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**EVALUATING THE COMPETENCY LEVEL OF STUDENTS IN BASIC COMPUTER HARDWARE
PARTS AMONG GRADE 12 NON-ICT STUDENTS IN MEYCAUAYAN NATIONAL HIGH SCHOOL
FOR THE ACADEMIC YEAR 2024-2025**

A Research Presented to

Senior High School Department

Meycauayan National High School

Bulacan

In Partial Fulfillment

of the Requirement for the Subject

Practical Research 2

Information and Communication Technology (BABBAGE)

By

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ABSTRACT

This study aims to evaluate the competency level of Grade 12 Non-ICT students at Meycauayan National High School regarding basic computer hardware components for the academic year 2024-2025. Understanding computer hardware is essential in a technologically advanced environment for practical applications and personal and professional growth. However, non-ict students often lack practical computer hardware skills, such as installation and maintenance, due to limited opportunities for hands-on instruction. Earlier studies highlight curriculum discrepancies and insufficient time allocated for practical sessions as primary reasons why students struggle to develop experience and comprehension of computer hardware (Svenningsson et al., 2022) (Sambo & Precious, 2022).

This research seeks to address these issues by measuring the current proficiency levels of Grade 12 non-ict students in basic computer hardware. The study explores their understanding and attitudes towards these components and identifies factors influencing their knowledge and skills. Studies by Agbenyo et al. (2024) suggest that incorporating practical training and improving time management within the curriculum can significantly enhance students' skills and learning outcomes. By filling this gap, the findings aim to provide insights into the barriers hindering students' competency in computer hardware and offer recommendations to integrate more practical learning opportunities into the school curriculum. Ultimately, this research strives to enhance students' proficiency in this essential field of technology, equipping them with the necessary skills to thrive in a digitally driven world. The study's outcomes will help educators and policymakers develop innovative strategies to improve curriculum and better prepare students for future technological challenges and advancements.



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INTRODUCTION

The world of today is driven by technology. As computers become an integral part of most people's lives (Khadar, 2023) both personally and professionally, students must understand computer hardware. Among the successes brought about the study of computer hardware, it should be emphasized that they have had an influence in the evolution of our everyday life. It should not only be understood but applied too. Therefore, besides knowing computer hardware, theoretical knowledge should be applied by students (Simões, 2022).

However, there seems to be a notable deficiency among the non-ICT students about the proficiency levels of computer hardware knowledge and skills. Most non-ICT students rarely get practical exposure to computer hardware. Hence, they do not possess skills in practical assembly, among others. Different curricula followed in different schools bring about inequalities in the primary knowledge of students about computer components. In addition, the perceptions and attitudes of non-ICT students toward technology education (Svenningsson, et al., 2022) may depend on their motivation to engage themselves with the concepts of hardware.

Agbenyo et al (2024) developed an instrument called Students Practical Skills in Computer Hardware Maintenance and found that students do not have regular class sessions, are not incorporated into school timetables, and are not fully aware of computer hardware maintenance knowledge. The study recommends that school management should implement an efficient timetable system to incorporate practical training in computer hardware maintenance.

Sambo & Precious (2022) the students rarely have a class where they carry out practical training and are oblivious to some vital information associated with computer hardware. Educational institutions should adopt a time management system that allows for practical training in computer hardware. It therefore suggests that some students may lack proper exposure to practical skills, probably impacting their confidence and ability to study such basic parts of computer hardware.

Several studies shown the reasons contributing to low proficiency levels and knowledge of students in computer hardware. However, there are no studies yet that tries to measure the computer hardware knowledge of students at Meycauayan National High School. This study aims to examine the current level of proficiency in computer hardware among Grade 12 Non-ICT students, entitled "Evaluating the Competency Level of Students in Basic Computer Hardware Parts among Grade 12 Non-ICT Students' in Meycauayan National High School for the Academic Year 2024-2025". This study focuses on the proficiency level on different computer hardware components of grade 12 non-ICT students. It also intends to assess their understanding on computer hardware and orient them concerning computer hardware.

The purpose of this study is to measure the knowledge of grade 12 non-ICT students regarding computer hardware, particularly in today's world where such knowledge is increasingly important. It highlights the understanding of Grade 12 non-ICT students concerning the basic components of computer hardware. The purpose of this research is



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to enhance the knowledge and comprehension of Grade 12 non-ICT students about these fundamental hardware parts.

