

**KNOWLEDGE, ATTITUDE AND UTILIZATION OF ARTIFICIAL
INTELLIGENCE IN LABORATORY COURSES AMONG
PARAMEDICAL STUDENTS**

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INTELLIGENCE IN LABORATORY COURSES
AMONG PARAMEDICAL STUDENTS**

An Undergraduate Thesis
Presented to the Faculty of the College of Nursing,
Midwifery, and Radiologic Technology
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In Partial Fulfillment of the
Requirements for the Degree
Bachelor of Science in Radiologic Technology

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CERTIFICATE OF PANEL APPROVAL

In partial fulfillment of the requirements for the degree of Bachelor of Science in Radiologic Technology, this research output entitled, “**Knowledge, Attitude and Utilization of Artificial Intelligence in Laboratory Courses Among Paramedical Students**” is hereby recommended for acceptance and approval.

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ABSTRACT

Artificial intelligence (AI) has emerged in recent years as technology advancements continue to accelerate. Its implementation is expanding into various fields, including healthcare and education. In contrast to traditional digital tools, AI-driven systems can adapt, predict, and customize learning experiences to align with each student's unique capabilities and interests. However, research on AI utilization in paramedical laboratory courses is still limited. This study explored the correlation between paramedical students' level of knowledge, attitude, and utilization of AI in their laboratory courses. For this study, a quantitative approach was employed using a descriptive-correlational design. The Technology Acceptance Model (TAM; Davis, 1985) and the Unified Theory of Acceptance and Use of Technology (UTAUT; Venkatesh et al., 2003) served as theoretical frameworks. A total of 282 paramedical students from a higher educational institution in Misamis Occidental were chosen as the respondents in the study, selected through stratified proportional sampling. Data were collected using a validated three-part modified questionnaire. Mean, standard deviation and Pearson Product-Moment Correlation Coefficient were used for data analysis. The results showed that the paramedical students had a high level of knowledge about AI, and they possessed a positive attitude towards it. They also reported high utilization of AI in their laboratory courses. However, no significant correlation was found between the students' level of knowledge, attitude, and utilization of AI. It is concluded that the student's level of knowledge and attitude did not directly influence their utilization of AI in laboratory settings. It is recommended that future research should explore additional constructs and variables that might directly affect paramedical students' use of AI in laboratory settings.

Keywords: *artificial intelligence, attitude, knowledge, paramedical students, utilization of AI*

DEDICATION

We, the researchers, want to dedicate this paper to Almighty God, whose wisdom and guidance have been our rock throughout this journey. His grace has given us the clarity and strength to tackle challenges, helping us bring this research to life.

We also want to give a heartfelt shout-out to our amazing parents, friends, and siblings. Your unwavering support and sacrifices have been the foundation of our dreams. Your love and encouragement have truly inspired us to reach for the stars!

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The Researchers

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The Researchers

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INTRODUCTION

Rationale of the Study

Artificial intelligence (AI) is rapidly becoming known and used globally. It exists in everything from smartphones and personal computers at home to applications that can navigate roads one has never been to and even as an aid for the healthcare industry in service delivery and quality patient care. It is safe to say that AI is present in every individual's daily life now and shows no signs of disappearing.

As defined by the Merriam-Webster dictionary, artificial intelligence is the ability of computer systems to mimic intelligent human behavior. Tasks that once could only be carried out with a human's intelligence are now handled by computer systems. Additionally, artificial intelligence is a technological advancement that is gradually being integrated into healthcare (Mousavi Baigi et al., 2023).

Artificial intelligence in healthcare exists in various applications. These applications can be seen in diagnosis and treatment plans, patient involvement and compliance, and as well as handling administrative tasks (Davenport & Kalakota, 2019). A great example of this would be the computer-aided diagnosis (CAD) systems. CAD systems utilize innovative imaging processing programs, such as AI and machine learning, to deliver the most accurate and reliable diagnosis possible (Guetari et al., 2023). This is because CAD systems have the advantage of going beyond human memory and detecting disease variants that physicians cannot.

