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# Modular Learning Platform Implementation and Cognitive Skills Development of Senior High School Students

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## Abstract

The study was conducted in Tacurong National High School Barangay New Isabela, Tacurong City. The study used quantitative research to determine the details needed, using the survey questionnaire. The research design used in this study was descriptive statistics. Slovin's formula determined the number of samples from the general population. This study utilized the random sampling technique by employing numerous straightforward cluster sampling approaches. On the other hand, the mean, standard deviation, frequency count, percentage distribution, and correlation were used to assess the study's respondents' responses. Based on the findings and conclusions of the study, the researchers present the following recommendations; in the level of implementation, the researchers found out that the school's performance during the implementation of the modular learning platform was high as satisfactory, but it partly reflects the performance of the students. Thus, the curricularists must evaluate the integrated curricula and formulate a more effective aid of teaching using this study as the basis for better integration. The school must further focus on the student's learning and come up with more effective strategies that will help the students to be more active and productive even with distance learning. Given that the cognitive skills development of the students was low as unsure, the researchers suggest that the Department of Education must focus on learner consultations for modular teaching approach-built confusion in identifying their learning capacities and this may result in low academic performance. Future researchers may further research large-scale and more specific studies aligned with this topic.

**Keywords:** Modular platform; Cognitive skills; Senior high school; Philippines.

## 1. Introduction

The World Health Organization announced the pandemic of the novel SARS-CoV2 illness, and it has since grown to be a significant global public health issue. With this alarming situation, the teaching and learning processes were quickly converted to complete online learning, particularly the modular approach (Amir *et al.*, 2020). The term "modular approach" refers to learning that takes the form of individualized instruction and allows students to use Self-Learning Modules (SLMs) in the print or advanced format/electronic copy, depending on what is most suitable for their environment, as well as other learning resources like textbooks, activity sheets, study guides, and other study materials (Llego, 2021). According to Dargo and Dimas (2021), the investigation found that a 2.25 percent fall in learners' General Weighted Average (GWA) following the installation of Modular Distance Learning (MDL) implies a substantial improvement in their academic performance, which is the reason the researchers decided to undertake this study.

Modular learning is one of the most popular types of distance learning alternatives to traditional face-to-face learning, claims Malipot (2020). According to the Department of Education (DepEd) Learner Enrollment and Survey Forms, two million registrants preferred online learning, while 7.2 million selected "modular" inaccessible learning, TV and radio-based practice, and other modalities. According to the study of (Sumaong and Dangle, 2020), it may be a learning strategy that is now in use; this style of learning primarily uses printed and digital modules as the preferred distance learning option among students and parents. It also affects first-year students in remote locations where internet connectivity is no longer available for online study. Further, modular teaching within the teach-learn method is more practical than traditional educational strategies since students can study at their own pace within this modular approach (Ambayon, 2020).

The National Child Traumatic Stress Network (NCTSN) claims that age affects how the brain reacts to COVID-19. In the preschool years, it's normal to see signs of worry, appetite loss, more outbursts, and complaints, or ambivalent nervous attachment behaviors. The authors specifically demonstrate how sleep-related problems might, in some situations, have a significant impact on cognitive, emotional, and learning levels (Poirel, 2021). Further, this study discovered that the state of the student's learning is now returning to normal if learners are ready to learn new things and apply the knowledge acquired during the height of the pandemic. The researchers are particularly interested in whether the students' learning quality declined at the peak of the pandemic.

As the crisis began, the researchers found interest in discovering if the modular approach affected the level of cognitive skill development of the Senior High School (SHS) students at Tacurong National High School. Thus, the purpose of the study was to determine the level of implementation of the modular learning platform of Tacurong National High School and the cognitive skills development of learners in senior high school.

