ISSN (Online): 2455-3662
EPRA International Journal of Multidisciplinary Research (IJMR) - Peer Reviewed Journal
Volume: 11| Issue: 2| February 2025|| Journal DOI: 10.36713/epra2013 || SJIF Impact Factor 2025: 8.691 || ISI Value: 1.188

SOCIAL NETWORKING USAGE AND STUDENT MOTIVATION AS PREDICTORS OF STUDENT ENGAGEMENT IN SCIENCE

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Article DOI: https://doi.org/10.36713/epra20204
DOI No: 10.36713/epra20204

ABSTRACT
This study assessed whether students' social networking usage and motivation significantly predict their engagement in learning science. A descriptive-correlational research design was utilized, involving 339 respondents from three selected public high schools in the Tagum City Division, chosen through stratified random sampling. The study gathered data using three adapted questionnaires: the Social Networking Usage Questionnaire, the Science Motivation Questionnaire II (SMQ-II), and the Science Engagement Scale. Statistical analyses included mean, standard deviation, Pearson's r, and multiple regression. The findings indicated that the respondents' social networking usage is often manifested; students' motivation is highly manifested; and students' engagement in learning science is observed most of the time. Moreover, the findings indicate both social networking usage and student motivation have significantly correlated and predicted students' engagement in learning science. The study recommends that teachers utilize social networking and motivation to enhance student engagement. Finally, this study could provide valuable insights to students, parents, teachers, school administrators, DepEd officials, and researchers by gaining insight into the factors influencing students' engagement in learning science.

KEYWORDS: *Science Education, Social Networking Usage, Student Motivation, Student Engagement, Descriptive And Correlational Design, Regression Analysis, Tagum City, Davao Del Norte, Philippines*

INTRODUCTION

Background of the study

Student engagement is a critical factor in academic success, especially in science education, as it reflects the time and effort students invest in their schoolwork. Ghasemi et al. (2020) emphasized that engagement directly impacts academic achievement, but Martins et al. (2021) highlighted a decline in science interest among secondary students. Social networking sites, while offering educational opportunities, can contribute to disengagement by distracting students from lessons (Tamal et al., 2019). Yudho et al. (2023) found that low motivation is linked to decreased engagement, suggesting that teachers must employ strategies to foster active participation in science classrooms (Vamvakas et al., 2023).

Research from various countries identifies multiple factors contributing to the decline in student engagement. Perera (2021) found that poor teacher-student relationships, limited peer interaction, and low-quality learning activities negatively impacted engagement in Sri Lanka. Sumaryanti and Yuniar (2022) observed that excessive social networking use hindered engagement in Indonesia. In the Philippines, Rogayan Jr. and Bautista (2019) noted difficulties in science engagement despite students possessing essential skills, while Calusag and Calusag (2023) found that students in Zamboanga del Norte experienced reduced engagement due to social networking distractions. Delfino (2019) and Gara and Dela Cruz (2023) also linked disengagement to a lack of motivational activities and vague teaching, respectively.

In Tagum City Division, Grade 10 Science records from the 2022–2023 school year show that 34% of students received only fairly satisfactory grades, with a small percentage failing. This raises concerns about engagement levels, as many students struggle to master science concepts. To address this, the school has implemented remediation and enrichment programs to support struggling learners. Existing research has established a connection between student engagement, social networking, and motivation in technology-enhanced classrooms (Badshah et al., 2021; Yin et al., 2023), but most studies have limitations due to convenience sampling. This study aims to examine how social networking and motivation influence science engagement among Grade 10 students in Tagum City, with the results informing effective teaching strategies and shared with stakeholders to promote best practices in science education.

Research Questions

The research aimed to answer the following:

1. What is the level of social networking usage of students in terms of:
   1.1. academic;
   1.2. socialization;

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1.3. entertainment; and
1.4. informativeness?

2. What is the level of student motivation in Science in terms of:
2.1. intrinsic motivation;
2.2. career motivation;
2.3. self-determination;
2.4 self-efficacy; and
2.5 grade motivation?

3. What is the extent of student engagement in Science in terms of:
3.1 cognitive engagement;
3.2 behavioral engagement;
3.3 emotional engagement; and
3.4 social engagement?

4. Is there a significant relationship between:
4.1. social networking usage and students' engagement in Science?
4.2. student motivation and students' engagement in Science?

5. Do social networking usage and student motivation significantly predict student engagement in Science?

METHOD

Research Design

This quantitative study employed a descriptive correlational design, which involves defining research interests, framing questions, reviewing literature, designing the study, selecting participants, collecting survey data, analyzing findings, and publishing results (Kittur, 2023). To facilitate data collection, researchers often use structured tools like questionnaires, which are designed to elicit specific responses and can be self-administered for convenience (Abduljawad, 2015). Once data are gathered, rigorous analysis is conducted to identify patterns and correlations, ensuring the accuracy of measurements (Watson, 2015). In this study, survey questionnaires were used to collect quantitative data on students' use of social networking, motivation, and engagement in science.