In addition, AI in healthcare is transforming many administrative aspects of medical care. Automating routine procedures like data input, claims processing, and appointment scheduling allows physicians and allied healthcare professionals to focus on patient care with more autonomy over their workflow process (Barth, 2023).

As a matter of fact, AI has also been involved in recent drug discoveries. It is speeding up progress by assisting with drug development, foreseeing side effects, and selecting the best candidates for clinical trials (Daley, 2022). Just recently, the

FDA has granted Insilico Medicine its first Orphan Drug Designation. Currently, in its Phase II clinical trial as of this writing, INS018_055 is a small molecule inhibitor treatment for idiopathic pulmonary fibrosis (IPF) and was discovered and designed using AI (Philippidis, 2023).

Over the years, changes have been made in the healthcare industry that were considered revolutionary not only for patients but also for allied healthcare professionals. In effect, the application of AI in the healthcare industry is seen as a solution that can ease the strain on medical professionals, enhance patient care, and address the shortage of human resources in the industry (Gao et al., 2020).

In a study by Syed and Zoga (2018), radiology has always been the first to be impacted in the matter of technological advancements in the healthcare industry. Hence, it does not come as a surprise that AI has made promising developments in image processing and image interpretation (Ampofo et al., 2023). Likewise, the dentistry field is swiftly discovering novel applications of AI, including image analysis, electronic health records, and clinical decision-making. The rapid progress of AI in dentistry underscores the need for dental education to thoughtfully incorporate AI into curricula, ensuring that future professionals are well-prepared to use it ethically and responsibly in their practice (Kim et al., 2023).

AI in nursing also allowed the potential to advance nursing skills and enable nurses to give patients better personalized, evidence-based care (Ronquillo et al., 2021). In the same study, it was emphasized that it would be beneficial to draw on the experience and knowledge of nurses who work closely with patients in order to better understand the clinical issues that AI technologies seek to solve. Meanwhile, a study by Miotto et al. (2018) investigated the use of AI in clinical laboratories for interpreting laboratory test results. It demonstrated the potential of AI algorithms in analyzing and interpreting complex laboratory data, aiding in diagnostic accuracy and efficiency.

As AI continuously grows, it has also made advancements in the field of education (Fitria, 2021). As described by York (2024), AI tools for students are software and applications that use AI to help, improve, or simplify the way students

learn. Unlike traditional digital tools, systems powered by AI can adapt, anticipate, and customize learning experiences based on each student's unique requirements and inclinations. The following are AI-powered tools and software applications commonly used by paramedical students:

ChatGPT. This application is arguably the most popular on this list. Most paramedical students and even instructors are familiar with its easy-to-use interface. It can provide a direct answer and explanation for a variety of questions, from a simple "What is medicine?" to much more complex questions like "How is gravity calculated?". Dentistry students use it to quickly summarize reading materials, making it easier for them to understand difficult topics. Its dialogue feature also helps them practice patient communication. Although ChatGPT is a useful educational tool, they also acknowledged that it shouldn't be used as the primary source of information.

Quizlet. This AI-powered application has also been helpful for paramedical students in preparing for quizzes, exams, and even return demonstrations in their laboratory courses. Nursing students use it to create custom flashcards for terms, definitions, drug information, anatomy, and the like. These flashcards can be used for quick reviews and memorization. With the option to create flashcards or use existing ones, they can perfectly use this tool, which practices active recall study techniques that enhance the nursing students' study efficiency and knowledge retention.

Labster. Virtual lab simulations from Labster are available for many disciplines in science, such as biology, chemistry, and medicine. During the pandemic, when face-to-face classes were not an option, simulations were a common choice to cope with this dilemma. In fact, medical technology students were exposed to virtual labs where this AI tool would guide their virtual hands through each part of the anatomy and afterward let them answer the specific segment that is shown on the screen. With the aid of this AI tool, they are able to learn and memorize parts and functions, conduct experiments, pick up lab skills,

and engage in interactive scientific exploration. Because of this, these students were able to stay productive and learn inside the safety of their homes.