This study aims to:

RO1: To identify the proportion of Grade 12 Non-ICT Students in computer hardware, particularly in:

- (a) basic computer hardware parts
- (b) knowledge on setting up and shutting down
- (c) familiarity with connectors and ports

RO2: To assess the overall competency level of Grade 12 Non-ICT students in computer hardware.

RO3: To identify the specific strengths and weaknesses of students in key areas of computer hardware.

RO4: To recommend strategies for improving students' competency in computer hardware

This study will contribute by assessing the current competency level of Grade 12 Non-ICT students in basic computer hardware in Meycauayan National High School. It will help identify gaps in their knowledge, enabling the development of targeted teaching methods to improve their understanding. The results can lead to curriculum enhancements that integrate technological literacy for Grade 12 non-ICT students. Additionally, this study can provide a basis for future research and guide school policy decisions to ensure students are better prepared for technology-driven environments.

STATEMENT OF THE PROBLEM

The general problem of this study is trying to figure out if Grade 12 non-ICT students' have the same knowledge level or skills in computer hardware in Meycauayan National High School for the academic year 2024-2025.

The following problem statement could be broken with the research questions:

1. What is the proportion of grade 12 Non-ICT Students in Meycauayan National High School Senior High School about computer hardware, particularly in:

- (a) basic computer hardware parts
- (b) knowledge on setting up and shutting down
- (c) familiarity with connectors and ports?

2. How can the overall competency level of Grade 12 Non-ICT students in computer hardware be described in the study?

3. What are the notable strengths and weaknesses in the key areas of basic computer hardware among Grade 12 non-ICT students?

4. What specific strategies can be recommended to improve the computer hardware competency of Grade 12 Non-ICT students?



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SIGNIFICANCE OF THE STUDY

The study of evaluating the competency level of Grade 12 non-information and communication technology students in basic computer hardware parts holds significant importance for several reasons.

This information will be useful and convenient to the following:

Non-ICT students. This study will help non-ICT students identify their technological strengths and weaknesses, preparing them for future academic and professional attempts in a technology-reliant world.

TVL teachers. This study will help the TVL teachers with the findings that can be used to improve curriculum and teaching methods and implement targeted interventions to enhance students' skills and workforce readiness.

Parents. This study will help the parents for being supported for their children, and also can be a guide for making decisions.

Local Government Units (LGU). This study will help the awareness of students' proficiency levels and inform decision-making on the allocation of resources and policies.

School Administrator. This study can be utilized by identifying areas in which students struggle and pushing for better training programs. School administrators can use the findings of this study to enhance instructional tactics and resource distribution.

IT companies. This study will help them offer valuable insights into the skill levels of potential future employees.

Tech Startups. This study helps startups tailor recruitment strategies and training programs for non-ICT students, identifying skill gaps and fostering a more skilled workforce in the tech industry.

Future Researchers. This study will help the future researchers to have a helpful guide for a basis for more advancement and exploration of students in computer hardware and use this research work as a reference for their literature review and source material for research paper.

SCOPE AND DELIMITATION

This study covers the evaluation of competency level of students in basic computer hardware parts among grade 12 non-Information and Communication Technology Students' at Meycauayan National High School for the Academic Year 2024-2025. This study is located in El Camino Road, Barangay Camalig, Meycauayan Bulacan.

This study only measures the competency level of Grade 12 Non-ICT students in basic computer hardware parts knowledge and doesn't assess their ability to apply this knowledge in real situations. Due to time constraints, the researchers were also unable to reach the target of 300+ respondents, which limits how much we can generalize the results. While the study gives useful insights into the current curriculum, the small sample size means the findings may not fully represent all Grade 12 Non-ICT students. However, the respondents are Grade 12 Non-ICT students, consisting the following strands: STEM, ABM, HUMSS, HE, and GAS.



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METHODOLOGY

RESEARCH DESIGN

The researchers used the descriptive research design because it systematically collects and analyzes data on the competency levels of students in basic computer hardware parts by grade 12 Non - ICT students. Descriptive research refers to data collection to explain a situation comprehensively and to provide objective knowledge of competency level of students in computer hardware. In the context of this study (Bayat, 2007), descriptive research will help answer questions about competency levels of students in grade 12 Non-ICT, focusing on the what, when, where, and how aspects of the issue.

POPULATION AND SAMPLE

The total population of Grade 12-Non Information and Communication Technology (ICT) students is 533 students within Meycauayan National High School for the Academic year 2024-2025. This research used simple random sampling because every student in the population has an equal chance of being picked. The respondents were in Grade 12 Non - ICT Students in Meycauayan National High School, using random sampling, 100 respondents were randomly selected from ABM, HUMSS, HE, GAS, and STEM, representing the five strands in Grade 12 Non - ICT. The sample ensures that there is no bias involved and a good sample that will be enough to represent the characteristics of valuable research results.

