

# Digital Learning Tools Availability and Students' Engagement in Science

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## ABSTRACT

Digital tools offered promising opportunities to enhance student engagement and improve learning outcomes. Understanding this relationship is essential for educational institutions as they sought to develop more engaging and effective learning environments. Despite the increasing integration of digital technologies in education, a significant gap remained in understanding their specific impact on student engagement, particularly within science education. This study specifically aimed to investigate the relationship between the availability of digital learning tools and students' engagement in science among Grade 10 students at Dologon National High School. The study used a descriptive-correlational design to evaluate the relationship between two variables. The study utilized content-validated questionnaires to assess both variables, which were administered to 152 grade 10 students at Dologon National High School. The analysis revealed a positive moderately strong correlation coefficient which suggested that the availability of digital learning tools significantly influenced students' engagement levels in science subjects. The findings indicated that teachers could also infer the highly significant relationship on digital learning tools availability and students' engagement. This could serve as their basis on improving their students' level of engagement in their Science classes.

**Keywords:** Availability, behavioral, cognitive, digital learning tools, emotional, students' engagement, usability, variety.

## INTRODUCTION

In recent years, the integration of digital learning tools in educational settings has gained significant momentum, particularly in the field of science education. Digital tools, such as online simulations, interactive software, and collaborative platforms, offer promising opportunities to enhance student engagement and improve learning outcomes. This research aims to explore the availability of digital learning tools and their impact on students' engagement in science classes. Understanding this relationship is essential for educational institutions as they seek to develop more engaging and effective learning environments.

Apparently, despite the increasing integration of digital technologies in education, a significant gap remains in understanding their specific impact on student engagement, particularly within science education. A systematic review has revealed that many studies lack a consistent definition of student engagement in the context of digital tools, resulting in varied interpretations and measurements across different settings (Kahu, 2013). Additionally, the existing literature often overlooks how specific digital tools can enhance engagement among high school students, especially in science subjects. This gap highlights the need for further investigation into the effectiveness of digital learning tools and their potential to promote active participation and interest among students.

Subsequently, students' engagement encompasses behavioral, emotional, and cognitive aspects of learning. Engagement is influenced by various factors, including the availability of digital learning tools, teaching methods employed by educators, and students' individual characteristics such as motivation and prior

knowledge. The interaction between these variables can significantly shape the educational experience; for instance, effective use of digital tools can enhance engagement by providing interactive and collaborative learning opportunities that cater to diverse learning styles (Bond et al., 2020).

In fact, a study by Ally (2012) found that social media platforms significantly enhance collaboration and communication among students, leading to increased engagement levels in classroom settings. Similarly, Carlos (2024) stated that demonstrating digital tools positively impacted student attentiveness and participation during science classes. The findings suggested that integrating technology into lessons made learning more dynamic and encouraged students to take a more active role in their education.

In another local study, De Guzman et al. (2021) investigated the effects of using interactive digital tools, such as educational apps and online simulations, in science classes. The results indicated that students who utilized these tools exhibited higher levels of attentiveness and active participation during lessons. The study emphasized that integrating technology into science education not only made learning more dynamic but also encouraged students to take a more proactive role in their education.

This study specifically aimed to investigate the relationship between the availability of digital learning tools and students' engagement in science among Grade 10 students at Dologon National High School.

This research was conducted during the school year 2024-2025 at Dologon National High School, focusing specifically on Grade 10 students. By examining this demographic, the study sought to provide insights into how digital learning tools could be effectively leveraged to enhance educational outcomes within local educational settings.

## **METHODOLOGY**

### **Research Design**

The study is a non-experimental research and this makes use of a descriptive-correlational design to evaluate the relationship between two variables. The Availability of Digital Learning Tools with three (3) sub-variables namely; availability, usability and variety involving factors and Engagement with sub-variables namely; behavioral, emotional and cognitive factors of student's in science.

### **Locale of the Study**

Dologon National High School (VNHS) serves as the primary locale for this study, situated in Dologon, Maramag, Bukidnon, Philippines. Established under the Philippine education system, DNHS is a significant educational institution that caters to a diverse student population from various socioeconomic backgrounds. The school aims to provide quality education and promote holistic development among its students. Also, the said school is convenient and easy to access for the researcher. Its accessibility enables efficient data collection and fosters meaningful engagement with teachers, allowing for a comprehensive exploration of the subject matter.

### **Participants of the Study**

The study was participated by the Grade ten (10) students of Dologon National High School S.Y 2023-2024. The researchers used the sampling technique of Cochran formula to identify the number of participants for this study. Hence, one hundred fifty two (152) grade 10 students were chosen to be the participants of this study. They are selected by the researchers since they are being exposed to digital learning tools in their science subject.

### **Research Instruments**

The researchers used survey questionnaires for collecting data necessary to meet the objectives of this study. Hence, the researchers patterned a total of six survey questionnaires. Three survey questionnaires were for digital learning tools and also three for the students' engagement in science. The reliability of these

questionnaires was assessed through carrying out a pilot testing on thirty (30) grade 10 students of Valencia National High School. To measure its reliability, its internal consistency reliability (cronbach alpha) was determined.