Anatomy 3D Atlas. This type of software is valuable, especially when it comes to learning and exploring the full 360° view of anatomical structures, physiology, and medical conditions of the human body. Radiologic technology students mostly utilize this application when practicing how to position patients properly in different radiologic procedures. Learning human anatomy is essential to ensure that accurate and quality images are taken only once to avoid double exposure of patients to radiation.

Grammarly. When written tasks such as research are done in laboratory courses, paramedical students often use this AI-powered writing assistant designed to assist them in developing their writing skills. It is because it recognizes and corrects grammar, spelling, punctuation, and writing style mistakes. This application is very beneficial to paramedical students when it comes to writing essays, reports, and other schoolwork.

These are just some of the AI tools that support the learning experience of paramedical students by providing interactive simulations, data analysis capabilities, and resources, especially in their laboratory courses. It is also to be noted that the list of AI-powered tools and software applications that paramedical students utilize are not limited to those mentioned above only.

Since artificial intelligence is ever-evolving and always has something innovative to offer, studies about it are also constantly being updated throughout the years to keep up with its possible number of contributions and even disadvantages in numerous industries, such as in healthcare, to efforts being applied to machine and deep learning, and even how to incorporate AI ethically into several practices. However, for this study, the researchers would like to focus only on the knowledge, attitude, and utilization of AI in laboratory courses among paramedical students.

Knowledge is, in fact, power. Hence, when there is a lack of knowledge, a person would feel powerless and unavoidably fear the unknown. For some, AI is

something that they have not considered dipping their toes into, and this insufficient knowledge about AI can create a negative attitude by building doubt, hesitation, and concerns regarding possible risks. A study by Teng et al. (2022) identified that the majority of Canadian healthcare students were both optimistic and concerned about the roles of AI in their areas, which was then associated with their lack of knowledge about AI.

On the other hand, it is expected that if a person has a decent amount of knowledge about something, then it becomes easier for them to feel positive about it. Tung and Dong (2023) concluded in their study that Malaysian students in the medical field who are aware of AI also show a willingness to learn more about it. Thus, it was then recommended for medical schools in Malaysia to start integrating AI teaching into their curricula to assist students in grasping and accepting AI as a supplemental tool in healthcare delivery. It is anticipated that when people are knowledgeable about AI, it can also be easier to utilize its capabilities in improving treatment outcomes and as well as enhancing patient care.

Attitude defines how one would feel or act towards certain things, people, and situations. A person's attitude is shaped by their mindset and beliefs, which in turn affects how they think, act, and interact with others and the environment. Therefore, attitude towards AI is a critical factor in how one would navigate this rapidly changing technology. While some view AI with skepticism due to concerns about job displacement and losing control, others also welcome it positively because they see the potential for innovation and efficiency. Those with a positive attitude possess a mindset that embraces challenges as opportunities for learning and development. A study from Stewart et al. (2023) identified that healthcare students in Western Australia are interested in AI and believe that it will impact the practice of medicine, however, they do not comprehend the fundamental computational principles or limitations of AI as they have not received any education on AI. The majority of these healthcare students are supportive of its introduction into the curriculum and view AI as a tool and aid to existing clinical practice.

In contrast, those with a negative attitude often stem from fear about AI's implications for individuals and society. Gao et al. (2020) stated that a lack of trust in AI and the absence of humanistic care are the important reasons why some people still have a negative attitude toward medical AI. Those with mixed attitudes have a combination of conflicting perspectives toward a particular subject. A study from Al-Qerem et al. (2023) identified that the attitudes of Jordanian healthcare students towards AI were multifaced. A sizable portion of these students voiced doubts regarding the superiority of AI over human professors, and a significant percentage of respondents also supported the significance of healthcare students gaining a fundamental understanding of clinical AI's accuracy over physicians. These mixed attitudes may result from worries concerning AI's effects on traditional medical education and behavior, including the fear of job displacement, impact on the patient-provider relationship, and concerns about patient safety.

Many significant corporations have regularly employed AI, such as Google's search engine intelligence and smart device personal assistants. These applications' deep learning and machine learning are employed in a variety of health information system contexts. For example, AI is utilized to make choices in medical fields that entail enormous volumes of data, such as pathology and radiography (Aboalshamat, 2022).

