



**HOLY CROSS COLLEGE OF CALINAN
DAVAO-BUKIDNON HIGHWAY, CALINAN POBLACION, DAVAO CITY**

**THE RELATIONSHIP OF STUDENTS ENGAGEMENT TO HANDS
ON ACTIVITY AND STUDENTS CRITICAL THINKING SKILLS**

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March, 2024

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ON ACTIVITY AND STUDENTS CRITICAL THINKING SKILLS**

A Research Paper

Presented to the Basic Education Department
of the Holy Cross College of Calinan, Inc.

In Partial Fulfillment of the Requirements
in Practical Research

By

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APPROVAL SHEET

In partial fulfillment of the requirements in Practical Research, this study entitled **THE RELATIONSHIP OF STUDENTS ENGAGEMENT TO HANDS ON ACTIVITY AND STUDENTS CRITICAL THINKING SKILLS**, prepared and submitted by **Cagaanan, Roie Chester C., Malaque, Rucyl Janyz L., Daya, Mark Syion A., Kawamura, Hiroshi P., Temporado, Nadharie Ken H., and Barcelo, Jarel Eisly V.** is hereby recommended for oral examination, approval, and acceptance.

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Approved by the panel of examiners, after the presentation of the study with the grade of **PASSED**.

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ABSTRACT

Critical thinking develops in an engaging educational setting that students in hands-on learning create. Students who actively participate in experiential learning gain critical thinking skills in addition to acquiring knowledge. Combining sensory study with critical thinking fosters a deeper understanding of ideas and encourages creative thinking. This study employed a descriptive research design with the objective of determining the level of students' engagement in hands-on activities and the critical thinking skills of the respondents. Thus, this study employed a descriptive research design to explore the connection between the critical thinking skills of students and their engagement in hands-on activities, utilizing a correlational approach. Data collection involved the computation of the mean, Pearson correlation coefficient, frequency, and percentage. Based on the findings, students' engagement in hands-on activities has indicated that it can affect their critical thinking skills in terms of sex, age, and the year level of the respondents. Most significantly, regardless of sex, age, or year level, the study's findings showed a relationship between students' engagement in hands-on activities and their critical thinking skills. Thus, the researchers accepted the alternative hypothesis, indicating that there is a significant relationship between the level of students' engagement in hands-on activity and students' critical thinking skills.

Keywords: *Hands-on Activity, Critical Thinking Skills, Students' Engagement, Relationship*

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Chapter 1

INTRODUCTION

Background of the Study

Hands-on activities serve as a foundation for developing critical thinking abilities (Anwer, 2019). Instead of merely listening to lectures, students who engage in hands-on learning engage in or carry out physical tasks that are related to the course material. By actively interacting with the content to solve a problem or build something, they learn by doing. Participatory learning was a feature of hands-on learning. Practical learning can be incorporated into almost any subject by teachers (Miriam, 2021). On the other hand, a key component of educational reforms is the emphasis on critical thinking. This approach encourages schools to focus on transferable skills that students can apply across various subject areas (The Glossary of Education Reform, 2013).

Being able to think critically is a common educational goal (Hitchcock, 2018). The study by Facione (2015), as cited in the study of Basri, Asari, Sisworo, and Purwanto (2019), specified six critical thinking abilities that emerged during the learning process: interpretation, analysis, assessment, inference, explanation, and self-regulation. The purpose of critical thinking was to establish and clarify a point capable of resolving issues (Facione, 2015). On the grounds of respecting student engagement and educating students for success in life as well as for democratic citizenship, its adoption as an educational objective has been suggested by which "Critical thinkers" have the traits and skills necessary to think critically when called upon (Hitchcock, 2018). According to a University of Nebraska-Lincoln research, students who engaged in hands-on learning and were given the freedom to "explore and discover" ideas remembered knowledge 50%

better than those who were just given lectures (Student-Centered World, 2022). However, according to Fithriyah, Sa'dijah, and Sisworo (2016), the results of the study show the ability of junior high school students to engage in critical thinking was still somewhat constrained that only 26.92% of participants were able to correctly answer one question out of the three questions that were examined for student proficiency.

The analysis, evaluation, and self-regulation sub-skills were the least understood by students among the six critical thinking sub-skills (interpretation, analysis, evaluation, inference, explanation, and self-regulation). It was revealed that analysis (46%), evaluation (17%), and self-regulation (21%) were the lowest critical thinking sub-skills learned by students when compared to other critical thinking sub-skills (Basri, Asari, Sisworo, and Purwanto, 2019). The same conclusions—namely, that junior high school pupils' ability for critical thought is rather low—are drawn from a study by Irawan, Rahardjo, and Sarwanto (2017), stating that only 44.87% of students performed on average across all categories of critical thinking skills.

In the Philippines, a study by Benedicto and Andrade (2022) states that a lack of critical thinking skills among students may be a result of teachers' experience and knowledge. To investigate students' critical thinking abilities through the application of problem-based learning techniques, two sets of teacher candidates present two problem-based learning techniques: the authentic strategy and the non-linear method. The findings demonstrated a lack of critical thinking abilities in the pupils' ability to assess arguments and develop conclusions. Except for the ability to identify assumptions, students in groups 1 and 2 demonstrated significantly different levels of critical thinking abilities. The critical thinking abilities of the aspiring instructors do not considerably vary

according to order. According to the study's findings, students still lacked superior critical thinking abilities, especially when it came to analyzing arguments and making conclusions, since they lacked sufficient background information and in-depth comprehension.

Based on the evaluation of the intervention as perceived by the respondents, the experimental group of Mindanao State University found that the majority of the activity-based and cooperative learning techniques were above average and exciting. A total of 99 third-year high school students participated in their study, 32 in the experimental and control groups, and 35 students served as the pilot group. Eighty-three percent (83%) claimed that the tasks are more engaging and difficult and that they make people think. Sixty percent (60%) of them thought it eliminated their assumptions. Students were able to learn at their own pace and with greater flexibility, thanks to the use of activities and cooperative learning (Valdez, Lomoljo, Dumrang & Didatar, 2015).

Some studies have been conducted by Agustia, Yennita, Azizahwati, and Rahmad (2019) regarding the development of hands-on learning activities for improving students' critical thinking skills. However, few studies have explored the relationship between students' engagement in hands-on activities and students' critical thinking skills. With this, the researchers would like to unveil if there was truly a relationship between critical thinking skills and the engagement of students in hands-on activities.

Statement of the Problem

This study aims to assess if there was a significant relationship between students' engagement in hands-on activity and students' critical thinking. Specifically, this study sought to answer the following questions:

1. What was the demographic profile of the students in terms of:

1.1 sex;

1.2 age; and

1.3 year level?

2. What was the level of engagement of students in hands-on activities when

grouped according to:

2.1 sex;

2.2 age; and

2.3 year level?

3. What was the perceived level of critical thinking skills of students when

grouped according to:

3.1 sex;

3.2 age; and

3.3 year level?

4. Is there any significant relationship between the engagement of students in hands-on activity and critical thinking of students?

Hypotheses

- H₀:** There was no significant relationship between the level of students' engagement in hands-on activity and students' critical thinking.
- H_a:** There was a significant relationship between the level of students' engagement in hands-on activity and students' critical thinking.

Review of Related Literature

In this section, the researchers gathered information from various sources that are related to students' engagement in hands-on activity and students' critical thinking skills to gain a deeper understanding and provide a strong foundation for the study.

Engagement of Students in Hands-On Learning and Its Impact

In the context of classroom engagement, teaching becomes an active occupation that demands continuous commitment to actively engage students in their daily school activities. The active involvement of students in classroom tasks and lessons was crucial for academic success, forming a fundamental basis for various education programs (Carolan, 2018). Students gain knowledge by engaging in practical activities and comprehending how variables influence real-life scenarios (Ekwueme, Ekon & Ezenwa-Nebife, 2015). Engaging actively in the learning process boosts students' memory retention and application of skills, contributing to the increasing favorability of this method. Hands-on learning encompasses experiments, simulations, projects, and brainstorming, fostering enhancements in students' creativity and problem-solving skills, as well as teamwork and communication capabilities (Bloemendaal, 2023).

Learning is a continuous process where experiences, whether firsthand or indirect, lead to significant changes in a person's behavior. However, it's crucial to understand that learning doesn't always mean progress or personal development in the intended direction (Surbhi, 2021). Active learning techniques encourage students to participate in their education by analyzing, debating, researching, and producing. In class, students put their knowledge into practice, work through difficult decisions, solve issues, offer answers, and articulate concepts in their terms through writing and discussion (Theobald, Hill, Tran, Agrawal & Arroyo, 2020). Research indicates that students engaging in active learning, such as hands-on projects or group discussions, acquire knowledge more rapidly compared to their peers who solely depend on textbooks and passive lectures (Wood, Sarjeant, Bruno, Macrae, Maynard-Casley & Towler, 2017).

Education strategies that can maximize in-class learning have attracted the attention of researchers for a long time. The impact of hands-on experience on learning and cognitive development was one strategy that has been the focus of research for the past few decades. The idea that children learn best when given the chance to find knowledge or accomplish things on their own rather than learning through direct instruction alone may be shared by all modes of hands-on learning, despite some slight distinctions between them (Hartin, 2022). Different activities are best suited to accomplishing different goals, hence a mix of hands-on activities should be applied in classrooms to accommodate students with different learning styles (Lombardi, Hicks, Thompson & Marbach-Ad, 2014). A significant finding was that students should possess sufficient prior knowledge of a specific subject before engaging in hands-on activities. Students tend to grasp scientific principles better through direct instruction rather than

discovery learning. However, if students gain the required knowledge to guide their hands-on activities, hands-on learning can positively impact various educational settings. (Hartin, 2022).

Research shows that hands-on activities improve learning by enhancing immersion, creativity, problem-solving, and information retention (Pellegrino & Hilton, 2013; National Academies of Sciences, Engineering, & Medicine, 2018). According to Dhanapal (2014), certain students performed better because they learned and recalled information better through hands-on activities. Hands-on learning enhances information retention due to physiological and psychological effects, activating both sides, with visual and spatial processes handled by the right hemisphere and listening and analytical processes by the left. The brain strengthens connections and stores relevant knowledge through combined learning methods (Arnholz, 2019).

The study of Dhanapal (2014) shows that certain students performed better because they learn and recall information better through hands-on activities. When kids learned through doing, there was typically a higher level of engagement and motivation demonstrated in the students. A study by Adawiyah (2016) discovered that teaching students how to write descriptive texts through hands-on activities utilizing the Team Pair Solo method was very successful. The experimental group's mean pretest score was 58.28, while the control group's mean posttest score was 72.88, and they received 61.13, which means that students participated in activities that were fun and interesting.

Numerous experts concur that learning through practical application has a greater impact than theoretical information since it actively engages pupils in developing their critical thinking and problem-solving skills. Students can collaborate in groups during

practical learning exercises to develop their teamwork and problem-solving abilities (Engineering for Kids, 2022). In an intervention study, 161 eighth-grade children performed differently when given hands-on training activities vs ones that required paper and pencil. While students in the paper-and-pencil group planned experiments using sketches and assessed the results of studies displayed in photographs, students in the hands-on group worked with physical equipment. In contrast, paper and pencil students outperformed hands-on students on an evaluation work for a science fair poster that was similar to the paper and pencil training, while hands-on students outperformed paper and pencil students on a hands-on test that was identical to the training tasks (Schwichow, Zimmerman, Croker & Härtig, 2016).

The idea of cognitive learning supports continuous learning throughout life. Employees can build on their previous knowledge and incorporate new ideas into what they already know. Through hands-on activities, individuals acquire learning strategies they can reuse and apply. This means they can grasp new information more efficiently because they already understand which methods are most effective for them (Valamis, 2022). Hands-on learning activates both the left and right sides, enhancing connections and knowledge storage. It also activates motor and sensory parts, as seen in brain scans, enhancing the processing of visual and spatial information. Protracted presentations require time, but practical activities boost students' mental and heart rates (Miriam, 2021).

Creativity is the ability to use one's imagination and creative thinking to come up with answers to challenging issues (Welch & McPherson, 2012; as cited in Kupers, Dijk & Lehmann-Wermser, 2018). Encouraging problem-solving skills through creativity was

considered an effective approach, highlighting the importance of creativity for students. Many children struggle with problem-solving, but introducing creativity shows them numerous alternatives. This fosters the ability of students to think creatively and generate unique ideas and solutions (Martin, 2017). Assessing creativity helps develop more effective curriculum and teaching methods, offering ongoing feedback for students to refine their creative skills throughout their lives. The measurement of creativity underscores its fundamental importance in education. Emphasizing the value of creativity in the educational journey was a key advantage of assessing it in schools. The valuable feedback from measuring creativity assists students in their creative development and guides schools toward optimal environments for fostering creativity. All these aspects contribute to evaluating creativity in assessments of student and academic success (People for Education, 2017).