Research Respondents

Grade 10 students enrolled in three selected public schools in Tagum City Division for SY 2024-2025 were the study respondents, selected using stratified random sampling. A sample size of 339 was determined from a population size of 2,822 using the Online Raosoft Sample Size Calculator. Figure 1 shows a map highlighting Tagum City, Davao del Norte, Philippines, where the study was conducted.



Source: InTagum (https://investintagum.blogspot.com/p/about-tagum.html)

Figure 1: Vicinity Map of Tagum City Highlighting the Participating Schools

Research Instruments

Three survey questionnaires were used to collect data: the Social Networking Usage Questionnaire, the Science Motivation Questionnaire II (SMQ-II), and the Science Engagement Scale. These instruments underwent expert content validation and pilot testing to ensure reliability. The Social Networking Usage Questionnaire by Gupta and Bashir (2018) consists of 21 items across four subfactors, with a Cronbach's alpha of 0.830. The SMQ-II, developed by Glynn et al. (2011), contains 25 questions divided into five subscales, with a reliability coefficient of 0.92. The Science Engagement Scale, adapted from Gürbüz et al. (2020), includes 33 items across four subscales, with a Cronbach's alpha of 0.90. A five-point Likert scale was used to measure responses.

Statistical Treatment of Data

The following statistical techniques were used to examine and evaluate the collected data.

Mean. This statistical approach was used to quantify and identify the respondents' level of usage of social networking, motivation, and engagement in learning science.

*Pearson r***.** This tool was used to determine the correlation among the study variables.

Multiple Regression Analysis. This was applied to determining if social networking usage and student motivation significantly predicted students' engagement in learning science.

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RESULTS

Table 1: *Level of Social Networking Usage*

Items	SD	Mean	Descriptive Equivalent
Academic			
1. use to solve my academic problems.	0.94	3.89	High
2. use to do research works.	0.89	4.26	Very High
3. use for online academic group discussions	1.01	3.78	High
4. use to communicate with my friends in preparation for exam.	1.14	3.68	High
5. use for collaborative learning.	1.02	3.54	High
6. use to learn about my curricular aspects and any other academic activities.	0.92	4.12	High
7. use to seek help from my teachers.	1.13	3.33	Moderate
Category Mean	**1.01**	**3.80**	High
Socialization			
1. use to become more sociable.	1.07	3.43	High
2. use to create my social identity.	1.08	3.44	High
3. prefer using social networking sites to attending social gathering.	1.17	3.10	Moderate
4. use to keep in touch with my relatives and friends.	1.04	3.96	High
5. use to get information regarding current social events.	1.04	3.99	High
Category Mean	**1.08**	**3.58**	High
Entertainment			
1. use for sharing pictures.	1.07	3.86	High
2. use to look at funny sharing.	1.10	3.86	High
3. use for watching movies.	0.91	4.35	High
4. use to get relief from academic stress.	0.98	4.19	High
Category Mean	**1.02**	**4.07**	High
Informativeness			
1. use for reading news.	1.05	3.75	High
2. use to share new ideas.	1.07	3.64	High
3. use for getting job-related information.	1.08	3.59	High
4. use to keep abreast with the breakthroughs in science.	1.05	3.52	High
5. use to learn about the impacts of science and technology in the environment.	1.05	3.83	High
Category Mean	**1.06**	**3.67**	High
Overall Mean	**1.04**	**3.77**	High

Table 1 shows that students use social networking for learning science at a high level, with entertainment scoring the highest mean of 4.07, while socialization scored the lowest at 3.58, both categorized as high. The overall mean of 3.77 indicates that social networking is an important part of students' daily lives, serving various purposes. These findings align with Mese and Aydin's (2019) study, which highlighted the use of social networking sites for research, collaboration, communication, content sharing, and entertainment. Bitherman and Frempong-Kore (2021) also found a positive impact of SNS on learning, offering benefits like better resource access, increased collaboration, and greater engagement. Additionally, Dash et al. (2022) reported that 90% of students use SNS to access learning content, particularly in science, engaging in group discussions and watching educational videos (Ojeda-Serna et al., 2020).