Based on the study by Narayanan et al. (2023), AI-integrated medical education provides new possibilities for superior teaching and learning experiences and better outcomes. AI may also be used in medical education to analyze and evaluate in real-time using optical mark detection and automated scoring. In addition, the utilization of AI aids healthcare teams in minimizing documentation time by digitally storing patient data and creating a digital database for diagnosis, treatment, post-treatment care, and ongoing medical care that is based on individual patient needs. Even medical specialists collaborate with software/hardware experts to design a platform for data collection and routine procedures (Haleem et al., 2019).

Indeed, AI is hailed as a powerful scientific tool with great potential. Its influence is increasingly felt across industries, including healthcare. From transforming various aspects of healthcare to impacting regulatory procedures in providers, payers, and pharmaceutical companies, AI innovations are becoming more prevalent and promising (Wani, 2022).

Theoretical Framework

This study was supported by the Technology Acceptance Model (TAM) of Davis (1985) and Unified Theory of Acceptance and Use of Technology (UTAUT) of Venkatesh et al. (2003).

As to the first theory, TAM revolves around the discussion of why people use technology, especially in the context of work. According to TAM, two factors can influence whether a user accepts or rejects the likes of any computer-based information systems, and in this study's context, artificial intelligence. These two factors are the technology's (1) perceived usefulness and (2) perceived ease of use. Moreover, these factors will also be responsible for forming a user's attitude and, subsequently, their acceptance and actual use of artificial intelligence.

Perceived Usefulness is “the degree to which an individual believes that using a particular system would enhance his or her job performance.” As discussed by Damerji and Salimi (2021, as cited in Labrague et al., 2023), individuals who regard AI as a tool that supports and enhances their profession are more likely to acquire positive attitudes, which increases their motivation to utilize AI in practice. After all, a system with high perceived usefulness is one in which a user believes in the certainty of a good use-performance relationship (Davis, 1989).

On the other hand, Perceived Ease of Use is defined as “the degree to which an individual believes that using a particular system would be free of physical and mental effort.” As explained in TAM, a technology that is easier and more efficient to use is correspondingly more helpful for its users. Gado et al. (2022) discovered that students' willingness to accept AI technology is influenced by their evaluation of its ease of use, usefulness, and trust in their ability to use AI effectively. Thus, if

an innovation such as AI is proven to be difficult to configure and handle, especially for beginners like students, then the possibility of potential users accepting it becomes less.

The first theory was perfect as the framework of this study since it enabled the researchers to examine how the respondents' knowledge about AI influenced their attitude towards AI and whether these can be associated with their utilization of AI in their laboratory courses.

In the second theory, UTAUT combined eight models and described four constructs. These constructs play a major role as direct factors in user acceptance of technology and usage behavior. As will be explained in the following paragraphs, these four constructs are performance expectancy (PE), effort expectancy (EE), social influence (SI), and facilitating conditions (FC).

Performance expectancy (PE) is defined as the "degree to which an individual believes that using the system will help him or her to attain gains in job performance." This construct is very similar to TAM's Perceived Usefulness, wherein a technology such as AI is accepted and utilized if it presents the advantage of helpfulness. It is also to be noted that PE was proven to be the strongest predictor of intention among the four factors.

Furthermore, effort expectancy (EE) refers to the "degree of ease associated with the use of the system." This is similar to TAM's Perceived Ease of Use, in which a technology like AI is accepted and utilized if it offers the convenience of being user-friendly and accessible.

Meanwhile, social influence (SI) is defined as the "degree to which an individual perceives that important others believe he or she should use the new system," which is essentially synonymous with being encouraged by peers or even instructors concerning AI acceptance and intention of usage.

Lastly, facilitating conditions (FC) are defined as the "degree to which an individual believes that an organizational and technical infrastructure exists to support the use of the system." This construct concerns the actual usage of AI among the four factors (Abbad, 2021). Its impact on AI usage is predicted to grow

with experience as users discover numerous options of assistance and guidance throughout an organization, and, in this case, it is the university and its AI educational program, if available.