Students' capacity for inventive thought can be stimulated via creativity. Due to the tight curricular schedules, teachers encourage activities like open-ended questions, imaginative team-building exercises, brainstorming sessions, and debates (Edsys, 2017). According to Martin (2020), it empowers students to actively generate knowledge, fostering involvement in education and resulting in enhanced academic performance and elevated test scores. A journal article by Chua and Sharma (2016) highlights the effectiveness of hands-on activities in boosting student engagement and motivation. Many psychologists and educators contend that the mental abilities required for success in the classroom and the workplace of the future are those of creativity. Schools must appreciate and educate them as a result. Students must be prepared to learn freely and continually adapt, innovate, and problem-solve creatively in the workplace in a

knowledge economy where machines can perform routine activities and practically all information is accessible with just one click (Davis, 2018).

Introducing students to cooperative environments early in their school experiences presents opportunities for them to be more productive and joyful as they work with others in a team-based environment, and being a part of a team that genuinely cares about its members will also give a student a strong support system (Marlborough, 2019). It was essential to create teamwork-friendly organizational settings and cultures where psychological safety may flourish and serve as a method to settle arguments, ensure safety, reduce mistakes, learn from mistakes, and enhance performance. Coordination, communication, and adaptability are a few more beneficial relationship qualities that can boost efficiency across teams or activities that have been found (Salas, Reyes & McDaniel, 2018).

Enhancing Students' Capacity in Critical Thinking Skills

Developing effective critical thinking skills is crucial for determining the quality of student learning, making it essential to integrate critical thinking into the curriculum content, instructional strategies, and sequencing across all grade levels (Alsaleh, 2020). Critical thinking is a skill taught in educational institutions that aims to equip individuals to understand the world, navigate vast information, and avoid deception. Through questioning motives and purposes, critical thinking involves probing beyond apparent surface challenges. To engage in critical thinking, one must acquire essential facts and data and meticulously evaluate them, questioning their accuracy and authority (University of Greenwich, 2021). A child's ability to develop critical thinking skills is greatly influenced by their education. As a result of their innate curiosity, children

frequently ask questions. Children can be taught to think critically from the moment they start asking questions (Marquez, 2017). Reading and writing fluency alone do not establish literacy. In addition to demonstrating a thorough understanding of the material, subject-matter expertise, and critical thinking abilities, students must also demonstrate academic improvement. Studies demonstrate that Filipino students have trouble understanding what they read and have poor written information-processing skills (Brazel, 2020).

One primary purpose of giving students problems is to get them thinking critically and drawing conclusions from the data they have gathered (Dwyer, Hogan & Stewart, 2014; Fajrianti, Hendriani & Septarini, 2016). Critical thinking was demonstrated through the processes of analyzing, evaluating, and summarizing (Vong & Kaewurai, 2017). Florea and Hurjui (2015) stated that critical thinking can also be defined as an active learning process that involves agreeing or disagreeing with information, judging to determine the truth, and correcting false information to produce new ideas. Further, Alban (2023) says that critical thinking encourages imagination and alternative thinking that can be used in every aspect of your life. According to Salas (2016), students' level of critical thinking skills considering the seven components was fair with an average mean of 2.04, which shows that the ability of students to separate or break a whole into different aspects, such as identifying or analyzing, explains that they have average skill in doing so.

The fundamental guidelines and curriculum of VHS in Indonesia state that critical thinking abilities should be taught to pupils (Peraturan Menteri Pendidikan dan Kebudayaan Republik Indonesia Nomor 70, 2013; Saputra, Joyoatmojo, Wardani, &

Sangka, 2019). Critical thinking skills were closely related to cognitive activity. Such skills were part of the learning outcomes of the knowledge aspect of higher-order-thinking categories (FitzPatrick & Schulz, 2015). Acquiring proficiency in critical thinking enables you to enhance the value of data, analyze business trends, understand the dynamics of people and performance, and embrace a broader business perspective that contributes positively to the company (Moir, 2020). Teacher education should emphasize the value of asking questions, as critical thinking commences with the act of questioning (Facione, 2015; Nosich, 2016).

Critical thinking involves the recognition of one's capability to distinguish between right and wrong. It is only when an individual applies concepts in alignment with their definitions that they can be deemed to possess refined critical thinking skills. Moreover, an individual with advanced critical thinking abilities should approach information systematically, exhibit patience while remaining adaptable, and assess information based on specific criteria rather than unquestioningly accepting it (Paul & Elder, 2016). The school environment stands out as the primary context where planned teaching can effectively foster critical thinking, transforming it into a lifelong skill for students. With current educational systems prioritizing teachers, their role becomes crucial as standards in the process of social learning. Hence, teachers need to master a quality or skill before imparting it to students. This approach allows teachers to inspire students, enhance their self-confidence, and enable the cultivation of traits such as questioning, developing various perspectives, analyzing, and exploring alternative solutions during the planning of classroom activities and settings (Aybek & Yolcu, 2018).

The Systematic Literature Review (SLR) method, which identifies, reviews, analyzes, and interprets existing research, was the research technique employed. It helped students become more adept at several signs of mathematical critical thinking, including interpreting, analyzing, evaluating, and making conclusions. Several Realistic Mathematics Education (RME) learning steps, including preparation, opening, learning process, and closing, were also established (Nashrullah, 2021). In education discussions, experts highlight that critical thinking involves three main skills: analyzing, evaluating, and making inferences (Pawl, 1993; F. Taghva, Rezaei, Ghaderi & R. Taghva, 2014). Simply put, critical thinking means looking at a problem, considering all the information, and coming up with a sensible solution or idea (Warnick et al., 1994; F. Taghva, Rezaei, Ghaderi & R. Taghva, 2014). It's crucial to note that critical thinking also means examining ideas, figuring out hidden values, assessing topics, and making conclusions (Petress, 2004; F. Taghva, Rezaei, Ghaderi & R. Taghva, 2014).

Jaca, Tumulak, and Boquin (2023) discovered that students' involvement in the word game created a positive impact on their eagerness to learn new vocabulary, boosted self-confidence in verbal expression, refined analytical skills, and improved reading comprehension abilities. This indicates that the use of gamified learning contributed to improvements in both vocabulary skills and the general attitude toward acquiring vocabulary. In the investigation by Sulistiani, Waluya, and Maskuran (2018), the effectiveness of employing hands-on activities in implementing discovery learning to improve students' mathematical critical thinking skills was investigated. Remarkably, students exhibiting epistemic curiosity (EC) showcased competence in all six critical thinking indicators, with only minor deficiencies noted in two of them. On the flip side,

students categorized as perceptual curiosity (PC) faced challenges in fulfilling critical thinking indicators, excelling mainly in generating questions but displaying weaknesses in the other five indicators. The evident difference in critical thinking capabilities favored EC students, highlighting the influence of curiosity type on mathematical cognition.

Kamali and Fahim (2011) and Ateyeva, Ciptaningrum, Hidayah, Kassymova, Dossayeva, and Akmal (2019) have discussed the concept of critical thinking, which involves the ability to examine various perspectives, advocate for ideas, and employ both inductive and deductive reasoning to draw factual or judgmental conclusions based on well-founded implications derived from clear statements of knowledge or belief. Facione (2015) and Ateyeva, Ciptaningrum, Hidayah, Kassymova, Dossayeva, and Akmal (2019) further expound on the concept of interpretation, describing it as the capacity to grasp and express the meaning or significance of a wide array of experiences, situations, data, events, judgments, conventions, beliefs, rules, procedures, or criteria. This process includes sub-skills such as categorization, interpreting significance, and clarifying meaning.

Gender Distinctions in Engaging in Hands-On Learning

According to Wrigley-Asante, Ackah, and Frimpong (2023), the causes of the gender gaps in academic achievement at the two levels of the educational ladder were investigated. The degree of academic achievement of males at that level is typically impacted by their participation in extracurricular activities and other economic activities, which were also linked to broader socioeconomic impacts such as economic hardship, financial limitations, and gendered views. Given that they have an advantage over women, men are likely to feel motivated to do better because of this mentality. Females,

on the other hand, while gender stereotypes played a significant role in the differences in academic performance at the high school level, the improved academic performance of females can be attributed to teaching methods and styles, parental motivation and support, and advocacy campaigns for women's empowerment may find it difficult because they must work more to close the gap between themselves and their male counterparts.

According to Conner and Pope (2013), the academic involvement of 6,294 students from 15 high-achieving schools, of which 54% are female, 44% are white, 34% are Asian, and 22% are from other racial or ethnic backgrounds two-thirds of children in these schools do not consistently express high levels of affective, behavioral, and cognitive engagement in their academic homework, which was defined as being "fully engaged" in learning. In contrast to males, 19% of girls were less active, according to research done in 2016 by Telford, Olive, Cochrane, and Davey. Less physical activity in girls was linked to less influence in the home and classroom as well as less involvement in extracurricular sports. Boys commonly thought that they were physically superior and that girls should consider it. During physical education, it is possible to say that boys tend to be more hands-on when it comes to disciplines that demand strength (Logictad, Rope, & Brattbakk, 2021). Compared to active girls, active boys were happier with physical education activities, claiming that a student's level of engagement can differ depending on the activity they complete and their gender (Kralova & Fialova, 2021).

According to the Centers for Disease Control and Prevention (2022), children ages 6-17 years old should participate in 60 minutes of physical activity every day. However, in 2017, only 26.1 % of high school students participated in physical activity.

These high school students participated more in muscle-strengthening exercises. The findings of the research by Howells, Wellard, and Woolf-May (2020) indicate that boys attain 88 percent (for boys) and girls 70 percent of the recommended daily physical activity levels on PE days, while girls only reach 77 percent (for girls) on non-PE days. This suggests that boys were more active than girls on both PE and non-PE days.

Hands-On Activity and Critical Thinking Skills

Ling (2017) examines how constructivist-based hands-on activities positively impact 14-year-old Form 2 students' understanding of image formation by a plane mirror. The experimental group, engaging in hands-on activities, demonstrated significantly better concept acquisition and reduced misconceptions compared to the traditionally instructed group. The findings highlight the effectiveness of constructivist-based approaches in science education, advocating for their integration to enhance understanding and reduce misunderstandings related to visual phenomena. Peterson (2001) and Wright (2014) introduced and analyzed an active learning strategy for assessing student engagement. The conventional concept of participation in the classroom, encompassing vocal and active involvement through questioning, answering, and engaging in class discussions and activities, serves as a focal point.

According to Peterson (2001) and Wright (2014), students were obliged to submit self-assessments of their participation throughout the course. These self-assessments aimed to convince faculty that students not only comprehended the class material but were actively involved in the learning process. This self-evaluation approach necessitates students to proactively engage in their participation, encouraging them to actively connect with the course material and promoting thoughtful consideration of the course

beyond the classroom setting. Remarkably, the effectiveness of the self-evaluation component was apparent as even students less interested in participating are motivated to engage, recognizing the need to be accountable for their level of involvement.

When students have the opportunity to learn in a real-world, hands-on setting, they frequently become engaged, stimulated, and eager to learn as much as they can. If a student is given a more realistic or practical task to perform, their desire to learn grows, and they are more eager to listen and pay attention. Additionally, students gain more control over their own educational experience. A student's critical thinking skills increase in a hands-on learning environment. This happens because pupils must decide what to do next to get the result they were aiming for. As students sit through a lecture, they are no longer forced to rely on memory and focus. Instead of simply memorizing information for a test and much of the information frequently being gone after the exam, these critical thinking skills stay with a student (Universities Colleges & Schools, 2022). Additionally, Piergiovanni (2014) said that it has been demonstrated that engaging students in class activities like writing assignments and group discussions encourages critical thinking.

Engaging kids in hands-on learning activities was one approach to enhancing their critical thinking abilities. Numerous studies have shown that using hands-on activities in the classroom can enhance students' ability to think (Hussain & Akhtar, 2013; Saido et al., 2015). Further, according to Zulyadaini (2017), student worksheets were one of the resources teachers employed to aid in the learning process. Therefore, it is anticipated that this worksheet will help students develop their critical thinking skills (Agustia, Yennita, Azizahwati & Rahmad, 2019).

Although many studies have looked at hands-on activities and critical thinking skills, it was important to acknowledge that there were still gaps in the existing research. Despite the increasing amount of these studies, some unanswered questions require additional research to be validated and a more trustworthy conclusion to be reached. The literature of this study did highlight the complex relationship between students' engagement in hands-on activity and students' critical thinking skills. The findings, which show that hands-on learning has a considerable impact on students' critical thinking, provide support for this. The study's discovery of the connection between hands-on activity and critical thinking abilities emphasizes the need to take hands-on experience into account while developing critical thinking abilities. It would, therefore, be beneficial to assess further the relationship of students' engagement to hands-on activities and students' critical thinking skills by conducting more specialized research to fill this specific gap in the literature.

Theoretical Framework

This study was grounded in two fundamental theories. Firstly, Jean Piaget's Cognitive Development theory states that as children grow, their intelligence changes. Additionally, as mentioned, cognitive development in children involves more than just acquiring knowledge but also the development of a mental model of the world around them (Miller, 2011; Main, 2021). The theory further emphasized that children progress through four stages of intellectual growth, namely the sensorimotor stage, preoperational stage, concrete operational stage, and formal operational stage. In each developmental stage, a child's thinking exhibits distinct qualitative differences compared to other stages,

suggesting that each stage includes a unique form of intelligence, reflecting the increasing complexity of their thinking (Mcleod, 2023).