Table 1.
Demographic profile

Strand

| | |
|-------|----|
| STEM | 20 |
| HUMMS | 20 |
| HE | 20 |
| ABM | 20 |
| GAS | 20 |

DATA COLLECTION

This study shows the five phases, Conceptualization phase, Design phase, Empirical phase, Analytical phase, and Dissemination phase. The researchers do this phases to know the competency level of students in computer hardware.

Conceptualization phase. The researchers start to planned and evaluate the Grade 12 Non - ICT Students competency level in basic computer hardware parts. The researchers planned on how will they know the competency level of students in computer hardware. The objective of this study is to know if Grade Non - ICT Students have strength and weakness in computer hardware.

Design phase. The researchers start to do the papers and to prepared the materials they will use in measuring the competency of Grade 12 Non - ICT Students. They start to make questions for respondents and start making step on how will they approach



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and to collect respondents in every strand, they also prepared consent form to know if the respondents is agree to answer the questions or no.

Empirical phase. In the empirical phase of the study, the researchers employed a combination of survey questionnaires and direct observation to assess the competency level of non-ICT students in identifying and understanding basic computer hardware components. The research utilized a random sampling method to select participants. Prior to administering the surveys and conducting observations, the researchers thoroughly explained the terms and conditions to ensure that the participants were fully informed about the assessment process. A total of 100 Grade 12 Non-Ict Senior High School learners took part in the study.

Analytical Phase. During the analytical phase, the researcher carefully analyzed the data collected from the participants. First, a frequency table was created to summarize the total scores of the Grade 12 Non-Ict respondents. Next, descriptive statistics were applied, including the calculation of the mean and the mean percentage, to provide a comprehensive understanding of the data.

Dissemination Phase. In the dissemination phase, the researchers will publish the findings of this study online to make the results accessible to future researchers. This will contribute to the existing body of knowledge and provide valuable insights for studies related to the topic.

DATA ANALYSIS

This research utilizes frequency and percentage in assessing RO1. Frequency refers to the total scores of Grade 12 Non -ICT Students in our questionnaire (Oxford, 2024). Percentage refers to a part of a whole, expressed out of 100.

The researchers also utilizes mean and mean percentage score. In order to interpret the mean of the students, The interpretation below was used:

Arbitrary Table

| Mean percentage score | Verbal Interpretation |
|-----------------------|-----------------------|
| 0-24% | No proficiency |
| 25-49% | Low proficiency |
| 50-74% | Near proficiency |
| 75-89 | Proficient |
| 90-100% | High proficiency |



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RESULTS AND DISCUSSION

In this part the researchers presents the results and findings of this study. It shows in table the percentage of every grade 12 Non-ICT students respondents, showing the competency of grade 12 Non-ICT students in computer hardware.

RO1. Proportion of Grade 12 Non-ICT Students who are Knowledgeable of Computer Hardware Parts

This study examines whether non-ICT students know about the competency level of students in basic computer hardware parts among Grade 12 non-ICT Students in Meycauayan National High school for the Academic Year 2024-2025. The table below shows the results:

Table 2.

Knowledge of Grade 12 Non-ICT Students in Computer Hardware

| Tasks: Identify... | Frequency of student who performed the task (%) | Frequency of student who cannot performed the task (%) |
|----------------------------------|--|---|
| 1. Ram | 40% | 60% |
| 2 .Hard Disk Drive (HDD) | 48% | 52% |
| 3. Mouse | 100% | 0% |
| 4. Keyboard | 100% | 0% |
| 5. Motherboard | 71% | 29% |
| 6. Network Interface Card (NIC) | 25% | 75% |
| 7. Printer | 100% | 0% |
| 8. Central Processing Unit (CPU) | 46% | 54% |
| 9. Optical Disk Drive (ODD) | 31% | 69% |
| 10. Modem | 43% | 57% |

This table shows the competency level of students in basic computer hardware, it shows that students got higher percentage in basic parts like Mouse (100%), Keyboard (100%), Motherboard (71%), and Printer (100%), but in others items like Ram (48%), HDD (48%), NIC (25%), CPU (46%), ODD (31%), and Modem (43%) is they got lower average, it means they knowledge in other parts of computer hardware like NIC, Modem, ODD, Ram, CPU, HDD is not that high.