In the context of this study, UTAUT provides an extensive understanding of how individuals accept and use artificial intelligence. Applying UTAUT helps the researchers recognize why paramedical students accept AI and successfully utilize it in settings such as their laboratory courses.

Conceptual Framework

The conceptual framework discusses the relevant and present dependent and independent variables of the study. The independent variables are the paramedical students' knowledge and attitude toward artificial intelligence (AI), and the dependent variable is the utilization of AI by the paramedical students in laboratory courses.

According to Jackson (2019), artificial intelligence is a discipline of computer science that studies machine intelligence using artificial methods and techniques to create intelligent machines or intelligent systems that mimic, extend, and expand human intelligence while exhibiting intelligent behavior.

AI is applied to different contexts and it is visible in applications to architecture in smart buildings and smart cities, smart mobility, medicine, smart industry, and smart education or smart classrooms (González-Calatayud et al., 2021). As mentioned by Hamet and Tremblay (2017), AI, defined as the science and engineering of creating intelligent robots, was created in 1956. This term refers to a wide variety of medical objects, including robotics, medical diagnostics, medical statistics, and human biology — all the way up to and including today's "omics."

It is undisputable that AI has become progressively incorporated into the educational environment and teaching process in schools. As technology advances, more and more people recognize its significance in education (Huang et al., 2021). However, learners' understanding of AI is still limited; research has usually focused

on learners' acceptance of AI, while the practical application of AI in the classroom has received little attention (Zawacki-Richter et al., 2019).

Healthcare students are not terrified about being replaced by AI. Unfortunately, limited exposure to AI has been shown to cause anxiety in undergraduate students and influence their future career decisions; thus, examining attitudes and current knowledge of healthcare students may be a powerful approach for curriculum decision-makers to highlight areas of need regarding AI education. Consequently, it is critical to collect information from a diverse group of healthcare students (Mousavi Baigi et al., 2022).

AI is rapidly being utilized to assist paramedical students in their learning journeys, delivering individualized experiences and improved outcomes (Nagi et al., 2023). In the research made by Mousavi Baigi et al. (2023), 26 studies examined healthcare students' knowledge of AI. Among them, 18 studies assessed students' knowledge as low as 50%. On the other hand, students' excellent understanding of AI was observed in six of the investigations, while two of the studies revealed average student general knowledge, which is almost 50%.

In a study accomplished by Doumat et al. (2022), they were able to gather 206 health profession students as their respondents. When it came to AI knowledge sources, 81.1 percent of these respondents acquired their information from the media, while 9.7 percent got it via the school curriculum. Students who learned the basics of AI as part of their school curriculum knew more about AI than their counterparts who did not. Moreover, clinical students tend to be more educated about AI in medicine. It is also to be noted that nearly a quarter of students were influenced by AI developments in their specialization choice. Finally, just a quarter of students prefer to be assessed by AI, even though the majority believe AI evaluation is more objective.

According to the evidence in research by Mousavi Baigi et al. (2023), healthcare students had a good and optimistic attitude toward AI in medicine, yet most students had insufficient knowledge and abilities in dealing with AI. Face-to-face education, training manuals, and precise instructions are definitely essential for

implementing and learning how AI technology works while also increasing the student's awareness of the possible benefits of AI. As the area of AI in healthcare gains pace, it is evident that more information, as well as AI-based training for physicians and healthcare students, is necessary.

Attitudes toward AI vary by discipline. Even students who are opposed to AI identified the need to incorporate a basic understanding of AI into their curricula (Teng et al., 2022). It can be assumed that these health profession students are aware of the potential applications and implications of AI in radiology and medicine in general. Wood et al. (2021) showed that healthcare students had a favorable and encouraging attitude about AI in the clinical profession and its future usage; nevertheless, students saw AI as a danger to healthcare disciplines and had a negative attitude toward it.

Based on these different studies conducted about AI in healthcare, AI education should be included in school curricula to improve students' understanding and attitude toward AI. Improving AI understanding in paramedical students will surely lead to greater adoption of AI as a tool in healthcare education, unleashing its potential to revolutionize medical education (Doumat et al., 2022).