Second is John Dewey's Constructivist Learning theory, which states that the most effective way to acquire knowledge is through a process of thoughtful consideration and active mental construction (Mascolo & Fischer, 2005; Brau, 2022). This implies that when learning, people should think about the information they are given and create their understanding based on past experiences, personal views, and cultural background. Therefore, creating knowledge depends on how each person interprets their experiences (Brau, 2022).

The above-mentioned theories support the study at hand since it focuses on two important aspects of students' learning dimensions, namely their engagement in hands-on activities and their critical thinking skills. The importance of students' involvement in developing their understanding of the concept through hands-on activities is aligned with Dewey's Constructivist Learning theory. On the other hand, students' development of their critical skills following the different styles is aligned with what Piaget believed.

Conceptual Framework

The study was guided by the following conceptual framework shown below:

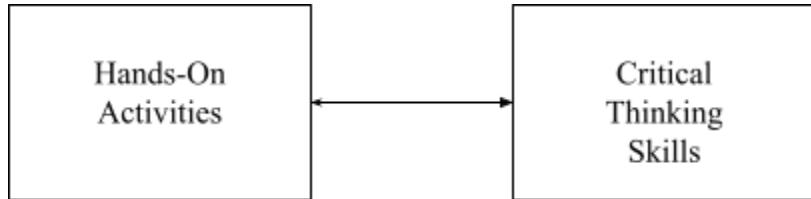


Figure 1: Conceptual Framework

The figure presented above delineates the researchers' purpose to investigate the relationship between students' engagement in hands-on activity and students' critical thinking. In this context, the independent variable was "hands-on activities", which refers to experiential learning, where students immerse themselves in a subject to learn and engage in centered reflection to improve their knowledge, skillset, and values. On the other hand, the dependent variable was "critical thinking", which refers to a process that encourages pupils to critically assess information and create reasoned judgments. Students can use critical thinking to determine the relevance and value of arguments and ideas, detect gaps in reasoning, and systematically handle academic and non-academic challenges. The primary objective of this study was to determine how students' engagement in hands-on activity could contribute to developing their critical thinking.

Significance of the Study

This study aims to explore the relationship between students' engagement in hands-on activities and their critical thinking skills, with implications for education. For students, this research underscores the importance of practical tasks in honing critical thinking abilities, providing valuable insights for both academic and future career

success. Teachers can use these findings to enhance their teaching strategies by incorporating more hands-on activities, thereby promoting critical thinking among their students. Moreover, this study can serve as a foundational reference for future researchers, inspiring further study in school institutions and ultimately advancing the understanding of the relationship between students' engagement in hands-on activity and students' critical thinking skills.

Scope and Limitation

This research aims to investigate the relationship between hands-on activities on students' engagement and the development of their critical thinking skills. It will involve students from a specific educational institution, focusing on a particular grade level or age group. The study's primary focus will be on assessing critical thinking skills related to analysis and evaluation in this specific context.

To maintain the study's focus and feasibility, it will be limited to a particular geographical location, making the findings applicable to the chosen educational institution or region. This study was specified for year levels 7, 8, 9, and 10, with an age range of 10 years old up to 18 years old. Additionally, the research will focus on critical thinking skills with a range of topics, and the findings may not be broadly applicable to other academic domains. The study's data collection and analysis will be conducted, and it will not explore the long-term effects of hands-on activities on critical thinking skills. These parameters serve to provide a clear framework for the research, outlining its boundaries and constraints while defining the specific focus and context of the study on the relationship between students' engagement in hands-on activities and their critical thinking skills.

Definition of Terms

In this section, key terms used in this research are operationally defined to ensure clear and precise communication of their intended meanings within the context of the investigation.

Critical Thinking Skills refer to the assessment of the students' understanding of how hands-on activities affect participants' analytical abilities through the use of survey questionnaires.

Hands-On Activities refer to the activities given by different subject teachers in HCCC to increase the learning capacity of students.

Students' Engagement refers to the involvement, interest, and participation of students in hands-on activities, which was present in the learning process.

Relationship refers to the connection of the two variables in this research, which were the hands-on activities and students' critical thinking skills.

Chapter 2

METHODS

This chapter covers the research design and research procedure that was utilized by the researchers in pursuing the study. It discusses the locale of the study, the selection of the respondents, the sampling method, the research instruments, and the statistical treatment of the study.

Research Design

This study was quantitative and employed the descriptive-correlational type of research. Quantitative research focuses on evaluating and quantifying factors to produce findings. It incorporates the use of numerical data and statistical tools to analyze that data to provide answers to issues like who, how much, what, where, when, how many, and how. It also describes how to obtain facts in numerical form to explain a problem or phenomenon (Apuke, 2017). Correlational research was frequently used by researchers to understand the relationships between different variables. The researcher does not have control over the variables in these types of studies (Wong, 2020).

A descriptive approach was utilized to describe the respondents' sex, age, and year-level demographics. The same technique was utilized to profile students' participation in hands-on activities in terms of their sex and year level. Similarly, a descriptive approach was used to assess junior high school pupils' critical thinking abilities. On the other hand, a correlational approach was applied to determine whether there was a significant relationship between students engaging in hands-on activities and their critical thinking abilities.

Research Respondent

The respondents of this research were junior high school students. These individuals, from grades 7-10, represent the target population of the study. In determining the respondents of the study, the researchers utilized the stratified random sampling technique. In order to do so, the researchers acquired the whole population of each section from grades 7 to 10. After this, the researchers then took only a few percent of each section to get the number of students. Additionally, the researchers considered factors such as sex and year level to ensure a diverse and well-rounded sample. The inclusion of participants from different year levels and sexes will provide a comprehensive understanding of how the engagement in hands-on activity and critical thinking skills may differ across different year levels and sexes.

Research Locale

This study was conducted in one of the private-Catholic Schools in Davao City, which caters to students from pre-school level to college level, with PAASCU accreditation level 2 for both Basic Education and College Departments. In the S.Y. 2012-2013, the school ushered in a new development in the educational system with the official implementation of the K-12 Basic Education Curriculum across the country. On a relevant note, the said respondent school was committed to providing holistic quality formation for all its students. It aims to raise not just intellectually capacitated learners but also skillful ones, especially in molding everyone for their future. It has a variety of student organizations focused on preparing students to be globally competitive.

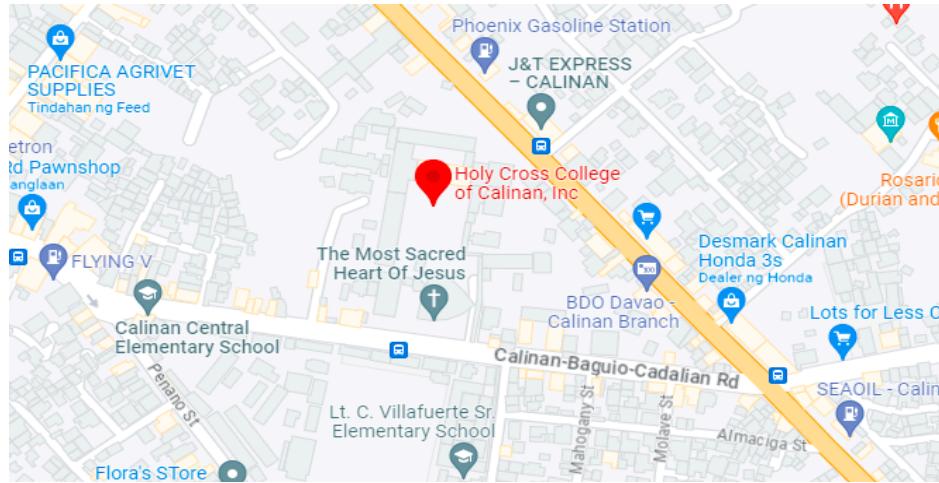


Figure 2: Research Locale

Research Instrument

The first survey questionnaire utilized in this study to assess student engagement in hands-on activities was from the instrument by Kubischta (2014) entitled: "Engagement and Motivation: Questioning Students on Study Motivation, Engagement and Study Strategies". The researchers selected this study as a foundation for their questionnaire due to its relevance in measuring how engaged the students are in their classes. Meanwhile, to measure the critical thinking skills of students, the researchers used a survey questionnaire developed by Rosa (2021), entitled "Student Self-Assessment Critical Thinking Questionnaire". This survey questionnaire was selected for its suitability in evaluating the critical thinking skills of students. Additionally, in both adapted questionnaires, the researchers followed the five-point Likert scale type using the following descriptions: strongly disagree, somewhat disagree, neutral, somewhat agree, and strongly agree, with the corresponding score weights of 1, 2, 3, 4, and 5.

It is important to note that some questions in the questionnaire mentioned above would not benefit the needs of the research. The researchers only utilized 10 questions from the first source for the hands-on activity and another 10 from the second source for critical thinking. Moreover, the adapted items were put on a table for the level of hands-on activities of the students and for the level of students' critical thinking skills.

Data Gathering Procedure

Initially, research protocols were observed by the researchers. Before the gathering, a letter was also sent to the school principal and school president asking for approval to conduct the study. The letter contained the objectives of the study, its significance, and the needed research respondents. After the president and principal approved the study, the researchers conducted an orientation to inform the respondents regarding the study and gave them the informed consent form and parental consent stating that the student would become a part of the study. On the next day, after the parental consent was signed by their parents, the participants signed the ICF so that they could answer the survey questionnaire. Moreover, the respondents were also informed that it was voluntary and that they had the freedom to withdraw. In addition, the researchers assured the respondents of concerns regarding the confidentiality of the details that are collected from them.

Ethical Consideration

Understanding what constitutes ethical research is crucial for organizing a research topic since it helps one comprehend the discourse of academic research (Cacciattolo, 2015). There are several reasons why it is critical to follow ethical

considerations in research. To maintain ethical considerations throughout a study, planning a research project, preserving data collecting, protecting participants by keeping privacy and confidentiality, sticking to standards, and preventing plagiarism should all be considered. These enable the researchers to effectively progress toward the goal of this study (Resnik, 2020). In this study, the researchers utilize the following considerations: voluntary participation, privacy, and confidentiality.

First is voluntary participation; any participation in a research study is completely voluntary. It is free to decline to participate for any reason. The respondents may also stop participating at any time or refuse to answer any individual questions. Further, the respondents can freely stop even after signing the consent form (Bhandari, 2021). In this study, the researchers provided enough information and reassurance to the respondents regarding participation for them to comprehend fully.

The second is privacy, according to Hecker and Kalpokas (2024), it pertains to the participant's right to control access to personal information. In this study, the researchers ensured privacy by having a document with a password that only the researchers knew. Last is confidentiality, which pertains to the researcher's obligation to protect and prevent unauthorized disclosure of this personal information (Hecker and Kalpokas, 2024). Confidentiality can be seen in this study where the researchers did not disclose the names of the respondents, and the questionnaire was put in an envelope and brought home by one of the researchers to ensure that no one could see it except for the researchers.

Data Analysis

To answer the statement of the problem, frequency distribution and percentage were employed. According to Percent Distribution for RTRA (2021), a percentage

distribution expresses each class's frequency as a percentage of the total frequency, which is equal to 100. Further, according to Jove Core Statistics (2022), a data presentation that shows the proportion of observations for each data point or set of data points is known as a percentage frequency distribution.

Further, the researchers utilized the mean and standard deviation to determine the level of engagement of students in hands-on activities and critical thinking. In statistics, the mean refers to the average value calculated by adding up a set of data and dividing it by the total number of data points. (Dubovskiy, 2011). This describes the mean of a set of numbers. By adding all values and dividing by the count, you find the average (Sykes, Gani & Valley, 2016). On the other hand, the standard deviation displays the degree of variance from the mean (average). While a high SD shows that the data were dispersed throughout a wide range of values, a low SD suggests that the data points tend to be close to the mean. It can determine how evenly distributed the data was by looking at the standard deviation. It measures how far apart each observed value is from the mean (Ilola, 2018).

In analyzing and interpreting the data gathered on the level of engagement of students in hands-on activities. The following gradation and interpretation were used.

Table 1: Table Interpretation on the Level of Engagement of Students

Range of Means	Description	Interpretation
4.21 - 5.00	Very High	This means the level of engagement of students in hands-on activities was very high.
3.41 - 4.20	High	This means the level of engagement of students in hands-on activities was high.
2.61 - 3.40	Average	This means the level of engagement of students in hands-on activities was average.
1.81 - 2.60	Low	This means the level of engagement of students in hands-on activities was low.
1.00 - 1.80	Very Low	This means the level of engagement of students in hands-on activities was very low.

Meanwhile, in analyzing and interpreting the data gathered on the level of critical thinking in terms of sex, age, and year level, the following gradation and interpretation were used.

Table 2. Table Interpretation on the Level of Critical Thinking

Range of Means	Description	Interpretation
4.21 - 5.00	Very High	This means the level of critical thinking in students was very high.
3.41 - 4.20	High	This means the level of critical thinking in students was high.
2.61 - 3.40	Average	This means the level of critical thinking of students was average.
1.81 - 2.60	Low	This means the level of critical thinking in students was low.
1.00 - 1.80	Very Low	This means the level of critical thinking in students was very low.