| | | |
|---|-----|-----|
| 1. How to connect your mouse in the system unit? | 81% | 19% |
| 2. How to connect your keyboard to computer? | 78% | 22% |
| 3. How to connect the monitor to system unit? | 54% | 46% |
| 4. What will you check if your computer desktop has no power? | 88% | 12% |
| 5. How to shutdown your computer properly? | 83% | 17% |



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This table shows the knowledge of students in setting up and shutting down the computer, the students got higher percentage in every items, it means they have higher knowledge in setting up and shutting down computer.

| | | |
|------------------------------|-----|-----|
| 1.USB (Universal Serial Bus) | 98% | 2% |
| 2. VGA Connector | 55% | 45% |
| 3. Ethernet Cable | 63% | 37% |
| 4. Audio Ports | 94% | 6% |
| 5. Coaxial Cables | 45% | 55% |

This table shows the familiarity of Non-ICT students in USB, VGA Connector, Ethernet Cable, Audio ports, and Coaxial Cables, it shows students have knowledge in USB (98%), VGA Connector (55%), Audio Ports (94%), and Ethernet Cable (63%), but in Coaxial Cables they got (45%) percentage, it means students have average familiarity in the items.

RO2. Overall Competency of Grade 12 Non-ICT Students

Table 3.

Mean, Mean percentage score, and Verbal Interpretation

| | Mean | Mean percentage score (%) | Verbal Interpretation |
|--|------|---------------------------|-----------------------|
| A.Basic computer hardware parts | 5.85 | 58.5% | Near proficiency |
| B. knowledge on setting up and shutting down | 3.85 | 77% | Proficient |
| C.Familiarity with connectors and ports | 3.16 | 63% | Near proficient |

This table shows the Mean, Mean percentage score, and Verbal Interpretation. In question A it shows in Mean that they earned 5.85 average and in Mean percentage score is 58.5%, This means their knowledge and skills in basic computer hardware parts are just adequate since they obtained a near proficiency rating in the verbal interpretation. In question B on knowledge on setting up and shutting down computer they got 3.85 average and in Mean percentage score is 77%, they obtained proficient in the Verbal interpretation. In question C in familiarity with connectors and ports they got 3.16 average and in Mean percentage score is 63%, they obtained Near proficient in Verbal interpretation and their knowledge is exactly adequate.

RO3. Strengths and weaknesses in the key areas of basic computer hardware among Grade 12 Non-ICT students

In the tables it shows that in common parts of computer like mouse, printer, and keyboard is they perfectly execute the items but in others items like CPU, HDD, ODD, NIC, Ram, Modem is they got lower score and average, it means they have knowledge in common and basic computer but in others parts like CPU, ODD, HDD, NIC, Ram, Modem is they got lower score and average. Their weakness is uncommon parts of computer and their strength is understanding the basic and very common parts of computer.

RO4. Strategies to improve competency of Grade 12 Non - ICT Students in computer hardware



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According to (Li , 2010) this study highlights strategies for improving the competency of students in computer hardware by emphasizing the importance of hands-on, experimental learning. It recommends training students in good experimental practices to improve their technical skills, such as safe handling of components and following proper procedures. The study suggests using confirmatory experiments to validate theoretical knowledge and integration experiments to combine different concepts, which helps students develop problem-solving and troubleshooting abilities. By applying their theoretical knowledge during experiments, students learn to analyze and solve real-world problems, enhancing their skills in hardware design, data analysis, and system implementation. These strategies aim to build a solid foundation of knowledge in computer hardware and significantly improve students' competency, particularly for those with limited prior experience.

CONCLUSION

This study revealed that Grade 12 non-ICT students have slightly lower understanding in computer hardware. Most students demonstrated moderate familiarity with basic hardware components but struggled with practical skills like troubleshooting and independent assembly and disassembly. Only a small portion of students exhibited high competency across all areas, indicating a gap in hands-on skills and technical understanding.

These findings suggest a need for curriculum enhancements that incorporate more practical exercises and hands-on activities to improve students' skills in computer hardware. By providing targeted training and experiential learning opportunities, schools can help students build the confidence and proficiency needed for independent work with computer hardware, preparing them better for future technological challenges.