## **Digital Learning Tools Questionnaires**

### **Availability, Usability and Variety Scale**

In determining the level of digital learning tools in terms of Availability, Usability and Variety, the researcher patterned the study of Carlos (2024) entitled Self-efficacy scale from the study of Usher, E.L & Pajeres, F., (2009) entitled “ Impact of Digital Learning Tools on Student Engagement in High School Classrooms in Peru”. It is a (30)- item scale designed to test the students’ availability of digital learning tools in their science class. The questionnaire underwent validation and was assessed with a Cronbach alpha of 0.954.

### **Students Engagement Questionnaires**

#### **Behavioral, Emotional and Cognitive engagement Scale**

Student Engagement Questionnaire is a (30)- item scale designed to test the behavioral, emotional and cognitive engagement of students’ with regards to the availability of digital learning tools in their science class.

In discerning the level of students’ engagement in science in terms of Behavioral, Emotional and Cognitive, the researchers patterned the study of Magpantay & De Guzman (2021) entitled “Interactive digital tools in science education: Effects on student engagement.” It is a (30)- item scale designed to test the students' level of engagement towards science subjects. The questionnaire underwent validation and was assessed with a Cronbach alpha of 0.954.

## **Data Gathering Procedure**

The researchers followed ethical considerations upon the employment of data-gathering procedures. The researchers initially asked permission and approval of the principal of Dologon National High School through Dr. Rolisa T. Benedicto, principal of VNHS. A letter of consent was also disseminated to the participants after being approved to conduct the study. All data in this study were gathered through tangible survey questionnaires. To keep the confidentiality of the data, participants’ identity remained anonymous.

## **Statistical Analysis**

After the data collection, data underwent descriptive statistics analysis by determining the mean, to interpret the students’ level of engagements; behavioral, emotional and cognitive engagement and digital learning tools; availability, usability and variety. The independent variables which are psychological factors and the dependent variable which is the students’ digital learning tools availability were statistically tested with IBM SPSS to compute correlation coefficients and their respective probability values. Pearson correlation coefficient (r) statistical analysis was utilized to determine the strength of the correlation between students’ digital learning tools availability and engagement.

## **Research Ethics**

The researchers are aware of the ethical considerations upon conducting the research study. The researchers asked for a letter of approval from the Principal of Valencia National High School to conduct the study with a note from the researcher's advisor. The researchers also obtained consent from participants, attached to it were the participants' signatures as a proof of their willingness to participate in the study. The consent form includes a thorough explanation of the research study and the methods, and how their responses will be used. Also, indicating the freedom of the participants to withdraw freely from the study anytime. Any data gathered from the participants remains confidential and stored securely, it is only used for the interested purpose, only held for as long as necessary, and destroyed once no longer needed. The researchers ensured that ethical practice is applied and should be carried out in a professional, respectful, and courteous manner.

## RESULTS AND DISCUSSION

### Summary of Findings for Students’ Digital Learning Tools

Table 1 shows the summary of students’ level of digital learning tools in their Science subject. The table presents the combined mean scores of the three (3) dimensions of digital learning tools: Availability (3.34); Usability (3.35); and Variety (3.38). The results indicate that the students' level of digital learning tools was “Average”. This implies that the level of availability, usability, and variety of digital learning tools of students in their science subject education as average points, this average assessment highlights a critical need for improvement in the availability, usability, and diversity of digital tools to enhance student engagement and academic success in science education.

Table 1: Summary of Students Digital Learning Tools

Dimensions	Mean	Descriptive Rating	Qualitative Interpretation
Availability	3.34	Neutral	Average
Usability	3.35	Neutral	Average
Variety	3.38	Neutral	Average
<b>Overall Mean</b>	<b>3.35</b>	<b>Neutral</b>	<b>Average</b>

\*Legend:

Range	Descriptive Rating	Qualitative Interpretation
4.51-5.0	Strongly Agree	Very High
3.51-4.5	Agree	High
2.51-3.5	Neutral	Average
1.51-2.5	Disagree	Low
1.00-1.5	Strongly Disagree	Very Low

Hence, the study of Drijvers & Doorman (2023), the successful use of digital tools is essential for boosting student interest and improving learning results in science. This shows how important it is to improve the currently average quality of digital resources to create a better learning environment.

### Summary of Findings for Students’ Engagement in Science

Table 2 shows the summary of students’ level of engagement in Science. The table presents the combined mean scores of the three (3) dimensions of student engagement: Behavioral (3.36); Emotional (3.46); and Cognitive (3.42). The results indicate that the students' level of engagement in Science was “Average”. This implies that the level of behavioral, emotional, and cognitive engagement of students in their science subject education as average points. This average assessment emphasizes the need to enhance strategies that promote active participation, emotional connection, and critical thinking in science classes, as these elements are essential for fostering deeper engagement and improving academic success in the subject.

