.955206 | 1.9799 | 68.36023 | 76.10258 |

Two-Sided Confidence Interval of the Mean Difference

| Statistic | Count | Mean Difference | Standard Deviation | Standard Error | T* | DF | 95.0% C. I. of Mean Diff. | |
|------------|-------|-----------------|--------------------|----------------|--------|-----|---------------------------|-------------|
| | | | | | | | Lower Limit | Upper Limit |
| Difference | 121 | 59.33884 | 79.50666 | 7.227878 | 1.9799 | 120 | 45.02815 | 73.64954 |

Paired-Sample T-Test

| Alternative Hypothesis | Mean Difference | Standard Error | T-Statistic | DF | Prob Level | Reject H ₀ at $\alpha = 0.050$? |
|------------------------|-----------------|----------------|-------------|-----|------------|---|
| Mean Diff. \neq 0 | 59.33884 | 7.227878 | 8.2097 | 120 | 0.00000 | Yes |

Paired T-Test Report**Wilcoxon Signed-Rank Test****Test Details**

| The sum of Ranks (W) | Mean of W | Std Dev of W | Number of Zeros | Number Sets of Ties | Multiplicity Factor |
|----------------------|-----------|--------------|-----------------|---------------------|---------------------|
| 6404 | 3690.5 | 386.4405 | 0 | 22 | 6192 |

Test Results

| Test Type | Alternative Hypothesis | Z-Value | Prob Level | Reject H ₁ at $\alpha = 0.050$? |
|--------------------------|------------------------|---------|------------|---|
| Exact* | Median Diff. \neq 0 | | | |
| Normal Approximation | Median Diff. \neq 0 | 7.0218 | 0.00000 | Yes |
| Normal Approx. with C.C. | Median Diff. \neq 0 | 7.0205 | 0.00000 | Yes |

* The Exact Test is provided only when there are no ties.

Tests of Assumptions

| Assumption | Value | Prob Level | Decision ($\alpha = 0.050$) |
|------------------------|---------|------------|-------------------------------|
| Shapiro-Wilk Normality | 0.9089 | 0.000001 | Reject normality |
| Skewness Normality | 4.2582 | 0.000021 | Reject normality |
| Kurtosis Normality | 2.1450 | 0.031956 | Reject normality |
| Omnibus Normality | 22.7335 | 0.000012 | Reject normality |

Correlation Coefficient = -0.087811. Which shows a negative correlation. Hypothesis 1 is rejected from the above statistical analysis.

2.

Testing the Hypothesis 2:

Hypothesis 2: There is a slight negative correlation between students' actual usage of social media (X) and their opinions on social media usage(Y).

Paired T-Test Report

Descriptive Statistics

| Variable | Count | Mean | Standard Deviation of Data | Standard Error of Mean | T* | 95.0% LCL of Mean | 95.0% UCL of Mean |
|----------|-------|----------|----------------------------|------------------------|--------|-------------------|-------------------|
| X | 121 | 2.195868 | 1.245819 | 0.1132563 | 1.9799 | 1.971628 | 2.420107 |
| Y | 121 | 2.008265 | 0.6518674 | 0.05926067 | 1.9799 | 1.890932 | 2.125597 |

Two-Sided Confidence Interval of the Mean Difference

| Statistic | Count | Mean Difference | Standard Deviation | Standard Error | T* | DF | 95.0% C. I. of Mean Diff. | |
|-----------------|-------|-----------------|--------------------|----------------|--------|-----|---------------------------|-------------|
| | | | | | | | Lower Limit | Upper Limit |
| Mean Difference | 121 | 0.1876033 | 1.436522 | 0.1305929 | 1.9799 | 120 | -0.07096154 | 0.4461682 |

Paired-Sample T-Test

| Alternative Hypothesis | Mean Difference | Standard Error | T-Statistic | DF | Prob Level | Reject H ₂ at α = 0.050? |
|------------------------|-----------------|----------------|-------------|-----|------------|-------------------------------------|
| Mean Diff. ≠ 0 | 0.1876033 | 0.1305929 | 1.4366 | 120 | 0.15345 | No |

Paired T-Test Report

Wilcoxon Signed-Rank Test

Test Details

| The sum of Ranks (W) | Mean of W | Std Dev of W | Number of Zeros | Number of Ties | Sets | Multiplicity Factor |
|----------------------|-----------|--------------|-----------------|----------------|------|---------------------|
| 3637 | 3487.5 | 378.9631 | 28 | 8 | | 188340 |

Test Results

| Test Type | Alternative Hypothesis | Z-Value | Prob Level | Reject H ₀ at α = 0.050? |
|--------------------------|------------------------|---------|------------|-------------------------------------|
| Exact* | Median Diff. ≠ 0 | | | |
| Normal Approximation | Median Diff. ≠ 0 | 0.3945 | 0.69321 | No |
| Normal Approx. with C.C. | Median Diff. ≠ 0 | 0.3932 | 0.69419 | No |

* The Exact Test is provided only when there are no ties.