Moreover, the Pearson Correlation Coefficient was utilized to determine if there was a significant relationship between hands-on activity and critical thinking. The test

statistic known as Pearson's correlation coefficient was used to assess the statistical association or relationship between two continuous variables. Because it was based on the method of covariance, it was regarded as the greatest way to assess the relationship between relevant variables. It provides details on the strength of the correlation or association as well as the direction of the connection between the two (Statistics Solution, 2021).

Table 3: The Quantitative Interpretation of the Degree of Relationship of Pearson Correlation Coefficient

R	Descriptive Level
± 1.00	Perfect Correlation
between ± 0.75 to ± 0.99	High Positive (Negative) Correlation
between ± 0.51 to ± 0.74	Moderately High Positive (Negative) Correlation
between ± 0.31 to ± 0.50	Moderately Low Positive (Negative) Correlation
between ± 0.01 to ± 0.30	Low Positive (Negative) Correlation
0.00	No Correlation

Chapter 3

RESULTS AND DISCUSSION

This chapter covers the presentation, tabulation, analysis, and interpretation of the data gathered during the conduct of this study. The arrangement of the presentation was based on the order of the Statements of the Problem presented in Chapter 1.

Research Question #1: *What is the demographic profile of students in terms of sex, age, and year level?*

Table 4: Demographic Profile of Respondents.

	Valid	Frequency	Percentage
Sex	Male	60	33.33%
	Female	120	66.67%
	TOTAL	180	100%
Age	12	23	12.78%
	13	49	27.22%
	14	48	26.67%
	15	38	21.11%
	16	20	11.11%
	17	1	0.56%
	18	1	0.56%
	TOTAL	180	100%
Year Level	Grade 7	43	23.89%
	Grade 8	52	28.89%
	Grade 9	46	25.56%
	Grade 10	39	21.67%
	TOTAL	180	100%

Table 4 shows the demographic profile of the respondents according to sex, age, and year level. In terms of sex, a sum of one hundred eighty (180) respondents were taken, where 33.33% (60) were male, while 66.67% (120) were female. In terms of age, from the sum of one hundred eighty 180 respondents, 27.22% (49) indicates that the respondents who were 13 year olds had the highest number of respondents while 0.56% (1) indicates that the respondents who were 16 and 17 year olds had the lowest number of respondents. In terms of year level, Grade 8 represents 28.89% (52) of the population, which determines they have the highest number of population, while the Grade 10 attained 21.67% (39) of the respondents, indicating they have the lowest number of respondents.

Research Question #2: *What is the level of engagement of students in hands-on activities when grouped according to sex, age, and year level?*

Table 5: Students' Level of Engagement in Hands-On Activities

Table 5 shows the level of engagement in hands-on activities when grouped into sex, age, and year level. In terms of sex, the males have a slightly higher average engagement score of 3.730 compared to females with 3.473. Both males and females generally exhibit high engagement in hands-on activities. Male engagement in hands-on activities is more distant from one another compared to the female, which is supported by the study of Haq, Khuramm, and Khalil (2020), which aimed to assess the effect of activity-based learning on the listening skills of male and female students' achievement. The study results showed that the pretest score analysis revealed that the boys in the experimental and control groups had almost equal listening achievement levels. In contrast, the boys' experimental group performed better on the post-test. They

demonstrated a relative increase in engagement and involvement throughout the experiment.

Indicators	Classification	Mean	Standard Deviation	Description
Sex	Male	3.730	0.750	High
	Female	3.473	0.620	High
Age	12	3.687	0.671	High
	13	3.661	0.691	High
	14	3.831	0.490	High
	15	3.824	0.673	High
	16	3.585	0.931	High
	17	4.100	N/A	High
	18	3.800	N/A	High
Year Level	Grade 7	3.737	0.720	High
	Grade 8	3.592	0.528	High
	Grade 9	3.961	0.596	High
	Grade 10	3.674	0.785	High

According to age, there was a variation in engagement across different age groups.

Engagement appears to increase steadily from ages 12 to 17, with the highest engagement observed at age 17 with a mean of 4.100. The lowest engagement observed is at the age of 16, with a mean of 3.585. This indicates that age differences exist in students' levels of engagement. The majority of research referred to in this study has shown that during adolescence, student engagement tends to decrease with age (Archambault, Janosz, Morizot, & Pagani, 2009; Lv, Chen, Zheng, & Zhu, 2022). Younger students reported higher levels of school engagement. As kids get older, they discover that school activities

are either less engaging or do not meet their needs for personal development (Amir, Saleha, Jehas, & Ahmad, 2014), which contradicts the study of Timms, Fishman, Godineau, Granger, and Sibanda (2018). The study results shows that students of age higher than 25 reported higher levels of engagement in learning than did younger students. According to data from a New Zealand study, students' academic engagement levels varied over time between the ages of 10 and 16, but overall, the level exhibited a declining pattern (Wylie & Hodgen, 2012; Lv, Chen, Zheng, & Zhu, 2022). Further, the result in terms of grade level can be associated with the study conducted by Ling (2017), which constructivist-based hands-on activities positively impact 14-year-olds.

Meanwhile, all year levels have shown a high level of engagement, which varies across different grade levels. Grade 9 has the highest engagement, with a mean score of 3.961. The table interprets that both grade 7 and grade 10 engagement is relatively more spread out while both grade 8 and grade 9 engagement are closely clustered together. Notable grade differences in learning engagement were discovered in a study including a sample of Chinese undergraduate students. Specifically, freshmen students had significantly higher levels of engagement with learning compared to sophomores and seniors (Zhang & Ruolan, 2018).

Research Question #3: What was the perceived level of critical thinking when grouped according to sex, age, and year level?

Table 6: Students' Level of Critical Thinking Skills

Indicators	Classification	Mean	Standard Deviation	Description
Sex	Male	3.603	0.745	High
	Female	3.656	0.697	High
Age	12	3.652	0.673	High
	13	3.494	0.774	High
	14	3.756	0.583	High
	15	3.768	0.718	High
	16	3.435	0.851	High
	17	3.600	N/A	High
	18	3.900	N/A	High
Year Level	Grade 7	3.619	0.714	High
	Grade 8	3.515	0.692	High
	Grade 9	3.893	0.639	High
	Grade 10	3.523	0.675	High

Table 6 shows the level of critical thinking skills of the respondents when they were grouped according to sex, age, and year level. As shown in the table, both males and females have high levels of critical thinking skills scores, with females having a slightly mean of 3.656 compared to males with a mean of 3.603. The table interprets that both sexes' critical thinking skills are relatively spread out from one another. A study by Morais, Lopes, Silva, Dominguez, Payan-Carriera, Imaginário, and Santos (2023) showed that the characteristics of critical thinking were influenced by factors such as

gender, age, and academic field. The girls who were older and engaged in medical courses showed a greater ability to think critically. Data analysis revealed that while students' science process skills were deemed good, there was a greater predominance of female students. In the meantime, female students' critical thinking abilities are also categorized as critical and dominant in the highly significant category. The study's findings led to the conclusion that students' critical thinking abilities were influenced by their science process skills (Darmaji, Kurniawan, Astalini, & Rini, 2022).

While based on age, there was a consistently high level of critical thinking across different age groups. The highest average critical thinking score was observed among 18-year-olds, with a mean of 3.900. The lowest critical thinking scores were obtained by 16-year-olds with a mean of 3.435. This result is supported by AgeUK (2022), which states that different studies demonstrate that certain individuals exceed the average in their ability to think as they age. A study by Nippold, LaFave, and Shinham (2020) shows that 16-year-olds performed better than 13-year-olds. With these, it can be indicated that as the students grow, their critical thinking skills also increase. When test results from almost 50,000 people were combined, and each cognitive function was shown to peak at a distinct age, it appeared that participants' information processing speed peaked early, at about age 18 or 19, and then started decreasing rapidly (Association for Psychological Science, 2015). The table interprets that older age of students' critical thinking skills are more spread out. Meanwhile, at the age of 14, students' critical thinking skills are more clustered and constricted.

While in year level, Grade 9 students have the highest average critical thinking score with a mean of 3.893, while the lowest critical thinking score was attained in Grade

8 with a mean of 3.515, there seems to be a trend of slightly higher critical thinking scores among females, older students, and students in higher grade levels. All grade levels' critical thinking skills are spread out from one another. According to research by Llorens, Schaufeli, Bakker, and Salanova (2007) and Lv, Chen, Zheng, and Zhu (2022), critical thinking skills among Chinese first-year higher vocational college students progressively dropped. This was in line with past research that used a sample of Chinese college students, who initially demonstrated excellent levels of critical thinking skills but then declined after enrolling in college and reached a low point in their sophomore year (Xia & Zhong, 2017; Lv, Chen, Zheng, & Zhu, 2022).

Research Question #4: *Is there any significant relationship between the engagement of students in hands-on activity and the critical thinking of students*

Table 7: The Relationship of Students Engagement in Hands-On Activity and Students Critical Thinking Skills.

Indicators	r-value	p-value	Description
Level of Engagement	0.775	2.971×10^{-37}	High Positive Correlation
Level of Critical Thinking			

Table 7 results show the relationship between students' engagement with hands-on activities and their critical thinking skills. As can be seen in the table, the correlation value for the level of engagement and the level of critical thinking is 0.775 with a depicted magnitude of high positive correlation and a p-value of 2.971×10^{-37} , which indicates that there was a significant relationship between the two variables. All positive correlation values still indicate that the result was going upward. Meanwhile, this can be supported by the study of Hussain and Akhtar (2013) and Saido et al. (2015),

which shows that using hands-on activities in the classroom can enhance students' ability to think. Critical thinking is a learning outcome that is influenced by students' level of engagement, which is the foundation for students' growth of critical thinking (Raymond-Seniuk & Profetto-McGrath, 2011; Iranfar, Mohammadi, & Iranfar, 2012; Lv, Chen, Zheng, & Zhu, 2022). Research has also revealed a statistically significant correlation between students' critical thinking abilities and their involvement in learning, extracurricular activities, and research; higher levels of participation are associated with higher critical thinking abilities (Shcheglova, Koreshnikova, & Parshina, 2019).

Chapter 4

CONCLUSION AND RECOMMENDATION

This chapter presents the conclusion derived from the study's findings, along with the corresponding recommendations.

Conclusions

This study has provided valuable insights into the relationship between students' engagement in hands-on activities and their level of critical thinking skills and how these factors vary across different demographic groups. Regarding sex, both male and female respondents demonstrated high levels of engagement in hands-on activities, with slightly higher mean scores observed among male respondents. However, when it comes to critical thinking skills, both sexes consistently exhibited high levels, with females showing a slightly higher average.

Furthermore, respondents across all age groups displayed high levels of engagement in hands-on activities and critical thinking skills. Although there were variations in mean scores among different age groups, all age groups exhibited high levels of engagement and critical thinking skills. The findings revealed a significant positive correlation between students' engagement in hands-on activities and their critical thinking skills. This means the higher the engagement in hands-on activity, the higher the possibility of affecting the level of their critical thinking skills. As a result, the researchers accepted the alternative hypothesis and rejected the null hypothesis.

Recommendations

This study revealed a correlation between students' engagement in hands-on activities and students' critical thinking skills. Based on these findings, the following recommendations are proposed:

Students, especially those in grade 8, who have the lowest level of engagement and the lowest level of critical thinking skills, are encouraged to participate more during hands-on activities such as laboratory experiments and robotics activities so that they will be more engaged, and it corresponds to the gradual increase of critical thinking skills. For the teachers, they may incorporate fun activities that would result in better engagement from the students. The implementation of hands-on activities as an inquiry-based strategy in teaching may be encouraged by administrators and embraced by educators to continually improve public education.

The result shows that Pearson's r value for both levels of engagement and level of critical thinking is 0.775, which corresponds to a high positive correlation. Based on this, continuous research is recommended. Since it has been proven that there is a correlation between the two variables, future researchers might do a study that illustrates how the level of engagement in hands-on activities varies across the sexes. Also, a similar study may be conducted with a larger group of subjects to determine if the same findings will be established.

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APPENDICES

Appendix 1: Letter to the President



HOLY CROSS COLLEGE OF CALINAN, INC

Davao- Bukidnon Highway, Calinan Poblacion, Davao City

January 4, 2024

Sr. Cherie Eloisa Garrote, PM
School President
Holy Cross College of Calinan, Inc.

Dear Sister Garrote,

Greetings of peace and solidarity!

We are writing this letter to inform you that we will be conducting a research study entitled: **THE RELATIONSHIP OF STUDENTS ENGAGEMENT TO HANDS ON ACTIVITY AND STUDENTS CRITICAL THINKING SKILLS** as the major requirement in our Practical Research 1 and 2. The objective of our study is to know if there is a significant relationship between hands-on activity and critical thinking skills. Questionnaires will be used to gather data from the students of the basic education department. The result of the study will determine the contribution of hands-on activities to its students.

In line with this, we would like to ask permission to conduct a survey among the students on Holy Cross College of Calinan, and administer the questionnaire on the basic education department students.