## 2. Statement of the Problem

This study sought to determine the level of implementation of the modular learning platform at Tacurong National High School and the cognitive skills development of learners in senior high school. Specifically, this study sought to answer the following questions:

- What is the demographic profile of the senior high school students in Tacurong National High School in terms of:
  - name;
  - gender;
  - age; and
  - Grade?
- What is the level of implementation of the modular platform among the senior high school students in Tacurong National High School in terms of:
  - adoption;
  - appropriateness;
  - organization; and
  - sustainability?
- What is the level of cognitive skill development among the senior high school students in Tacurong National High School in terms of:
  - reading;
  - language development;
  - remembering; and
  - .4 logical reasoning?
- Is there a significant relationship between the implementation of modular learning platform and the cognitive skills development of senior high school students in Tacurong National High School?

## 3. Method

This chapter contains the research design and the methodology that was used during the conduct of the study. It includes the research design, respondents of the study, locale of the study, research instrument, sampling technique, data gathering procedure, and statistical treatment of the study.

### 3.1. Research Design

Using statistical data, the study used a quantitative approach, particularly correlational research, to determine the extent of a relationship between two variables. Creswell (2002) stresses that quantitative study is the correct method to use in a study with numerical valuations. The process of gathering the available data and information is part of the study. It analyzes and interprets the results.

A quantitative correlational research design determined the implementation of modular learning platforms and the cognitive skills development of senior high school students at Tacurong National High School. The research design used in this study was descriptive statistics. The superior design helps to study the characteristics of individuals, groups, and situations.

### 3.2. Respondents of the Study

The researcher selected the respondents for the study through random sampling and inclusion criteria. The respondents of the study were the students from Tacurong National High School who are officially enrolled in senior high school programs for A.Y. 2022-2023, regardless of their strand, sex, age, and residence.

Table-1. Distribution of the Respondents

Respondents	Grade 11	Grade 12	Total
ABM	24	20	44
HUMSS	33	60	93
STEM	24	25	49
Automotive	21	12	33
EIM	21	12	33
HE	23	12	35
ICT	38	17	55
<b>Total</b>	<b>184</b>	<b>158</b>	<b>342</b>

These respondents were selected to generate information to know the relationship of the implementation of the modular learning platform on the cognitive skills development of learners in terms of their skills in reading, language development, remembering, and logical reasoning.

### 3.3. Locale of the Study

The study "Modular Learning Platform Implementation and Cognitive Skills Development in Senior High School Students in Tacurong National High School" was conducted at Tacurong National High School, Barangay New Isabela, Tacurong City. This City is located in the province of Sultan Kudarat, Mindanao, Philippines. This school implemented Modular Learning Platform during the pandemic. Furthermore, the researchers chose this school to conduct this study, as it is one of the big public schools in the city.

### 3.4. Research Instruments and Validation

A survey questionnaire gathered the needed information and data for this study. The questionnaire was made up of three (3) parts: Part 1, Demographic profile of the respondents, Part II Level of Implementation of Modular Learning for the Students, and Part III, Level of Cognitive Skills Development of Senior High School Students, was composed of forty (40) questions, with a rating scale, interval, verbal description, and interpretation.

Table 2 illustrate the implementation of modular learning platform interpretation of data according to Pimentel (2010).

Table-2. Modular Learning Platform Implementation

Interval	Interpretation	Description
1.00 – 1.80	No Modular Platform Implemented.	No Implementation at all
1.81 – 2.60	49% below of modular platform was implemented among senior high students	Low Level of Implementation
2.61 – 3.40	50 – 79 % of modular platform was implemented among senior high students	Medium Level of Implementation
3.41 – 4.20	80 – 89 % of modular platform was implemented among senior high students	High Level of Implementation
4.21 – 5.00	90 – 100 % of modular platform was implemented among senior high students	Advanced Level of Implementation

Meanwhile, Table 3 contains the interpretation of data on the cognitive skills development of the senior high school students of Tacurong National High School according to Pimentel (2010).