RECOMMENDATIONS

The researchers would like to make a recommendation regarding the competency level of students in basic computer hardware parts among Grade 12 non-ICT students in this research paper. The researchers came up with the following recommendations:

- The researchers suggested that students engage in more comprehensive studies about the basic parts of computer hardware. These can be structured lessons that cover the basic components of a computer.
- The researchers recommend combining practical exercises in which the students are exposed to direct handling of computer hardware. Such hands-on work will help their understanding and improve their ability to identify and troubleshoot hardware components.
- Researchers suggested conducting regular assessments to evaluate students' understanding and competency levels. Giving students constructive interpretation will assist them in identifying areas where in they need to improve and file themselves for life.
- Researchers recommend that future researchers would benefit from understanding basic computer hardware components, as this knowledge will be valuable in their future.



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APPENDICES

Assent Letter

A blessed day!

You are invited to participate in a study titled **"Evaluating the Competency Level of Students in Computer Hardware: A Case Study Among Grade 12 Non-ICT Students' at Meycauayan National High School for the Academic Year 2024-2025"**. The purpose of this study is to [briefly state the purpose]. Your participation is voluntary, and you may withdraw at any time without penalty.

Data Privacy Notice:

In compliance with the **Data Privacy Act of 2012**, all information collected will be treated confidentially. Your data will only be used for this research, anonymized, and stored securely. You have the right to access, correct, or request deletion of your personal data.

By selecting "I agree" below, you consent to participate in this study and acknowledge that your personal data will be handled in accordance with the Data Privacy Act.

☐ I agree to participate

☐ I do not agree to participate

Signature over Printed Name

Name (Optional): _____



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Gender: ☐ Male ☐ Female ☐ LGBTQIA
 Age: ☐ 15-17 ☐ 18-20 ☐ 21-Above
 Strand: ☐ ABM ☐ HUMMS ☐ STEM ☐ HE ☐ GAS

To the researchers: Check the columns after observing a student do as they are instructed. Based on the students' performance, researchers will put a ✓ in the column to see whether the student did it right and ✗ if the student did it wrong.

| TASKS | RESPONDENTS | | | | | | | | | | | | | | | | | | | |
|---|-------------|---|---|---|---|---|---|---|---|----|----|----|----|----|----|----|----|----|----|----|
| A. Assess if they can identify the ff: basic computer hardware parts. | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 |
| 1.Ram | | | | | | | | | | | | | | | | | | | | |
| 2.Hard Disk Drive (HDD) | | | | | | | | | | | | | | | | | | | | |
| 3.Mouse | | | | | | | | | | | | | | | | | | | | |
| 4.Keyboard | | | | | | | | | | | | | | | | | | | | |
| 5.Motherboard | | | | | | | | | | | | | | | | | | | | |
| 6.Network Interface Card (NIC) | | | | | | | | | | | | | | | | | | | | |
| 7.Printer | | | | | | | | | | | | | | | | | | | | |
| 8.Central Processing Unit (CPU) | | | | | | | | | | | | | | | | | | | | |
| 9.Optical Disk Drive (ODD) | | | | | | | | | | | | | | | | | | | | |
| 10.Modem | | | | | | | | | | | | | | | | | | | | |

| | | | | | | | | | | | | | | | | | | | | |
|---|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|
| B. Identify their knowledge on setting up and shutting down the computer. | | | | | | | | | | | | | | | | | | | | |
| 1.How to connect | | | | | | | | | | | | | | | | | | | | |



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|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|
| your mouse in the system unit? | | | | | | | | | | | | | | | | | | | |
| 2.How to connect your keyboard to computer | | | | | | | | | | | | | | | | | | | |
| 3.How to connect the monitor to System Unit? | | | | | | | | | | | | | | | | | | | |
| 4.What will you check if your Computer Desktop has no power? | | | | | | | | | | | | | | | | | | | |
| 5.How to shut down your Computer properly? | | | | | | | | | | | | | | | | | | | |

| | | | | | | | | | | | | | | | | | | | |
|---|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|
| C. Identify their familiarity with the following types of connectors and ports. | | | | | | | | | | | | | | | | | | | |
| 1.USB (UNIVERSAL SERIAL BUS) | | | | | | | | | | | | | | | | | | | |



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| 2.VGA connector | | | | | | | | | | | | | | | | | | | | |
| 3.Ethernet cable | | | | | | | | | | | | | | | | | | | | |
| 4.Audio ports | | | | | | | | | | | | | | | | | | | | |
| 5.Coaxial cables | | | | | | | | | | | | | | | | | | | | |



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MEYCAUAYAN NATIONAL HIGH SCHOOL
CAMALIG, CITY OF MEYCAUAYAN, BULACAN

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