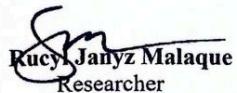
Participation in this study is completely voluntary, therefore, participants are free to withdraw from the study at any time without moral obligation to the researcher and to the school. Further the participants have the right to verify the data to be included in the final manuscript.

Should you wish to know more about the study, please feel free to contact:

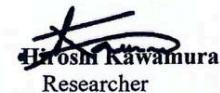
Roie Chester Cagaanan, 09691883706, roiechester@gmail.com

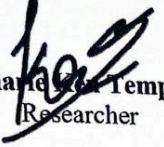
Thank you very much.

Very truly yours,


Rucy Janyz Malaque
Researcher


Roie Chester Cagaanan
Researcher


Hiroshi Kawamura
Researcher


Nadhanie ~~Temporado~~ Researcher

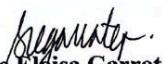

Mark ~~Sion~~ Daya Researcher


Jared Luisy Barcelo Researcher

Noted by:


Mr. Cris Dan Makiling
Research Adviser

Approved by:


Sr. Cherie Eloisa Garrote, PM
School President

Complaints about this research:

The Holy Cross College of Calinan requires that all the participants are informed and if they have complaints regarding the manner in which the research is conducted, it may be given to the researcher, or if an independent person is preferred, to the Research and Publication Head, Research Office, Holy Cross College of Calinan with the following numbers: 295-0797 or 09491985644.

Appendix 2: Letter to the Principal



HOLY CROSS COLLEGE OF CALINAN, INC
Davao- Bukidnon Highway, Calinan Poblacion, Davao City

January 3, 2024

Ma. Corazon C. Sunga, PhD
Basic Education Principal
Holy Cross College of Calinan, Inc.

Dear Ma'am Sunga,

Greetings of peace and solidarity!

We are writing this letter to inform you that we will be conducting a research study entitled: **THE RELATIONSHIP OF STUDENTS ENGAGEMENT TO HANDS ON ACTIVITY AND STUDENTS CRITICAL THINKING SKILLS** as the major requirement in our Practical Research 1 and 2. The objective of our study is to know if there is a significant relationship between hands-on activity and critical thinking skills. Questionnaires will be used to gather data from the students of the basic education department. The result of the study will determine the contribution of hands-on activities to its students.

In line with this, we would like to ask permission to conduct a survey among the students on Holy Cross College of Calinan, and administer the questionnaire on the basic education department students.

Participation in this study is completely voluntary, therefore, participants are free to withdraw from the study at any time without moral obligation to the researcher and to the school. Further the participants have the right to verify the data to be included in the final manuscript.

Should you wish to know more about the study, please feel free to contact:

Roie Chester Cagaanan, 09691883706, roiechester@gmail.com

Thank you very much.

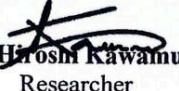
Very truly yours,

RECEIVED BY :

[Signature]
DATE: Jan 4, 2024


Lucy Janyz Malaque
Researcher


Roie Chester Cagaanan
Researcher


Hiroshi Kawamura
Researcher


Nadhari Ann Temporado
Researcher

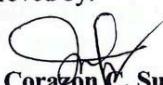

Mark Mylon Daya
Researcher


Jared Misly Barcelo
Researcher

Noted by:


Mr. Cris Dan Makiling
Research Adviser

Approved by:


Ma. Corazon C. Sunga, PhD
Basic Education Principal

Complaints about this research:

The Holy Cross College of Calinan requires that all the participants are informed and if they have complaints regarding the manner in which the research is conducted, it may be given to the researcher, or if an independent person is preferred, to the Research and Publication Head, Research Office, Holy Cross College of Calinan with the following numbers: 295-0797 or 09491985644.

Appendix 3: Letter to the Validator


HOLY CROSS COLLEGE OF CALINAN, INC
Davao- Bukidnon Highway, Calinan Poblacion, Davao City

January 3, 2024

Ms. Melina Gonzales
SHS Focal Person
Holy Cross College of Calinan

Dear Ms. Gonzales

Greetings of peace and solidarity!

We, Malaque, Rucyl Janyz L., Cagaanan, Roie Chester C., Temporado, Nadharie Ken H., Kawamura, Hiroshi P., Daya, Mark Syion A., and Barcelo, Jarel Eisly V., enrolled in the class of Our Lady of Assumption and conducting research entitled: **THE RELATIONSHIP OF STUDENTS ENGAGEMENT TO HANDS-ON ACTIVITY AND STUDENTS CRITICAL THINKING SKILLS.** This study aims to know the relationship of students' engagement in hands-on activity and students critical thinking skills and will attempt to gather the responses from the respondents toward the following questions:

1. What is the demographic profile of the students in terms of:
 - 1.1 sex;
 - 1.2 age; and
 - 1.3 year level?
2. What is the level of engagement of students in hands-on activities when grouped according to:
 - 2.1 sex;
 - 2.2 age; and
 - 2.3 year level?
3. What is the level of critical thinking of students when grouped according to:
 - 3.1 sex;

3.2 age; and

3.3 year level?

4. Is there any significant relationship between the engagement of students in hands-on activity and critical thinking of students when grouped to their:

4.1 sex;

4.2 age; and

4.3 year level?

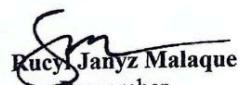
May we request your kind assistance in validating the questionnaire of the research study. Would you please fill up the attached validation sheet and give suggestions/comments for the improvement of our questionnaire.

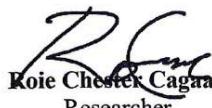
Should you wish to know more about the study, please feel free to contact:

Roie Chester Cagaanan, 09691883706, roiechester@gmail.com

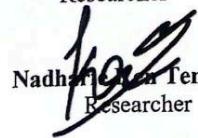
Thank you very much for your help.

Very truly yours,


Lucy Janyz Malaque
Researcher


Roie Chester Cagaanan
Researcher

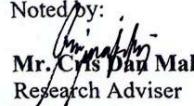

Hiroshi Kawamura
Researcher


Nadha Leon Temporado
Researcher

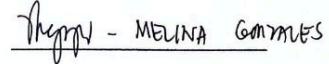

Mark Alfon Daya
Researcher


Jaroslav Barcelo
Researcher

Noted by:


Mr. Crispan Makiling
Research Adviser

Approved By:


Thyne - Melina Gammes

Appendix 3: Letter to the Validator



HOLY CROSS COLLEGE OF CALINAN, INC
Davao- Bukidnon Highway, Calinan Poblacion, Davao City

January 3, 2024

Ms. Noime Bustamante
Math Club Moderator
Holy Cross College of Calinan

Dear Ms. Bustamante

Greetings of peace and solidarity!

We, Malaque, Rucyl Janyz L., Cagaanan, Roie Chester C., Temporado, Nadharie Ken H., Kawamura, Hiroshi P., Daya, Mark Syion A., and Barcelo, Jarel Eisly V., enrolled in the class of Our Lady of Assumption and conducting research entitled: **THE RELATIONSHIP OF STUDENTS ENGAGEMENT TO HANDS-ON ACTIVITY AND STUDENTS CRITICAL THINKING SKILLS.** This study aims to know the relationship of students' engagement in hands-on activity and students critical thinking skills and will attempt to gather the responses from the respondents toward the following questions:

1. What is the demographic profile of the students in terms of:

1.1 sex;

1.2 age; and

1.3 year level?

2. What is the level of engagement of students in hands-on activities when grouped according to:

2.1 sex;

2.2 age; and

2.3 year level?

3. What is the level of critical thinking of students when grouped according to:

3.1 sex;

3.2 age; and

3.3 year level?

4. Is there any significant relationship between the engagement of students in hands-on activity and critical thinking of students when grouped to their:

4.1 sex;

4.2 age; and

4.3 year level?

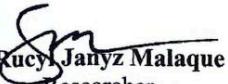
May we request your kind assistance in validating the questionnaire of the research study. Would you please fill up the attached validation sheet and give suggestions/comments for the improvement of our questionnaire.

Should you wish to know more about the study, please feel free to contact:

Roie Chester Cagaanan, 09691883706, roiechester@gmail.com

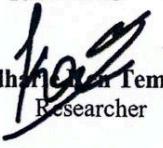
Thank you very much for your help.

Very truly yours,

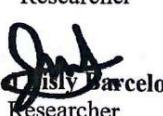

Rucy Janyz Malaque
Researcher


Roie Chester Cagaanan
Researcher

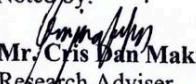

Hiroshi Kawamura
Researcher


Nadine Temporado
Researcher

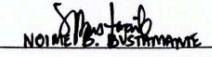

Mark Bryan Daya
Researcher


Jaroslav Marcelo
Researcher

Noted by:


Mr. Cris Dan Makiling
Research Adviser

Approved By:


Name B. Bustamante

Appendix 4: Validation Sheet

	<p style="text-align: center;">Holy Cross College of Calinan, Inc. Davao-Bukidnon Highway, Calinan Pobalcion, Davao City</p> <p style="text-align: center;">Research Assessment Tool and Validation Sheet</p>																																																
<p>Name of Evaluator : <u>Ms. Melina Gonzales</u></p> <p>Degree : _____</p> <p>Position : <u>SHS Focal Person</u></p> <p>Institution : <u>Holy Cross College of Calinan, Inc.</u></p>																																																	
<p>To the Evaluator: Please check the appropriate box for your ratings.</p> <p>POINT EQUIVALENT: 1 – Poor 3 – Good 5 - Excellent 2 - Fair 4 – Very Good</p>																																																	
<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 60%;">Criteria/ Indicators</th> <th style="width: 10%; text-align: center;">1</th> <th style="width: 10%; text-align: center;">2</th> <th style="width: 10%; text-align: center;">3</th> <th style="width: 10%; text-align: center;">4</th> <th style="width: 10%; text-align: center;">5</th> </tr> </thead> <tbody> <tr> <td>1 CLARITY OF DIRECTIONS AND ITEMS The vocabulary level, language structure and conceptual level of questions suit to level of respondents. The test directions and items are written in clear and understandable manner.</td> <td style="text-align: center;">/</td> <td style="text-align: center;">/</td> <td style="text-align: center;">✓</td> <td style="text-align: center;">/</td> <td style="text-align: center;">/</td> </tr> <tr> <td>2 PRESENTATION/ ORGANIZATION OF ITEMS The items are presented and organized in logical manner.</td> <td style="text-align: center;">/</td> <td style="text-align: center;">/</td> <td style="text-align: center;">✓</td> <td style="text-align: center;">/</td> <td style="text-align: center;">/</td> </tr> <tr> <td>3 SUITABILITY OF ITEMS The items appropriately represent the substance of the research. The questions are designed to determine the condition, knowledge, perception and attitudes that are supposed to be measured.</td> <td style="text-align: center;">/</td> <td style="text-align: center;">✓</td> <td style="text-align: center;">/</td> <td style="text-align: center;">/</td> <td style="text-align: center;">/</td> </tr> <tr> <td>4 ADEQUATENESS OF ITEMS PER CATEGORY The items represent the coverage of the research adequately. The number of questions per area category is representative enough of all the question needed for the research.</td> <td style="text-align: center;">/</td> <td style="text-align: center;">/</td> <td style="text-align: center;">✓</td> <td style="text-align: center;">/</td> <td style="text-align: center;">/</td> </tr> <tr> <td>5 ATTAINMENT OF PURPOSE The instrument as a whole fulfills the objectives for which it was constructed.</td> <td style="text-align: center;">/</td> <td style="text-align: center;">✓</td> <td style="text-align: center;">/</td> <td style="text-align: center;">/</td> <td style="text-align: center;">/</td> </tr> <tr> <td>6 OBJECTIVE Each item question requires only one specific answer or measure only one behavior and no aspect of questionnaire suggest bias on the part of the researcher.</td> <td style="text-align: center;">/</td> <td style="text-align: center;">✓</td> <td style="text-align: center;">/</td> <td style="text-align: center;">/</td> <td style="text-align: center;">/</td> </tr> <tr> <td>7 SCALE AND EVALUATION RATING SYSTEM The scale adapted is appropriate for the items.</td> <td style="text-align: center;">✓</td> <td style="text-align: center;">/</td> <td style="text-align: center;">/</td> <td style="text-align: center;">/</td> <td style="text-align: center;">/</td> </tr> </tbody> </table>		Criteria/ Indicators	1	2	3	4	5	1 CLARITY OF DIRECTIONS AND ITEMS The vocabulary level, language structure and conceptual level of questions suit to level of respondents. The test directions and items are written in clear and understandable manner.	/	/	✓	/	/	2 PRESENTATION/ ORGANIZATION OF ITEMS The items are presented and organized in logical manner.	/	/	✓	/	/	3 SUITABILITY OF ITEMS The items appropriately represent the substance of the research. The questions are designed to determine the condition, knowledge, perception and attitudes that are supposed to be measured.	/	✓	/	/	/	4 ADEQUATENESS OF ITEMS PER CATEGORY The items represent the coverage of the research adequately. The number of questions per area category is representative enough of all the question needed for the research.	/	/	✓	/	/	5 ATTAINMENT OF PURPOSE The instrument as a whole fulfills the objectives for which it was constructed.	/	✓	/	/	/	6 OBJECTIVE Each item question requires only one specific answer or measure only one behavior and no aspect of questionnaire suggest bias on the part of the researcher.	/	✓	/	/	/	7 SCALE AND EVALUATION RATING SYSTEM The scale adapted is appropriate for the items.	✓	/	/	/	/
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7 SCALE AND EVALUATION RATING SYSTEM The scale adapted is appropriate for the items.	✓	/	/	/	/																																												
<p>Comments and Suggestions: _____</p> <p style="text-align: right; margin-right: 100px;">  Signature Evaluator </p>																																																	

Appendix 4: Validation Sheet



Holy Cross College of Calinan, Inc
Davao-Bukidnon Highway, Calinan Pobalcion, Davao City

Research Assessment Tool and Validation Sheet

Name of Evaluator : Ms. Noime Bustamante

Degree : _____

Position : Math Club Moderator

Institution : Holy Cross College of Calinan, Inc.