Table 2: Summary of Students Digital Learning Tools

Dimensions	Mean	Descriptive Rating	Qualitative Interpretation
Behavioral	3.36	Neutral	Average
Emotional	3.46	Neutral	Average
Cognitive	3.42	Neutral	Average
<b>Overall Mean</b>	<b>3.37</b>	<b>Neutral</b>	<b>Average</b>

*\*Legend:*

Range	Descriptive Rating	Qualitative Interpretation
4.51-5.0	Strongly Agree	Very High
3.51-4.5	Agree	High
2.51-3.5	Neutral	Average
1.51-2.5	Disagree	Low
1.00-1.5	Strongly Disagree	Very Low

Hence, the study of Ruado & Cortez (2024) examines how emphasizing the enhancements in behavioral, emotional, and cognitive engagement brought about by the use of powerful digital technologies in the classroom promotes deeper student involvement and improves learning outcomes in science education; the findings highlight the significance of incorporating engaging educational tools.

#### Correlation Analysis Showing the Significant Relationship Between the Independent Variables and the Dependent Variables

The next table presents the correlation analysis showing the relationship between digital learning tools availability and students' engagement in Science

Table 3. Correlation Analysis on Digital Learning Tools Availability and Students' Engagement in Science.

Independent Variables	Correlation Coefficient (r)	P > F
Positive Moderately Strong Correlation		
Digital Learning Tools	.469**	.000
Students' Engagement	.469**	.000

*\*Legend:*

\*Correlation is significant at (p< 0.05) level

\*\*Correlation is highly significant at (p<0.01) level

NS- not significant

Based on the data presented above, the result revealed that digital learning tools availability have a correlation coefficient of 0.469 and a p-value of 0.000 and found a highly significant relationship on students' engagement in science.

The positive moderately strong correlation coefficients suggest that the availability of digital learning tools significantly influences students' engagement levels in science subjects. This relationship illustrates how access to these tools interacts with student engagement, which is also shaped by individual learning personalities. Furthermore, the extent to which digital learning tools are available in science subjects plays a crucial role in enhancing students' overall engagement with the material. These positive linear relationships therefore indicate that the null hypothesis, which states that there is no correlation between digital learning tools availability and students' engagement in Science, is rejected. Since it is evident from the given data above that the two variables significantly correlate with each other.

In fact, a study conducted by Lasinggaru and Mokodenseho (2023), revealed how digital learning platforms affect student engagement and academic performance among secondary school students. It found a positive

correlation between the frequency of using these platforms and increased levels of student engagement, which subsequently enhances academic achievement.

## CONCLUSIONS AND IMPLICATIONS

Based on the findings of the study, the level of students' digital learning tools availability was "Average". Evidently, all digital learning tools indicators in terms of availability, usability and variety recorded a result of "Average". These findings reveal that the students' don't have a substantial amount of digital learning tools available in their Science class. For the same reason, students' are limited with only little to few digital learning tools leading to less variety of their digital learning tools. In addition, this yields to them having just an average level of usability, which means they are not so proficient in the use or navigation of digital learning tools available in their Science class.

The level of students' engagement towards the subject, finds it to be just "Average." Hence, all students' engagement indicators namely; behavioral, emotional and cognitive also recorded a result of "Average." These findings indicate that with just an average level of digital learning tools availability, students respond parallel by which they also have an average level of students' engagement. This only proves the importance of having an available, diverse and functional digital learning tools in their Science subject to promote and sustain students' engagement.

Evidently, the Grade 10 students' digital learning tools considering 3 indicators namely: availability, usability and variety has a highly significant relationship on students' engagement in Science with its 3 indicators namely; behavioral, emotional and cognitive. This manifests how students' engagement levels can be directly influenced by the resources at their disposal. When students have access to a wider range of effective digital learning tools that are easy to use and navigate, they are more likely to engage actively with the science subject.

Moreover, enhancing the availability and variety of digital learning tools could lead to increased motivation and interest among students. As they interact with diverse resources that cater to different learning styles and preferences, their emotional connection to the subject may strengthen. In conclusion, the study underscores the critical role that digital learning tools play in fostering student engagement in Science classes.

## RECOMMENDATION

For further research and actions, teachers may refer to the findings of this study to realize the importance of digital learning tools availability towards students' engagement in their subject. Teachers as the facilitator of teaching and learning in the classroom are encouraged to prioritize investing in a broader array of digital resources and training for both teachers and students to improve overall engagement levels. By addressing gaps in availability and usability while expanding the variety of tools offered, educators can create a more stimulating and interactive learning environment that not only enhances academic performance but also nurtures a lifelong love for science among students.

Teachers may also infer the highly significant relationship on digital learning tools availability and students' engagement. As this may become their basis on improving their students' level of engagement in their Science classes. To future researchers, it is recommended that if you want to further conduct the same research problem you may conduct the study in a different setting, context, location or culture. You may also opt to study other subjects aside from science and other year levels apart from Grade 10 in order to see if there are new results. In addition, statistical analysis may be added with multiple regression analysis in order to determine which independent variables are known to predict the value of the single dependent variable.

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