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Table 2: ***Level of Student Motivation***

Items	SD	Mean	Descriptive Equivalent
Intrinsic Motivation			
1. Learning science is interesting.	1.02	3.99	High
2. I am curious about discoveries in science.	0.96	4.02	High
3. The science I learn is relevant to my life.	0.98	3.68	High
4. Learning science makes my life more meaningful.	1.03	3.75	High
5. I enjoy learning science.	1.11	3.78	High
Category Mean	**1.02**	**3.84**	High
Career Motivation			
1. Learning science will help me get a good job.	1.03	3.56	High
2. Understanding science will benefit me in my career.	1.00	3.70	High
3. Knowing science will give me a career advantage.	1.00	3.71	High
4. I will use science problem-solving skills in my career.	1.11	3.46	High
5. My career will involve science.	1.18	3.34	Moderate
Category Mean	**1.07**	**3.55**	High
Self-Determination			
1. I study hard to learn science.	1.10	3.56	High
2. I prepare well for science tests and labs.	1.03	3.54	High
3. I put enough effort into learning science.	1.01	3.62	High
4. I spend a lot of time learning science.	1.07	3.29	Moderate
5. I use strategies to learn science well.	1.04	3.55	High
Category Mean	**1.05**	**3.51**	High
Self-Efficay			
1. I believe I can earn a grade of ‘‘A’’ in science.	1.10	3.42	High
2. I am confident I will do well on science tests.	1.03	3.38	Moderate
3. I believe I can master science knowledge and skills.	1.12	3.32	Moderate
4. I am sure I can understand science.	0.94	3.64	High
5. I am confident I will do well in science labs and projects.	0.98	3.40	High
Category Mean	**1.04**	**3.43**	High
Grade Motivation			
1. Scoring high on science tests and labs matters to me.	1.06	3.86	High
2. It is important that I get an ‘‘A’’ in science.	1.05	3.86	High
3. I think about the grade I will get in science.	1.05	3.89	High
4. Getting a good science grade is important to me.	1.01	3.98	High
5. I like to do better than other students on science tests.	1.18	3.45	High
Category Mean	**1.07**	**3.81**	High
Overall Mean	**1.05**	**3.63**	High

Table 2 shows that students exhibit strong intrinsic motivation in science, with a high mean score of 3.84, while self-efficacy had the lowest score of 3.43, still within the high range. The overall motivation score was 3.63, indicating high motivation, with moderate variation in student perceptions.

These results align with Rahmayanti et al. (2020), who identified key components of student motivation, including intrinsic motivation, self-efficacy, and career motivation. Bazar et al. (2024) found that students are motivated by their drive to complete tasks and positive emotions related to assignments, while Romero et al. (2020) noted that intrinsic motivation is influenced by self-determination, self-efficacy, and task-oriented factors.

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Table 3: ***Extent of Student Engagement in Learning Science***

Items	SD	Mean	Descriptive Equivalent
Cognitive Engagement			
1. I go through the work for science class and make sure that it's right.	0.96	3.66	Highly Extensive
2. I think about different ways to solve a problem.	0.90	3.75	Highly Extensive
3. I try to connect what I am learning to things I have learned before.	0.95	3.92	Highly Extensive
4. I try to understand my mistakes when get something wrong.	0.98	4.10	Highly Extensive
5. I enjoy working through problems to find the answer on my own.	1.23	3.08	Moderately Extensive
6. I actively engage my mind when doing work for class.	1.17	2.95	Moderately Extensive
7. When work is challenging, I make an effort to study all parts, even the difficult ones.	1.22	2.99	Moderately Extensive
8. I do more than required in class.	0.98	3.40	Highly Extensive
Category Mean	**1.07**	**3.48**	Highly Extensive
Behavioral Engagement			
1. I stay focused.	1.04	3.86	Highly Extensive
2. I put effort into learning science.	0.94	3.77	Highly Extensive
3. I keep trying even if something is hard.	0.97	4.01	Highly Extensive
4. I complete my homework on time.	1.08	3.48	Highly Extensive
5. I talk about science outside of class.	1.13	3.08	Moderately Extensive
6. I participate in class.	1.11	3.60	Highly Extensive
7. I find ways to stay engaged and productive during different tasks.	1.24	2.97	Moderately Extensive
8. If I don't understand something, I take it as an opportunity to explore and learn more.	1.22	3.58	Highly Extensive
Category Mean	**1.10**	**3.54**	Highly Extensive
Emotional Engagement			
1. I look forward to science class.	1.06	3.43	Highly Extensive
2. I enjoy learning new things about science.	0.95	3.75	Highly Extensive
3. I want to understand what is learned in science class.	0.92	3.93	Highly Extensive
4. I feel good when I am in science class.	1.15	3.80	Highly Extensive
5. I feel encouraged in science class.	1.15	2.96	Moderately Extensive
6. I think that science class is exciting and full of interesting discoveries.	1.11	3.67	Highly Extensive
7. I want to be in science class.	1.15	3.80	Highly Extensive
8. I care about learning science.	1.12	4.00	Highly Extensive
9. I feel positive and uplifted when I am in science class.	1.17	3.69	Highly Extensive
10. I feel confident and excited when I learn new things about science.	1.23	3.61	Highly Extensive
Category Mean	**1.09**	**3.62**	Highly Extensive
Social Engagement			
1. I build on others' ideas.	1.04	3.62	Highly Extensive
2. I try to understand other people's ideas in science class.	0.90	3.88	Highly Extensive
3. I try to work with others who can help me in science.	0.93	3.95	Highly Extensive
4. I try to help others who are struggling in science.	1.08	3.61	Highly Extensive
5. I value and appreciate other people's ideas.	1.22	3.87	Highly Extensive
6. When working with others, I actively share my ideas.	1.16	3.89	Highly Extensive
7. I enjoy collaborating with my classmates.	1.21	4.04	Highly extensive
Category Mean	**1.08**	**3.84**	Highly Extensive
Overall Mean	**1.09**	**3.62**	Highly Extensive