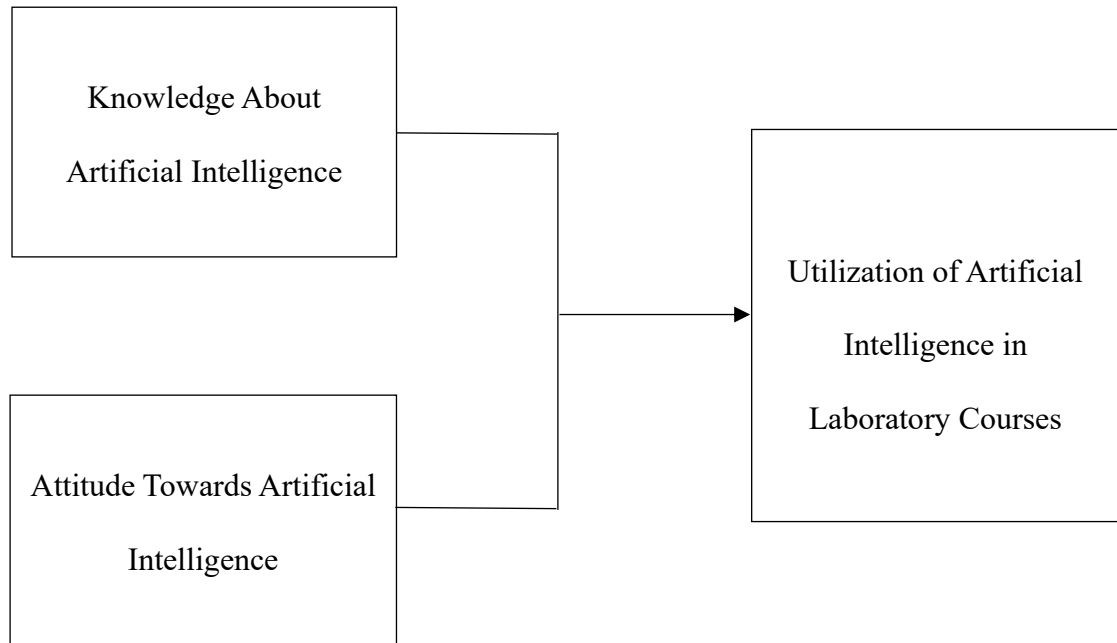


Figure 1. Schematic Diagram of the Study

Although many studies have already been conducted about the relationship between paramedical students' knowledge and their attitude towards AI, none of them have attempted to find the correlation between the paramedical students' knowledge, attitude, and utilization of AI in their respective laboratory courses yet. To the best of the researchers' information, this study is the first one to be made in Ozamiz City, Philippines.

Objectives of the Study

This study aimed to determine the level of knowledge, attitude, and utilization of artificial intelligence in laboratory courses among paramedical students. The following were the specific objectives: 1) Describe the knowledge of artificial intelligence among paramedical students; 2) Assess the attitude towards artificial intelligence among paramedical students; 3) Determine the extent to which paramedical students utilize artificial intelligence in laboratory courses; 4) Explore the relationship between the level of knowledge and utilization of artificial intelligence in laboratory courses among paramedical students; and 5) Explore the relationship between the level of attitude and utilization of artificial intelligence in laboratory courses among paramedical students.

Significance of the Study

The outcomes of this study may be beneficial in addressing how artificial intelligence is being applied in educational institutions, particularly by paramedical students. By focusing on the knowledge, attitude, and utilization of AI in laboratory courses among paramedical students, the study may serve as a catalyst for innovation and progress within the healthcare sector and paramedical education.

RESEARCH METHODOLOGY

Research Design

The study utilized the descriptive-correlational design that involves the collection of data from the population of interest to examine the knowledge, attitude, and utilization of artificial intelligence in laboratory courses among paramedical students. The descriptive-correlational design tries to explain the relationship between two or more variables without making any claims about cause and effect. Since the study investigates the relationships between, the research design is appropriate. Also, the correlational analysis provided insights into the associations between these variables, offering a full understanding of the status and interconnections within the specified context.