To the Evaluator: Please check the appropriate box for your ratings.

POINT EQUIVALENT:	1 - Poor	3 - Good	5 - Excellent
	2 - Fair	4 - Very Good	

		Criteria/ Indicators	1	2	3	4	5
1	CLARITY OF DIRECTIONS AND ITEMS The vocabulary level, language structure and conceptual level of questions suit to level of respondents. The test directions and items are written in clear and understandable manner.				/		
2	PRESENTATION/ ORGANIZATION OF ITEMS The items are presented and organized in logical manner.			/			
3	SUITABILITY OF ITEMS The items appropriately represent the substance of the research. The questions are designed to determine the condition, knowledge, perception and attitudes that are supposed to be measured.				/		
4	ADEQUATENESS OF ITEMS PER CATEGORY The items represent the coverage of the research adequately. The number of questions per area category is representative enough of all the question needed for the research.				/		
5	ATTAINMENT OF PURPOSE The instrument as a whole fulfills the objectives for which it was constructed.				/		
6	OBJECTIVE Each item question requires only one specific answer or measure only one behavior and no aspect of questionnaire suggest bias on the part of the researcher.				/		
7	SCALE AND EVALUATION RATING SYSTEM The scale adapted is appropriate for the items.					/	

Comments and Suggestions: _____


Signature Evaluator

Appendix 5: Informed Consent



HOLY CROSS COLLEGE OF CALINAN, INC.
Davao-Bukidnon Highway, Calinan Poblacion, Davao City

INFORMED PARENTAL CONSENT FORM

**THE RELATIONSHIP OF STUDENTS ENGAGEMENT TO HANDS-ON ACTIVITY
AND STUDENTS CRITICAL THINKING SKILLS**

Dear Mr/Mrs _____,

Introduction: The purpose of this form is to provide you (as the parent of a prospective research study participant) information that may affect your decision as to whether or not to let your child participate in this research study. The person performing the research will describe the study to you and answer all your questions. Read the information below and ask any questions you might have before deciding whether or not to give your permission for your child to take part. If you decide to let your child be involved in this study, this form will be used to record your permission.

Description: This study will assess the relationship of students' engagement to hands-on activity and students' critical thinking. Your child's identity will not be revealed to anyone and will remain confidential.

Confidentiality: Children's name and answers will not be revealed publicly and is only to us researchers. Rests assure that any personal information about the child will also not be leaked publicly.

Risks & Benefits: There are several advantages to involving students in practical tasks, such as better learning outcomes, increased and the growth of critical thinking and problem-solving abilities. However, it can come with certain hazards, though, such as the possibility of distraction and safety issues. Therefore, to guarantee that students may participate in hands-on learning experiences safely and effectively, supervision, and assessment are required.

Grievance Procedure: If I have any concerns or am dissatisfied with any aspect of this study, I may report my grievances anonymously to the Research and Publication Office through the following numbers: 295-0797 or 09491985644

For questions, please feel free to ask the researchers any questions before signing the consent form or at any time during or after the study.

Lead Researcher: Roie Chester C. Cagaanan Contact Details: 09691883706

Research Adviser: Mr. Cris Dan R. Makiling Contact Details: 09485885660

Informed Consent Statement

I, _____ give permission for my child, _____ to participate in the research project entitled, "**THE RELATIONSHIP OF STUDENTS ENGAGEMENT TO HANDS-ON ACTIVITY AND STUDENTS CRITICAL THINKING SKILLS.**". The study has been explained to me and my questions answered to my satisfaction. I understand that my child's right to withdraw from participating or refuse to participate will be respected and that his/her responses and identity will be kept confidential. I consent voluntarily.

Parent/Guardian Name and Signature: _____ Date: _____

Lead Researcher's Name and Signature: Roie Chester C. Cagaanan Date: _____

Appendix 6: Survey Questionnaire



HOLY CROSS COLLEGE OF CALINAN, INC.
Davao- Bukidnon Highway, Calinan Poblacion, Davao City

THE RELATIONSHIP OF STUDENTS ENGAGEMENT TO HANDS-ON ACTIVITY AND STUDENTS CRITICAL THINKING SKILLS

Dear Respondent,

Greetings in the Mighty Name of our Lord, Jesus Christ!

You are invited to participate in the research project identified above which will be conducted by Rucyl Janyz L. Malaque, Roie Chester C. Cagaanan, Hiroshi P. Kawamura, Nadharie Ken H. Temporado, Mark Syion A. Daya and Jarel Eisly V. Barcelo together with Mr. Cris Dan R. Makiling as our research adviser. This study is one of the major requirements in Practical Research 1 and 2. Questionnaires will be used to gather data from the respondents about the students' engagement to hands-on activity and students critical thinking skills.

Participation in this study is completely voluntary, therefore, participants are free to withdraw from the study at any time without moral obligation to the researcher and to the school. Further the participants have the right to verify the data to be included in the final manuscript.

Should you wish to know more about the study, please feel free to contact:

Roie Chester Cagaanan, 09691883706, roiechester@gmail.com

Thank you very much.

Very truly yours,

Rucyl Janyz Malaque
Researcher

Roie Chester Cagaanan
Researcher

Hiroshi P. Kawamura
Researcher

Nadharie Ken H. Temporado
Researcher

Mark Syion A. Daya
Researcher

Jarel Eisly V. Barcelo
Researcher

Noted by:

Cris Dan Makiling
Research Adviser

Complaints about this research:

The Holy Cross College of Calinan requires that all the participants are informed and if they have complaints regarding the manner in which the research is conducted, it may be given to the researcher, or if an independent person is preferred, to the Research and Publication Head, Research Office, Holy Cross College of Calinan with the following numbers: 295-0797 or 09491985644.



HOLY CROSS COLLEGE OF CALINAN, INC.
Davao- Bukidnon Highway, Calinan Poblacion, Davao City

SURVEY QUESTIONNAIRE

THE RELATIONSHIP STUDENTS' ENGAGEMENT TO HANDS ON ACTIVITY AND STUDENTS CRITICAL THINKING SKILLS

We are carrying out an evaluation of the relationship of students' engagement to hands-on activity and students' critical thinking. Your response to this survey is crucial in providing the necessary information.

If you have any queries about the questionnaire, please do not hesitate to approach any of the researchers. Your honest and sincere response and the time given to answer the evaluation is greatly appreciated.

Thank you very much for your cooperation.

Instruction: Please check or supply the information needed in the space provided.

Name (Optional) _____

Part I: Demographic Profile

1. Sex

[] Male [✓] Female

2. Age

[] 11	[] 12	[] 13	[] 14
[] 15	[✓] 16	[] 17	[] 18

3. Year Level

[] 7	[] 8	[] 9	[✓] 10
-------	-------	-------	----------

Part II: Students Engagement Through Hands-on Activities

Check the box of the response that best describe the engagement of students in hands-on activities using the following scales:

1= strongly disagree

2=somewhat disagree

3=neutral

4=somewhat agree

5= strongly agree

		1	2	3	4	5
Level of Engagement						
1	Engaging in hands-on activities enhances my understanding of the subject matter.			/		
2	Hands-on activities make the learning experience more enjoyable for me.			/		
3	I believe hands-on activities are beneficial for developing practical skills.				/	
4	I feel motivated to learn when hands-on activities are incorporated into the curriculum.			/		

5	I find hands-on activities helpful in retaining information for exams.			/	
6	The variety of hands-on activities in my subjects meets my learning preferences.				/
7	I am confident in my ability to succeed when engaged in hands-on learning experiences.				/
8	Collaborating with peers during hands-on activities improves my overall learning experience.			/	
9	I feel a sense of accomplishment after successfully completing a hands-on project.			/	
10	I am comfortable asking questions or seeking help during hands-on activities.			/	

Part III: Students Critical Thinking Skills

Check the box of the response that best describe the critical thinking skills of students using the following scales:

1= strongly disagree

2=somewhat disagree

3=neutral

4=somewhat agree

5= strongly agree

		1	2	3	4	5
Level of Critical Thinking:						
1	Hands-on activities have improved my ability to analyze information critically.				/	
2	I have learned to approach problems more systematically through hands-on activities.				/	
3	I am more confident in my problem-solving skills due to hands-on activities.				/	
4	I feel more capable of making informed decisions after participating in hands-on activities.			/		
5	I can identify and assess the relevance of information more effectively through hands-on learning experiences.					/
6	Hands-on activities have increased my ability to apply theoretical knowledge to practical situations.				/	
7	I have developed a greater capacity for logical reasoning through hands-on activities.					/
8	Hands-on activities have improved my skill in identifying and solving real-world problems.					/
9	Engaging in hands-on activities has improved my ability to work through complex problems independently.			/		
10	I feel more prepared for challenges that require critical thinking as a result of hands-on activities.					/

THANK YOU!!...

Appendix 7: Raw Data
Level of Engagement

	Sex	Age	Year Level	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10
1	F	12	7	3	3	3	3	3	3	3	3	3	3
2	M	12	7	5	4	5	3	2	4	4	5	5	5
3	M	13	7	3	4	3	5	3	5	4	4	4	3
4	F	12	7	3	3	4	2	3	3	3	2	2	2
5	F	13	7	4	4	4	5	4	4	5	4	4	5
6	F	13	7	3	3	4	2	3	3	3	2	2	2
7	F	12	7	5	4	4	4	3	4	4	4	5	5
8	F	12	7	3	4	5	4	5	4	4	4	5	4
9	F	12	7	4	5	5	5	4	5	5	5	4	5
10	F	13	7	4	4	4	3	2	5	2	4	2	4
11	M	12	7	4	4	5	4	4	4	3	5	5	3
12	F	13	7	4	5	4	3	4	4	4	4	5	5
13	F	12	7	3	4	2	2	3	4	2	4	5	3
14	M	12	7	3	3	3	3	5	5	3	4	5	5
15	F	12	7	3	4	5	3	4	4	3	3	4	3
16	F	13	7	4	5	5	5	5	5	5	5	5	4
17	M	14	7	2	3	1	4	2	5	2	3	2	4
18	M	13	7	5	4	4	4	5	5	4	4	5	4
19	F	12	7	3	4	5	2	3	4	4	3	4	3
20	M	13	7	5	5	5	5	5	5	5	5	5	5
21	M	13	7	5	5	4	5	4	2	4	5	4	4

22	M	14	7	5	5	5	4	2	3	4	4	5	4
31	M	13	7	4	5	5	4	4	5	4	5	4	5
23	F	14	9	5	4	5	4	5	5	5	4	5	5
24	F	15	10	4	5	5	4	5	3	2	4	3	5
25	M	15	10	3	4	3	3	3	3	2	4	3	4
26	F	15	10	3	2	3	3	3	3	2	3	3	3
27	M	16	10	4	5	4	4	5	5	4	4	4	5
28	F	14	9	4	3	4	4	4	3	4	2	5	5
29	F	14	8	5	5	3	2	5	4	3	5	3	5
30	F	13	8	3	4	4	3	3	2	3	4	5	4
32	F	16	10	3	4	4	3	4	4	3	4	3	4
33	F	16	10	5	5	4	5	5	4	4	5	5	4
34	F	15	10	3	4	4	3	4	4	5	3	2	2
35	F	15	10	3	3	2	3	3	3	2	3	3	2
36	F	15	10	4	3	4	3	4	3	3	2	4	2
37	M	16	10	3	4	4	3	3	3	4	4	3	2
38	F	16	10	4	4	4	4	4	4	3	3	4	4
39	F	16	10	4	4	4	4	4	4	4	4	4	4
40	M	15	9	3	3	3	3	4	3	4	3	3	4
41	F	14	9	4	4	4	4	4	4	3	3	3	3
42	M	15	9	3	3	3	3	3	3	3	3	3	3
43	F	15	9	5	4	5	4	4	4	3	4	3	2
44	M	15	9	5	5	4	4	4	3	4	5	4	5
45	F	15	9	5	5	5	5	5	4	4	5	4	3