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Table 3 highlights student engagement in science, showing that social engagement had the highest mean score of 3.84, while cognitive engagement had the lowest at 3.48, with all categories falling under the 'highly extensive' range. The overall mean score for engagement was 3.62, indicating a high level of participation. A standard deviation of 1.09 suggests variability in engagement, though most students showed strong involvement. These results align with Sukor et al. (2021), who found high social engagement (3.96) and emotional engagement (3.93), but lower cognitive engagement (3.42). Joshi et al. (2022) also noted that cognitive, behavioral, emotional, and social engagements are interconnected and contribute to students' skill and knowledge development.

Table 4: ***Significance of the Relationship Between Variables***

Variables Correlated	r-values	p-values	Remarks
Social Networking Usage & Student Engagement	.397	0.000	Significant
Student Motivation & Student Engagement	.646	0.000	Significant

Table 4 reveals a moderate positive correlation (r = 0.397) between social networking use and student motivation in science, suggesting that increased use of social media platforms is associated with higher student involvement and interest in learning. Social networking facilitates collaborative learning, content sharing, and community-building, enhancing engagement in science.

This finding is supported by Trang (2023) and Yin et al. (2023), who observed positive effects of social networking on student participation, and Habibi and Salim (2021), who noted the role of interactive communication and dynamic content in boosting engagement. Additionally, the stronger correlation (r = 0.646) between student motivation and engagement in science shows that motivated students are more actively engaged, reflecting a deeper interest in the subject. Motivation acts as a catalyst for increased focus, effort, and perseverance, suggesting that strategies fostering intrinsic interest or self-directed learning can improve both motivation and engagement. This aligns with Romero et al. (2020), Kong (2021), and Arguello (2018), who emphasized the impact of motivation on student engagement and learning outcomes.

Table 5: ***Influence of Social Networking Usage and Student Motivation on Student Engagement***

Independent Variable	Unstandardized Coefficients		Standardized Coefficients	t	p-value	Remarks
	B	Std. Error	Beta			
(Constant)	1.824	0.140	-	13.039	0.000	
Metacognitive Strategies	0.101	0.040	0.118	2.529	0.000	Significant
Achievement Emotions	0.390	0.031	0.590	12.590	0.000	Significant

R = 0.654; R square = 0.428; F = 125.790; p = 0.000

Table 5 indicates that both social networking usage and student motivation significantly predict student engagement in science learning. Social networking usage contributes to a 0.101 increase in student engagement for every unit increase in strategies, while student motivation leads to a 0.390 increase in engagement for every unit increase in emotions. These two factors together account for 42.8% of the variation in student engagement, as reflected by the R square value of 0.428. This highlights the crucial role of social networking and motivation in shaping students' engagement with science.

The findings align with Zatserkivna and Khalimanenko's (2024) study, which found that social networking sites positively impact student engagement by incorporating students into academic life. Alshayeb (2018) also emphasized that social networking platforms enhance student engagement through two-way communication and increased participation. Igboke and Olom (2021) further noted that these platforms provide an interactive space for collaboration. On the other hand, student

Recommendations

Students should enhance their use of social networking for science learning while maintaining positive motivation to improve engagement and academic performance. Teachers can integrate SNS in class, employ motivational strategies, and use interactive tools like PhET Simulations, Quizalize, and Khan Academy to foster interest in science. Parents should guide children in using social networking responsibly for education and create a supportive home environment. School administrators should promote programs that integrate SNS in science education and provide training for teachers. DepEd should implement inclusive digital programs, ensuring access to devices and internet connectivity while monitoring their

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effectiveness. Future researchers are encouraged to explore SNS and motivation in STEM education across different regions and variables.

CONCLUSIONS

The study concludes that students exhibit a high level of social networking usage and motivation in science, leading to a highly extensive engagement in the subject. A significant relationship exists between social networking usage, student motivation, and engagement in science. Additionally, both social networking usage and motivation are strong predictors of student engagement, emphasizing their crucial role in enhancing science learning.

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