Research Environment

This study was conducted in a higher education institution in Ozamiz City, Misamis Occidental, Philippines. The institution offers the following paramedical programs: Bachelor of Science in Nursing, Bachelor of Science in Medical Technology, Bachelor of Science in Radiologic Technology, and Doctor of Dental Medicine.

Respondents of the Study/Unit of Analysis, and Sampling Procedure

This study's respondents were students enrolled in the second semester of the academic year 2023-2024 in the following specific paramedical programs: Bachelor of Science in Nursing, Bachelor of Science in Medical Technology, Bachelor of Science in Radiologic Technology, and Doctor of Dental Medicine.

To determine the number of respondents per college program, a stratified proportional sampling approach was used. The paramedical students were grouped according to their college department. Third—and fourth-year level Dentistry, Nursing, and Medical Technology students were chosen to be respondents of the

study. The second—and third-year level Radiologic Technology students were part of the sample as well.

The researchers computed the number of samples from each group in proportion to the population per group. About 50% of the population per group was part of this study's final sample size, which summated to 282 paramedical student-respondents.

This sampling method was used to ensure proportional representation, enhancing the study's ability to capture diverse perspectives within the distinct stratum of the population.

Data Gathering Instruments

The study used modified questionnaires to gather necessary quantitative data. Items from the validated questionnaire of Truong et al. (2023) were employed to assess the knowledge and attitude of paramedical students towards artificial intelligence. The paramedical students' utilization of AI in laboratory courses was assessed using items from Venkatesh et al. (2003) found in the Unified Theory of Acceptance and Use of Technology (UTAUT). The questionnaire has three (3) parts:

A. Knowledge About Artificial Intelligence Questionnaire. This part contained different statements to measure the respondents' knowledge about artificial intelligence. The continuum presented below was used to interpret the data:

Continuum	Responses	Interpretation
3.26 – 4.00	Strongly Agree	Very High
2.51 – 3.25	Agree	High
1.76 – 2.50	Disagree	Low
1.0 – 1.75	Strongly Disagree	Very Low

B. Attitude towards Artificial Intelligence Questionnaire. This part assessed the respondents' attitude towards artificial intelligence. The continuum presented below was used to interpret the data:

Continuum	Responses	Interpretation
3.26 – 4.00	Strongly Agree	Very Positive
2.51 – 3.25	Agree	Positive
1.76 – 2.50	Disagree	Negative
1.00 – 1.75	Strongly Disagree	Very Negative

C. Utilization of Artificial Intelligence in Laboratory Courses Questionnaire. This part focused on the respondents' utilization of artificial intelligence in their laboratory courses. The continuum presented next page was used to interpret the data:

Continuum	Responses	Interpretation
3.26 – 4.00	Strongly Agree	Very Highly Utilized
2.51 – 3.25	Agree	Highly Utilized
1.76 – 2.50	Disagree	Less Utilized
1.00 – 1.75	Strongly Disagree	Least Utilized

Data Gathering Procedure

The researchers started by obtaining the approval of the Dean of the College of Nursing, Midwifery, and Radiologic Technology for the study's execution. They also approached the Deans of the College of Dentistry and College of Medical Technology and secured their permission to distribute the study's questionnaire since their respective enrolled students were chosen as the respondents. Upon securing their approval and permission, the researchers began disseminating the questionnaires individually to the respondents.

Each of the respondents was asked to give written and informed consent and given time to answer the research instrument. If assistance was needed, any of the researchers was available to guide them throughout the process. When all of the

questionnaires were collected, the data was tabulated and coded for analysis and interpretation.

Validity and Reliability of the Instrument

The instruments used for this study contained items from a previously validated questionnaire by Truong et al. (2023) and from the Unified Theory of Acceptance and Use of Technology (UTAUT) by Venkatesh et al. (2003), with permission from the corresponding authors.

A pilot study was conducted on paramedical students exempted from being the final respondents. The test was done to determine the modified questionnaire's local validity and reliability using Cronbach's Alpha.

Mode of Analysis/Statistical Treatment

The following statistical instruments and modes of analysis were used to infer reliable and accurate results:

Weighted Mean and Standard Deviation were used to determine the average of the data gathered on the paramedical students' level of knowledge, attitude, and utilization of artificial intelligence in laboratory courses.