Tests of Assumptions

| Assumption | Value | Prob Level | Decision (α = 0.050) |
|------------------------|---------|------------|-------------------------|
| Shapiro-Wilk Normality | 0.9096 | 0.000001 | Reject normality |
| Skewness Normality | 3.8276 | 0.000129 | Reject normality |
| Kurtosis Normality | 1.9040 | 0.056909 | Cannot reject normality |
| Omnibus Normality | 18.2761 | 0.000107 | Reject normality |

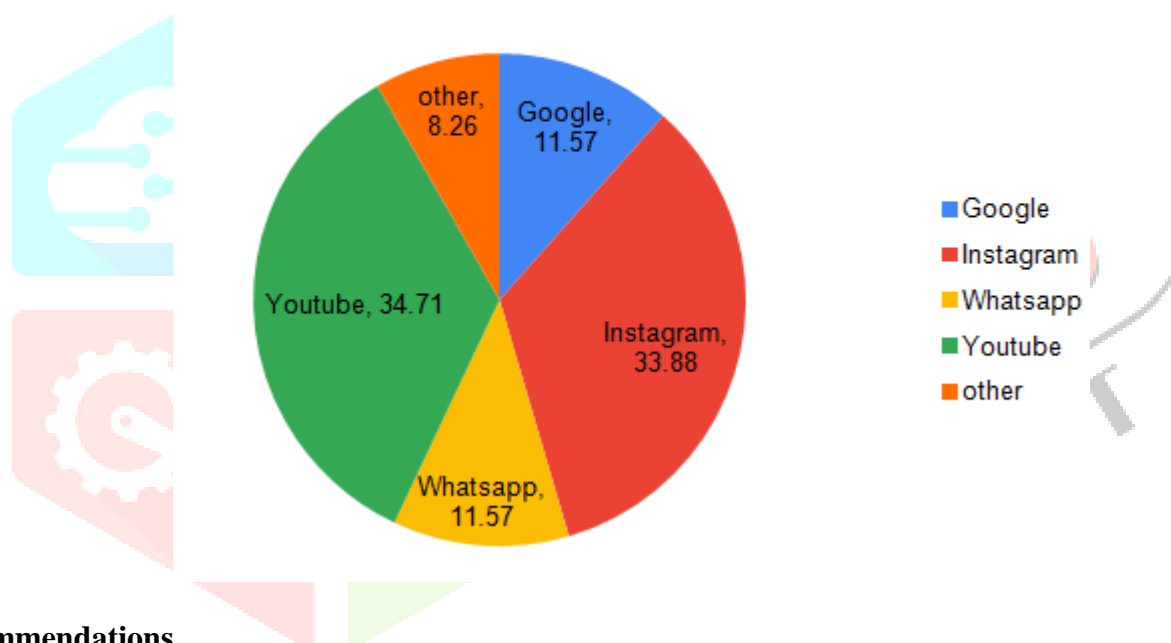
Correlation Coefficient = -0.053317. Therefore, Hypothesis 2 is significant.

Conclusion

From the results obtained in the study "Exploring the Impact of Social Media Usage on Students' Academic Achievement in Mathematics." it was found that:

1. Too much usage of social media is detrimental to the student's academic performance in mathematics subject. There is a negative correlation between time spent on social media and marks achieved in mathematics tests.
2. There is a negative correlation between students' actual usage of social media and their opinions on social media usage. So, students are unable to implement what they think actually about social media due to its attractiveness. Ultimately they are diverting towards too much usage of social media though they know the fact that it spoils their academic scores in mathematics.
3. From the collected random research samples, it was found that the average time spent on social media by senior secondary/Intermediate students is 132 minutes and their test performance in mathematics on average is around 72 %. It was found that the majority of students spend on Instagram, YouTube, WhatsApp, and Google search engines.
- 4.

% WATCHING



Recommendations

Based on the research findings, the following recommendations were made.

1. Parents should monitor their children's social media usage time to improve their children's academic performance in mathematics. Schools and colleges should ban the use of cell phones. In case, computers and the internet are required to be used for doing educational projects, students should be given access only to relevant sites. Other sites should be banned.
2. The government with the help of cybercrime departments, forensic and information technology departments should monitor cyberspace and filter and remove destructive and harmful content from social media for students' mental well-being. Content and language used on YouTube and other social media sites and apps must be censored.
3. There is a scope to do further research by taking large samples from Graduate and postgraduate students of different universities to test gender-wise social media influences on academics, behavioural changes etc.

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