46	M	14	9	3	5	5	4	4	4	5	4	3	4
47	F	14	9	5	3	4	4	4	3	3	2	3	3
48	M	14	9	4	4	5	5	5	5	4	5	4	5
49	F	16	10	1	2	1	2	1	3	3	2	2	1
50	F	16	10	5	5	5	4	5	5	5	5	5	5
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52	F	15	10	5	4	4	5	3	4	4	5	5	3
53	M	16	10	4	5	4	4	4	4	5	5	4	5
54	F	14	9	5	4	5	5	3	3	4	5	3	5
55	F	14	9	4	3	4	4	4	3	3	4	4	2
56	F	13	9	4	5	4	4	3	4	4	4	5	3
57	F	14	9	4	4	5	5	4	5	2	4	4	5
58	F	14	9	4	3	3	3	4	3	3	2	4	3
59	M	15	9	5	4	5	4	5	5	4	4	3	5
60	F	14	9	4	4	4	4	3	3	4	4	4	3
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62	F	16	10	3	2	3	3	4	3	3	3	4	2
63	M	17	9	5	5	5	5	4	4	3	4	3	3
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65	F	15	10	5	4	4	4	4	3	4	4	4	4
66	F	15	10	5	4	4	4	5	5	4	4	4	4
67	M	16	10	3	4	4	3	3	3	2	2	3	3
68	F	16	10	4	3	4	3	3	5	5	3	3	3
69	F	16	10	3	3	3	4	3	2	2	3	2	2

70	F	15	10	5	4	5	3	5	4	4	3	4	4
71	F	15	10	5	4	4	4	5	4	4	5	5	3
72	F	15	10	5	4	3	3	4	3	5	3	4	3
73	M	13	8	3	3	3	3	3	3	2	3	3	3
74	F	15	9	5	4	5	4	4	3	4	3	5	3
75	F	16	10	3	4	1	4	4	3	4	4	4	3
76	M	13	7	5	5	4	4	3	4	4	3	4	2
77	F	16	10	4	5	4	3	5	5	4	4	5	3
78	F	16	10	1	2	1	1	1	2	1	1	1	2
79	F	15	10	5	5	4	4	4	4	3	5	5	3
80	M	16	10	3	4	3	3	2	3	3	2	4	4
81	F	15	10	4	5	4	5	5	5	3	4	3	5
82	F	16	10	4	3	5	5	4	5	3	4	5	3
83	F	13	8	4	5	4	4	4	5	4	4	5	4
84	F	13	8	4	4	4	4	5	4	2	3	4	4
85	F	13	8	3	4	4	4	5	4	2	3	4	4
86	F	14	9	4	4	4	3	3	3	4	4	4	4
87	F	16	10	4	4	3	4	4	4	3	3	4	5
88	F	14	8	3	4	5	3	5	3	4	2	4	3
89	F	13	8	4	4	4	4	4	3	3	4	4	3
90	M	13	8	4	4	4	4	4	4	5	4	3	5
91	F	15	10	4	4	5	4	5	4	4	3	5	4
92	F	16	10	5	5	5	5	5	4	4	4	5	5
93	M	15	10	4	5	5	4	4	4	3	4	4	5

94	M	15	10	5	4	4	4	3	4	4	5	5	5
95	M	13	7	5	5	5	5	4	5	4	5	4	4
96	M	12	7	3	1	3	2	3	2	3	3	2	2
97	M	12	7	5	5	5	5	3	4	4	3	2	5
98	M	12	7	4	5	5	4	5	5	5	5	4	4
99	M	13	7	3	1	1	2	1	2	3	2	1	2
100	M	13	7	3	3	4	3	4	3	3	4	4	4
101	F	13	7	3	2	3	4	3	2	3	4	4	3
102	F	13	7	4	4	3	4	2	3	4	4	4	2
103	F	12	7	4	3	5	4	4	4	3	4	5	2
104	M	12	7	5	5	5	5	4	5	5	4	5	5
105	M	15	9	5	3	4	3	5	3	4	5	4	4
106	F	14	9	4	5	5	5	4	4	4	3	5	4
107	M	14	9	5	4	3	4	4	3	3	3	4	5
108	F	15	9	5	4	4	4	5	5	5	4	3	4
109	F	15	9	5	5	5	5	5	5	4	4	5	4
110	M	14	9	3	3	3	4	3	3	2	3	5	2
111	F	14	9	5	5		4	5	4	4	5	5	2
112	F	13	7	4	4	5	4	4	3	3	4	5	3
113	F	12	7	4	5	4	4	3	3	2	3	2	2
114	F	12	7	3	3	3	3	3	3	3	3	3	3
115	F	12	7	3	3	4	3	3	4	3	4	4	2
116	F	14	9	5	5	4	4	5	4	4	4	5	5
117	F	14	9	3	4	4	5	4	4	5	4	5	4

118	F	14	9	4	5	5	4	4	5	4	4	5	3
119	M	15	9	3	4		2	2	4	3	4	1	1
120	M	14	9	5	5	5	5	5	4	4	5	5	4
121	F	15	9	3	3	4	3	2	2	3	2	3	3
122	M	15	9	3	3	4	3	3	3	3	4	4	3
123	M	18	9	5	5	5	5	3	4	3	2	3	3
124	F	14	9	4	4	3	4	4	3	3	5	5	4
125	M	15	9	5	5	5	5	5	5	5	5	5	5
126	F	15	9	3	2	3	3	2	3	4	3	2	3
127	F	13	8	5	4	4	4	4	4	3	4	3	3
128	F	13	8	3	3	3	3	4	4	3	2	2	3
129	F	13	8	5	5	5	3	4	3	3	4	3	4
130	M	13	8	5	5	5	4	3	3	4	5	5	3
131	F	13	8	4	4	5	4	5	4	4	4	5	4
132	F	14	8	4	3	3	4	3	4	3	3	4	4
133	M	14	8	3	2	5	3	1	3	2	5	2	5
134	F	14	8	4	3	3	4	5	3	2	5	4	2
135	F	14	8	4	3	3	4	5	3	2	5	4	2
136	M	14	9	4	5	4	5	4	4	4	5	5	5
137	M	15	9	5	3	4	4	3	3	4	5	5	3
138	M	14	9	4	4	5	5	5	5	5	5	5	2
139	F	15	9	4	4	4	4	5	5	3	4	4	3
140	F	14	9	5	5	5	5	5	5	5	5	5	5
141	F	15	9	4	4	5	5	5	5	5	4	5	5

142	F	12	7	3	3	3	3	4	2	3	3	3	3
143	F	12	7	4	5	4	5	5	4	4	5	5	4
144	M	12	7	4	3	3	3	4	3	2	3	4	3
145	F	14	8	5	5	4	3	4	5	5	5	2	3
146	F	13	8	2	4	2	4	4	2	5	2	2	5
147	F	14	8	4	4	4	3	5	3	3	4	5	5
148	F	14	8	4	4	5	1	4	4	3	3	5	5
149	M	12	7	3	5	2	4	5	5	3	2	3	4
150	M	13	7	3	4	4	4	4	4	3	3	4	3
151	F	13	8	5	4	4	3	4	3	3	4	4	1
152	M	14	8	3	5	4	3	2	3	2	3	4	3
153	F	14	8	4	4	4	4	4	3	2	4	5	2
154	F	13	8	5	5	5	4	5	4	3	3	5	3
155	F	13	8	3	3	4	3	5	4	3	3	4	3
156	M	14	8	2	3	3	3	4	4	5	4	5	4
157	F	14	8	3	4	4	3	4	3	4	4	5	2
158	F	13	8	5	4	4	4	4	4	3	5	5	4
159	F	14	8	4	5	4	3	3	3	1	4	5	5
160	F	13	8	3	4	4	4	3	2	3	3	4	3
161	M	13	8	5	5	5	4	3	4	4	4	5	3
162	F	14	8	3	4	3	3	4	3	2	2	4	5
163	F	15	8	4	5	5	5	4	5	5	5	5	2
164	F	13	8	4	4	3	5	5	5	5	4	5	2
165	M	13	8	2	1	3	1	1	4	1	5	3	2

166	F	13	8	3	2	2	3	4	3	2	2	3	4
167	F	13	8	4	4	4	5	4	4	4	5	5	4
168	M	14	8	3	3	4	3	3	3	2	3	3	2
169	M	13	8	3	5	5	5	1	1	3	3	2	5
170	F	13	8	3	4	3	3	4	3	2	3	3	4
171	F	14	8	4	4	5	3	2	3	4	3	5	3
172	M	13	8	3	4	1	1	1	1	1	1	3	4
173	M	13	8	4	4	3		3	3	4	3	4	4
174	F	13	8	4	3	4	3	4	5	3	5	4	5
175	F	14	8	4	4	4	4	3	4	4	4	4	4
176	F	14	8	5	4	4	3	5	4	5	4	3	5
177	F	13	8	3	2	3	2	3	3	3	3	3	3
178	F	14	8	4	5	4	2	5	4	3	4	3	2
179	M	13	8	4	3	4	3	3	4	3	1	3	2
180	F	14	8	3	4	4	4	3	3	3	4	4	3

Appendix 7:
Level of Critical Thinking

	Sex	Age	Year Level	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10
1	F	12	7	4	3	2	3	3	3	3	2	3	4
2	M	12	7	5	5	4	5	5	4	5	4	5	4
3	M	13	7	4	4	4	3	2	5	1	5	4	3
4	F	12	7	4	3	2	3	3	3	3	2	3	4
5	F	13	7	4	4	5	5	5	5	5	4	4	4
6	F	13	7	1	3	2	3	2	4	3	2	1	3
7	F	12	7	4	4	5	4	5	5	4	5	4	4
8	F	12	7	5	4	5	4	4	5	4	4	4	5
9	F	12	7	5	5	5	5	4	5	5	5	5	5
10	F	13	7	3	4	5	4	5	3	5	2	3	3
11	M	12	7	5	4	4	4	4	5	4	5	3	3
12	F	13	7	4	5	4	5	5	5	5	5	5	4
13	F	12	7	3	2	3	2	3	2	4	3	5	4
14	M	12	7	4	4	4	5	5	4	4	4	3	3
15	F	12	7	3	3	2	3	4	3	3	3	3	3
16	F	13	7	5	5	5	5	5	5	5	5	5	4
17	M	14	7	3	2	5	1	3	4	1	3	1	4
18	M	13	7	5	4	4	5	4	4	5	4	4	5
19	F	12	7	4	3	4	4	4	5	4	4	5	3
20	M	13	7	4	4	5	3	5	4	5	4	3	4
21	M	13	7	4	4	4	4	5	4	2	3	1	1

22	M	14	7	5	2	3	5	4	3	2	1	2	4
31	M	13	7	5	5	4	5	4	4	4	4	4	4
23	F	14	9	4	5	4	5	4	5	5	5	5	4
24	F	15	10	3	4	3	3	4	4	3	2	3	4
25	M	15	10	3	4	3	4	3	4	2	3	4	3
26	F	15	10	3	3	2	3	3	3	3	3	2	2
27	M	16	10	4	4	5	5	5	4	4	4	3	4
28	F	14	9	4	5	4	5	4	5	4	5	4	5
29	F	14	8	1	3	3	4	2	5	3	5	3	5
30	F	13	8	3	2	2	3	3	2	3	4	4	3
32	F	16	10	4	3	3	3	4	3	3	3	3	4
33	F	16	10	4	3	2	3	4	4	3	2	3	4
34	F	15	10	5	3	3	3	5	5	2	4	3	5
35	F	15	10	3	3	3	2	2	2	2	2	2	2
36	F	15	10	4	4	4	4	4	3	3	5	4	3
37	M	16	10	3	3	2	2	3	3	3	2	2	3
38	F	16	10	5	4	5	4	4	4	4	3	4	3
39	F	16	10	4	4	4	4	4	4	4	4	4	4
40	M	15	9	3	4	4	3	3	4	4	4	4	4
41	F	14	9	4	3	4	3	4	3	4	3	4	3
42	M	15	9	3	3	2	3	3	3	3	3	3	3
43	F	15	9	3	2	2	4	3	3	2	2	4	4
44	M	15	9	5	4	4	5	5	5	4	5	5	5
45	F	15	9	3	3	3	3	4	4	4	3	2	2

46	M	14	9	3	4	4	3	4	3	5	4	3	4
47	F	14	9	5	4	3	4	2	3	4	4	2	2
48	M	14	9	4	5	4	4	5	4	3	5	5	4
49	F	16	10	2	3	3	2	2	3	1	2	1	3
50	F	16	10	4	5	5	4	4	5	4	5	5	5
51	F	15	10	2	2	2	2	3	3	3	2	3	2
52	F	15	10	4	3	3	4	5	5	4	3	4	3
53	M	16	10	4	5	5	4	4	5	5	5	5	4
54	F	14	9	3	4	2	4	3	3	4	4	3	5
55	F	14	9	4	4	3	4	3	3	3	4	4	3
56	F	13	9	3	4	3	3	4	4	4	4	5	4
57	F	14	9	5	4	4	4	3	4	2	3	3	4
58	F	14	9	4	4	3	3	3	3	3	4	4	3
59	M	15	9	5	4	3	4	4	4	3	4	3	4
60	F	14	9	4	4	3	4	4	5	5	4	4	4
61	F	14	9	4	2	3	3	3	2	2	3	3	4
62	F	16	10	3	3	2	3	2	3	3	3	2	4
63	M	17	9	4	3	3	4	3	3	3	4	4	5
64	F	15	10	5	4	5	5	4	5	4	5	5	5
65	F	15	10	4	3	4	4	5	3	4	4	4	4
66	F	15	10	4	3	3	4	3	3	4	2	3	3
67	M	16	10	3	3	3	3	3	2	2	3	3	2
68	F	16	10	4	4	4	3	5	4	5	5	3	5
69	F	16	10	3	3	2	3	2	3	3	3	2	3