**Table-3.** Cognitive Skills Development

Interval	Interpretation	Description
1.00 – 1.80	No Cognitive skills development.	None Developed
1.81 – 2.60	49% and below of cognitive skills was developed among senior high students.	Few Developed
2.61 – 3.40	50 – 79 % of cognitive skills were developed among senior high students.	Partially Developed
3.41 – 4.20	80 – 89 % of cognitive skills were developed among senior high students.	Mostly Developed
4.21 – 5.00	90 – 100 % of cognitive skills were developed among senior high students.	Complete Developed

### 3.5. Data Gathering Procedure

Before collecting data, the researchers obtained permission from Tacurong National High School's administration to perform the study. Following permission, the researchers began work on developing the survey questionnaire that would be used to collect data based on the student responses. There were three hundred forty-two (342) respondents who took the time to answer the survey questionnaire, consisting of one hundred eighty-four (184) Grade 11 students and one hundred fifty-eight (158) Grade 12 students from the provided strands. The surveys were handed out and gathered by the researchers immediately from the students. The researchers next had the appointed statistician statistically analyze all of the data that was obtained.

### 3.6. Statistical Treatment

To determine the demographic profile of the respondents, frequency and percentage distributions were used. A mean and standard deviation were used to determine the level of implementation of the modular learning platform and cognitive development skills for the senior high school students of Tacurong National High School. The Pearson r correlation was used to determine the significant relationship between the implementation of a modular learning platform and the cognitive development skills of senior high school learners. The findings were presented in different tables to feature the study results thoroughly. It discussed the gathered information by following the five-point Likert's Rating Scale and descriptive ratings to represent the research results in implementing the modular learning platform on the cognitive development skills of the learners.

## 4. Results and Discussions

### 4.1. Level of Modular Learning Platform Implementation

The COVID-19 Pandemic became a big obstacle for students in the year 2020 because the mode of learning transformed from Face-to-face to a Blended mode of learning. One of the steps taken by the Department of Education here in the Philippines is the implementation of a modular learning platform for students at all levels of schools under its jurisdiction. The Modular Learning Platform is also implemented in the high schools of Tacurong City, one of which is Tacurong National High School.

Below the table presents data that has been collected that measures the level of Implementation of Modular Learning Platforms in terms of Adoption, Appropriateness, Organization, and Sustainability responses of the students.

The [table 4](#) shows the summary of the Level of Modular Learning Platform Implementation in Senior High School students of Tacurong National High School this means, the standard deviation, verbal description, and interpretation.

**Table-4.** Summary of the Level of Modular Learning Platform Implementation

Indicators	Mean	SD	Description	Interpretation
Adoption	3.72	0.56	High Level of Implementation	80-90 % of modular platform was implemented among senior high students
Appropriateness	3.70	0.59	High Level of Implementation	80-90 % of modular platform was implemented among senior high students
Organization	3.70	0.61	High Level of Implementation	80-90 % of modular platform was implemented among senior high students
Sustainability	3.59	0.68	High Level of Implementation	80-90 % of modular platform was implemented among senior high students
<b>Grand Mean</b>	<b>3.68</b>	<b>0.48</b>	<b>High Level of Implementation</b>	<b>80-90 % of modular platform was implemented among senior high students</b>

Firstly, the adoption has a mean of over 3.72 places the highest spot among the three other domains, but become a lowest in standard deviation with the value of 0.59, a verbal description of “High Level of Implementation” and an interpretation of “80 to 89% of the modular platform was implemented among senior high students”. On the other hand, sustainability has a result of about a mean of 3.59 making the lowest mean among the four domains, but in standard deviation become the highest with the value of about 0.68, a verbal description of “High Level of

Implementation”, and an interpretation of “80 to 89% of the modular platform was implemented among senior high students”.

After all that has been stated, the combined value of the level of Modular Learning Platform Implementation has resulted in a grand mean of about 3.68, a grand standard deviation of 0.48. It also has a verbal description of “High Level of Implementation” which means that 80 to 89 % of the modular platform was implemented among senior high students of Tacurong National High School.

The effectiveness of the Moodle platform is dependent on a number of factors, according to a study by [Ivanenko et al. \(2020\)](#), including: clear learning objectives, training organization, engaging ways to present materials and ease of orientation, the suitability of examples and video materials, the clarity of ideas and concepts, the length of training, the expansion of knowledge and skills, and the potential for using materials in a future career. In general, both traditional methods and distance learning platforms are satisfactory for students.

#### 4.2. Level of Cognitive Skills Development

The perversion caused by COVID-19 in the lives of people in the world has made a big mark in the minds of the students because it will affect the whole of their mode of learning. Adopting a new way of learning is a big challenge, so students can't get used to it right away. With the return of the face-to-face mode of learning, researchers want to know the level of development in cognitive skills among students after the pandemic.

Below the table presents data that has been collected that measures the level of Cognitive Skills Development in terms of Reading, Language Development, Remembering, and Logical Reasoning responses of the students.

[Table 5](#) shows the summary of the mean and standard deviation of the level of cognitive skills development among Senior High School learners of Tacurong National High School, this shows the standard deviation, verbal description, and interpretation.

**Table-5.** Summary of the Level of Modular Learning Platform Implementation

Indicator	Mean	SD	Description	Interpretation
Reading	2.88	0.48	Partially Developed	50-79 % of cognitive skills were developed among senior high students
Language Development	3.11	0.66	Partially Developed	50-79 % of cognitive skills were developed among senior high students
Remembering	3.30	0.67	Partially Developed	50-79 % of cognitive skills were developed among senior high students
Logical Reasoning	3.27	0.69	Partially Developed	50-79 % of cognitive skills were developed among senior high students
<b>Grand Mean</b>	<b>3.14</b>	<b>0.42</b>	<b>Partially Developed</b>	<b>50-79 % of cognitive skills were developed among senior high students</b>

First off, the reading domain has a mean of 2.88 making the lowest point value among all domains, and a standard deviation of 0.48 ranked also to the lowest place, a verbal description of "Partially Developed," and an interpretation of "50 to 79% of cognitive skills were developed among Senior High School students of Tacurong National High School." Additionally, the remembering domain had a mean score of 3.30 making the highest value and an interpretation of "50 to 79% of cognitive skills were developed among Senior High School students of Tacurong National High School." Lastly, the logical reasoning domain has a result standard deviation of 0.69, a verbal description of “Partially Developed”, and an interpretation of “50 to 79% of cognitive skills were developed among Senior High School students of Tacurong National High School.

After evaluating everything that has been responded to, the combined value of cognitive skill development has a verbal description of "Partially Developed" and a grand mean equal to 3.14 with a grand standard deviation of 0.42. This means that "50 to 79% of cognitive skills were developed among Senior High School students of Tacurong National High School.

The Structural Equation Modeling (SEM) results showed that the student's prior experience with modular learning had a positive and substantial direct effect on the Student Experience (SE), ( $\beta$ : 0.848,  $p = 0.009$ ). For a better understanding of this new educational platform, K–12 students need to have prior experience with and knowledge of modular systems. Such an experience would help the pupils overcome any obstacles that develop as a result of the constraints of the modular platforms. Additionally, SEM demonstrated that SE significantly negatively impacted SI ( $\beta$ : 0.843,  $p = 0.009$ ). According to the study, students who had previously participated in modular education had more favorable opinions of the platforms. Additionally, the benefits of students' participation in modular distance learning for both them and their teachers help to improve students' learning experiences, particularly for isolated learners ([Jou et al., 2022](#)).