70	F	15	10	4	3	3	3	4	3	3	4	3	3
71	F	15	10	5	4	4	4	4	4	4	4	4	4
72	F	15	10	4	3	4	3	4	2	3	3	4	5
73	M	13	8	3	3	3	3	3	3	3	3	3	3
74	F	15	9	5	5	5	3	5	5	5	5	5	5
75	F	16	10	4	5	3	4	4	5	3	4	4	3
76	M	13	7	3	3	4	4	3	3	4	2	2	3
77	F	16	10	5	4	5	4	3	4	5	5	5	3
78	F	16	10	1	2	2	1	1	1	3	2	2	1
79	F	15	10	3	3	3	4	4	4	4	5	4	3
80	M	16	10	2	3	3	2	3	4	4	3	3	3
81	F	15	10	5	3	3	4	4	4	4	4	5	5
82	F	16	10	4	5	3	3	4	3	4	3	4	5
83	F	13	8	5	5	4	5	5	5	4	4	4	5
84	F	13	8	3	3	2	3	2	3	3	4	3	2
85	F	13	8	5	4	2	3	3	3	4	5	3	4
86	F	14	9	4	3	4	4	4	5	4	4	4	4
87	F	16	10	4	5	4	3	4	3	3	3	4	4
88	F	14	8	3	4	3	5	2	4	3	5	4	3
89	F	13	8	4	4	3	4	3	3	3	3	4	3
90	M	13	8	4	5	4	5	4	5	4	4	4	5
91	F	15	10	4	5	5	4	5	5	5	5	5	4
92	F	16	10	5	5	5	5	4	4	4	4	4	5
93	M	15	10	4	4	3	3	4	4	3	4	4	4

94	M	15	10	5	4	5	5	4	5	4	4	4	4
95	M	13	7	5	5	4	4	5	3	5	5	5	4
96	M	12	7	2	2	3	4	4	2	3	2	3	2
97	M	12	7	4	3	3	4	2	3	3	5	4	2
98	M	12	7	5	5	4	3	5	3	5	5	4	4
99	M	13	7	2	3	3	2	4	2	1	3	2	1
100	M	13	7	3	3	4	4	4	3	3	4	3	4
101	F	13	7	3	3	3	2	3	2	3	4	4	3
102	F	13	7	3	3	3	4	3	3	3	2	3	4
103	F	12	7	5	4	3	5	3	4	4	3	4	3
104	M	12	7	4	5	4	4	5	5	5	4	5	4
105	M	15	9	4	4	5	5	3	4	5	4	3	5
106	F	14	9	4	3	3	4	4	3	3	3	5	5
107	M	14	9	4	4	3	4	4	3	4	3	4	3
108	F	15	9	5	5	5	5	5	5	5	5	5	5
109	F	15	9	5	5	5	5	5	5	5	5	5	5
110	M	14	9	3	3	2	2	3	3	3	2	2	4
111	F	14	9	4	3	4	4	5	5	4	3	4	4
112	F	13	7	4	4	3	3	3	4	4	4	3	3
113	F	12	7	4	1	2	3	4	4	3	5	2	2
114	F	12	7	3	4	4	3	4	4	4	4	4	3
115	F	12	7	3	4	3	3	3	4	4	4	3	3
116	F	14	9	5	5	5	5	5	5	5	3	4	5
117	F	14	9	4	4	4	3	3	3	4	3	2	2

118	F	14	9	4	4	5	3	4	4	4	5	4	5
119	M	15	9	3	3	4	3	5	3	3	4	4	3
120	M	14	9	4	5	5	5	4	5	4	5	5	5
121	F	15	9	3	3	4	3	4	3	4	3	3	3
122	M	15	9	3	3	3	4	3	3	3	3	3	4
123	M	18	9	4	5	4	3	5	3	5	3	4	3
124	F	14	9	4	4	4	3	5	4	3	4	3	5
125	M	15	9	5	5	5	5	5	5	5	5	5	5
126	F	15	9	3	4	3	3	4	3	3	4	2	5
127	F	13	8	3	3	3	3	3	3	3	3	4	3
128	F	13	8	2	3	2	3	4	2	3	4	2	3
129	F	13	8	5	4	3	3	4	5	3	5	4	3
130	M	13	8	5	3	4	3	4	4	3	4	5	5
131	F	13	8	4	4	4	4	4	5	5	5	5	4
132	F	14	8	5	4	5	5	4	5	3	4	3	4
133	M	14	8	3	4	2	5	5	2	3	3	4	5
134	F	14	8	3	3	3	2	4	3	5	5	5	3
135	F	14	8	3	3	3	2	4	3	5	5	5	3
136	M	14	9	4	5	4	4	5	5	5	5	4	5
137	M	15	9	5	4	3	4	4	5	3	4	5	3
138	M	14	9	4	5	4	5	5	5	5	5	5	5
139	F	15	9	3	4	3	3	3	3	3	3	4	4
140	F	14	9	5	4	4	4	5	4	5	4	5	4
141	F	15	9	5	5	5	4	4	5	4	5	4	5

142	F	12	7	3	3	2	3	3	3	2	2	2	3
143	F	12	7	4	4	3	3	3	4	4	4	4	3
144	M	12	7	4	4	3	3	2	4	3	2	3	3
145	F	14	8	5	5	5	4	5	3	5	3	5	5
146	F	13	8	2		4	3	5	2	4	1	3	2
147	F	14	8	5	4	4	4	3	4	5	3	5	5
148	F	14	8	4	4	3	2	3	3	3	4	4	3
149	M	12	7	4	4	5	3	4	3	5	4	1	5
150	M	13	7	4	3	3	4	2	3	3	4	2	3
151	F	13	8	3	2	2	3	3	3	2	3	3	2
152	M	14	8	4	3	4	4	3	4	2	4	2	3
153	F	14	8	3	4	5	3	5	3	4	4	4	3
154	F	13	8	5	5	3	4	4	5	4	5	4	4
155	F	13	8	3	4	4	3	5	4	3	5	3	4
156	M	14	8	4	4	5	4	5	5	4	5	5	4
157	F	14	8	5	5	4	5	3	4	4	3	5	5
158	F	13	8	4	4	3		4	5	5	4	4	3
159	F	14	8	3	3	3	4	3	4	5	4	4	2
160	F	13	8	4	3	3	3	3	4	4	3	4	5
161	M	13	8	5	3	5	4	3	4	2	4	3	5
162	F	14	8	4	3	3	4	3	3	4	2	3	3
163	F	15	8	3	4	4	3	5	5	4	5	4	4
164	F	13	8	5	5	4	5	5	5	5	5	5	3
165	M	13	8	2	1	2	4	3	2	5	2	3	1

Appendix 8: Editor's Certificate

**HOLY CROSS COLLEGE OF CALINAN, INC**

Davao- Bukidnon Highway, Calinan Poblacion, Davao City

RESEARCH AND PUBLICATION OFFICE**CERTIFICATION**

This is to certify that the research paper of **Roie Chester C. Cagaanan, Rucyl Janyz L. Malaque, Mark Syion A. Daya, Hiroshi P. Kawamura, Nadharie Ken H. Temporado, and Jarel Eisly V. Barcelo** entitled **THE RELATIONSHIP OF STUDENTS ENGAGEMENT TO HANDS ON ACTIVITY AND STUDENTS CRITICAL THINKING SKILLS** has undergone the editing process and been approved by the undersigned.

This certification is issued upon the request by the researcher on July 7, 2025.

MARILYN C. BRAGANZA
Editor

CURRICULUM VITAE

PERSONAL INFORMATION

Name: Roie Chester C. Cagaanan
 Age: 17 years old
 Date of Birth: July 13, 2006
 Place of Birth: Davao City
 Address: Purok 1B-2, Talomo River, Calinan, Davao City
 Sex: Male
 Civil Status: Single
 Citizenship: Filipino
 Religion: Roman Catholic
 Father's Name: Rolando A. Cagaanan Occupation: Policeman
 Mother's Name: Lelebeth C. Cagaanan Occupation: Teacher



EDUCATIONAL BACKGROUND

	SCHOOL	YEAR GRADUATED
Intermediate:	Calinan Central Elementary School	2018
Junior High School:	Holy Cross College of Calinan, Inc.	2022
Senior High School:	Holy Cross College of Calinan, Inc.	2024
Track:	Academic Track	
Strand:	Science, Technology, Engineering, and Mathematics	

CURRICULUM VITAE

PERSONAL INFORMATION

Name:	Rucyl Janyz L. Malaque	
Age:	17 years old	
Date of Birth:	August 27, 2006	
Place of Birth:	Davao City	
Address:	Prk. 10 Curvada, Wangan, Calinan, Davao City	
Sex:	Female	
Civil Status:	Single	
Citizenship:	Filipino	
Religion:	Roman Catholic	
Father's Name:	Ruel M. Malaque	Occupation: N/A
Mother's Name:	Cynthia L. Malaque	Occupation: Brgy. Secretary

EDUCATIONAL BACKGROUND

	SCHOOL	YEAR GRADUATED
Intermediate:	Wangan Elementary School	2018
Junior High School:	Wangan National High School	2022
Senior High School:	Holy Cross College of Calinan, Inc.	2024
Track:	Academic Track	
Strand:	Science, Technology, Engineering, and Mathematics	

CURRICULUM VITAE

PERSONAL INFORMATION

Name: Hiroshi P. Kawamura
 Age: 17 years old
 Date of Birth: May 12, 2006
 Place of Birth: Davao City
 Address: Purok 6, Cadalian, Baguio District, Davao City
 Sex: Male
 Civil Status: Single
 Citizenship: Filipino
 Religion: Roman Catholic
 Father's Name: Takashi Kawamura Occupation: N/A
 Mother's Name: Nice Grace Porlares Occupation: OFW



EDUCATIONAL BACKGROUND

	SCHOOL	YEAR GRADUATED
Intermediate:	Cadalian Elementary School	2018
Junior High School:	Cadalian National High School	2022
Senior High School:	Holy Cross College of Calinan, Inc.	2024
Track:	Academic Track	
Strand:	Science, Technology, Engineering and Mathematics	

CURRICULUM VITAE

PERSONAL INFORMATION

Name: Nadharie Ken H. Temporado
 Age: 18 years old
 Date of Birth: December 26, 2005
 Place of Birth: Davao City
 Address: Lower Tamugan, Marilog District, Davao City
 Sex: Male
 Civil Status: Single
 Citizenship: Filipino
 Religion: Roman Catholic
 Father's Name: Markin P. Temporado Occupation: Businessman
 Mother's Name: Morjeryn H. Temporado Occupation: Housewife



EDUCATIONAL BACKGROUND

	SCHOOL	YEAR GRADUATED
Intermediate:	Lower Tamugan Elementary School	2018
Junior High School:	Lower Tamugan National High School	2022
Senior High School:	Holy Cross College of Calinan, Inc.	2024
Track:	Academic Track	
Strand:	Science, Technology, Engineering and Mathematics	

CURRICULUM VITAE

PERSONAL INFORMATION

Name: Jarel Eisly V. Barcelo



Age: 18 years old

Date of Birth: April 11, 2005

Place of Birth: Makati City

Address: Roman Diaz St. Calinan, Davao City

Sex: Male

Civil Status: Single

Citizenship: Filipino

Religion: Roman Catholic

Father's Name: Ely Barcelo

Occupation: N/A

Mother's Name: Josephine C. Vergara

Occupation: Govt. Employee

EDUCATIONAL BACKGROUND

SCHOOL	YEAR GRADUATED
Intermediate: Calinan Central Elementary School	2018
Junior High School: Holy Cross College of Calinan, Inc.	2022
Senior High School: Holy Cross College of Calinan, Inc.	2024
Track: Academic Track	
Strand: Science, Technology, Engineering and Mathematics	

CURRICULUM VITAE

PERSONAL INFORMATION

Name: Mark Syion A. Daya

Age: 17 years old

Date of Birth: June 13, 2006

Place of Birth: Baguio District

Address: Subasta, Calinan, Davao City

Civil Status: Single

Citizenship: Filipino

Religion: Roman Catholic

Sex: Male

Father's Name: Sony Daya

Mother's Name: Iona E. Aranas



EDUCATIONAL BACKGROUND

SCHOOL	YEAR GRADUATED
Intermediate: Calinan Lam Adventist Academy	2018
Junior High School: Holy Cross College of Calinan, Inc.	2022
Senior High School: Holy Cross College of Calinan, Inc.	2024
Track: Academic Track	
Strand: Science, Technology, Engineering and Mathematics	