Given that the Level of Modular Learning Platform Implementation of Tacurong National High School revealed its description as a High Level of Implementation, this signifies that modular learning was available to the majority number of students and it supported connections from parents to school instruction. This institution formulated a proper action plan for creating and distributing the modules and facilitated the consistent distribution of modules to the learners. Furthermore, the Level of Cognitive Skill Development of Senior High School students revealed its description as Partially Developed. This means that students partially recognized information and they could recall what they had examined through answering the assessments. Students also answered the questions or activities in the modules using their cognitive skills to solve problems. Here is the interpretation of the data to determine the relevant

value that denotes the somewhat favorable link between the level of Tacurong National High School's modular learning platform and the cognitive skills development of senior high students.

### 4.3. Relationship between the Level of Modular Learning Platform Implementation and Cognitive Skills Development

Result on Table 15 reveals the testing of relationship between the level of Modular Learning Implementation and Cognitive Skills Development of Senior High students in Tacurong National High School. The computed R-value is 0.434 in a test of relationship between the level of Modular Learning Implementation and level of Cognitive Skills Development computed R-value is 0.434 and P-value of 0.000. Results showed that there was a significant moderate, positive correlation between the level of implementation of a modular learning platform and the level of cognitive skills development of senior high school students,  $r(340) = .434, p < .001$ .

**Table-6.** Level of Implementation of a Modular Learning Platform and the Level of Cognitive Skills Development of Senior High School Students

Variables	df	R	p-value
Level of Cognitive Skills Development	342	.434	.000
Level of Implementation of the Modular Learning			

According to [Dargo and Dimas \(2021\)](#), the investigation found that a 2.25 percent fall in learners' General Weighted Average (GWA) following the installation of Modular Distance Learning (MDL) implies a substantial improvement in their academic performance, which is the reason the researchers decided to undertake this study.

Table 16 is the interpretation of the data to determine the relevant value that denotes the somewhat favorable link between the level of Tacurong National High School's modular learning platform and the cognitive skills development of senior high students.

**Table-7.** Interpretation of the Pearson's and Spearman's Correlation Coefficients

Correlation	Coefficient	Dancey (2007)
+1	-1	Perfect
+0.9	-0.9	Strong
+0.8	-0.8	Strong
+0.7	-0.7	Strong
+0.6	-0.6	Moderate
+0.5	-0.5	Moderate
<b>+0.4</b>	-0.4	<b>Moderate</b>
+0.3	-0.3	Weak
+0.2	-0.2	Weak
+0.1	-0.1	Weak
0	0	Zero

The level of implementation of modular learning platforms and the development of cognitive skills were found to be positively correlated (0.434) based on the data that was acquired and the outcome of its careful encoding. Therefore, it can be said that the use of modular learning during the pandemic affected the cognitive development of senior high school student's capacities.

## 5. Conclusions

The results of the study have led to the following conclusions:

1. Based on the demographic profile of the respondents it can be concluded as follows:
  - a. There are a substantial number of male students who have been recorded, and if the basis of the study is based on the gender of the participants, this may have a significant impact on the findings. It can be concluded that male respondents have virtually as much data collected as female respondents.
  - b. On the other hand, based on their age, it is clear from the study's findings that respondents between the ages of 17 and 18 have the highest data levels. Given that the majority of senior high school students fall within this age group.
  - c. When comparing respondents by grade level, grade 11 students make up 184 (55%), this is a significantly higher percentage than grade 12 respondents. This indicates that their population has a significant influence on the study's findings based on the perspective or experience of the students with the use of the modular learning platform, which will aid in the improvement of their cognitive skills.
2. The level of implementation of Tacurong National High School in terms of Adoption, Appropriateness, Organization, and Sustainability in the Modular Learning Platform was 80 to 89% being implemented. Therefore, it can be concluded that the implementation has been effective for the students during the midst of the pandemic.
3. The level of cognitive skills development of senior high school students in terms of Reading, Language Development, Organization, and Sustainability was 50 to 79% being developed. Thus, there is a need for development and polishing for the sake of the student to be ready for the modern status of learning.

4. The result of a significant relationship between the implementation of a modular learning platform and cognitive skills development is statistically significant. Given these points the modular learning platform implementation has a relationship on the development of students in their cognitive aspects.

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