Pearson Product-Moment Correlation Coefficient. This tool was used to test the significant relationship between the knowledge, attitude, and utilization of artificial intelligence in laboratory courses among paramedical students.

Ethical Considerations

The researchers employed all ethical considerations in the study. The researchers strictly implemented the following: (1) A request letter was made and addressed to the Deans of the different colleges involved in the study; (2) The respondents were asked to sign an informed consent before the actual distribution of the questionnaire; (3) The respondents were fully informed about the purpose, benefits, and potential risks of the study; (4) The respondents were informed that they could withdraw any time they wanted from participating in the study; (5) The

respondents were encouraged to contact the researchers in case of queries and concerns; and (6) It was a top priority that anonymity and confidentiality were maintained at all times during the conduct of the study. The data that was collected during this study was meticulously safeguarded to maintain utmost privacy and was destroyed after the completion of the study.

RESULTS AND DISCUSSIONS

This part of the study presents the findings and discussions related to the five specific research objectives in the Introduction. The respondents' levels of knowledge, attitudes, and utilization of artificial intelligence in laboratory courses were determined. Additionally, the relationship between the respondents' level of knowledge and utilization of artificial intelligence in laboratory courses and the relationship between the respondents' attitude and utilization of artificial intelligence in laboratory courses were evaluated. The presentation of findings is arranged into the following topics:

Respondents' Level of Knowledge about Artificial Intelligence

Respondents' Attitude towards Artificial Intelligence

Respondents' Utilization of Artificial Intelligence in Laboratory Courses

Significant Relationship between the Respondents' Level of Knowledge and their Utilization of Artificial Intelligence in Laboratory Courses

Significant Relationship between the Respondents' Attitude and their Utilization of Artificial Intelligence in Laboratory Courses

Respondents' Level of Knowledge about Artificial Intelligence

Table 1 shows the paramedical students' level of knowledge about artificial intelligence. The data obtained resulted in an average weighted mean of 2.77, which is interpreted as "high." It is evident that the paramedical student-respondents of this study are highly equipped with knowledge about artificial intelligence (AI) in healthcare.

The paramedical students are highly knowledgeable that AI provides recommendations for quality improvement in practices and hospitals, and its capability in providing quality improvement recommendations is critically important. Thus, AI's recommendations are seen as broadly applicable and beneficial across multiple domains within practices and hospitals.

AI for health has demonstrated significant potential for improving healthcare efficiency, taking into account the interaction between health variables such as service and management and ICT factors such as sensors, networks, data resources, platforms, applications, and solutions. AI-based solutions have been successfully developed to address numerous healthcare logistical problems, such as appointment planning, patient and resource scheduling, resource usage, and forecasting demand for emergency departments, critical care units, or ambulances (Klump et al., 2021).

On the other hand, paramedical students disagree that AI provides empathetic care to patients. They likely perceive that AI lacks the fundamental human qualities required for compassionate care. It underscores a critical perception that AI, despite its many strengths, is currently limited in its ability to deliver the deeply human, emotionally intelligent interactions that empathetic care requires.

In the study of Montemayor et al. (2021), empathic AI is either impossible or unethical. It is impossible because the AI lacks genuine empathy. It is unethical because empathy poses risks, not only for deceit in specific cases but also for weakening and undermining the meaning and expectations of genuine empathy. The nature of attention to another human being, which is important to empathy, is not solely a matter of rule compliance or positive outcomes represented by an algorithm.

Table 1
Respondents' Level of Knowledge about Artificial Intelligence
n=282

Variable	M	SD	Remarks
Knowledge	2.77	.70	High

Scale: 3.26-4.0(Very High); 2.51-3.25(High); 1.76-2.50 (Low); 1.0-1.75 (Very Low)

Respondents' Attitude towards Artificial Intelligence

Table 2 shows the paramedical students' attitudes towards artificial intelligence. The data obtained resulted in an average weighted mean of 2.79, which is interpreted as "positive." It indicates that most of the paramedical student-respondents of this study have a positive attitude towards artificial intelligence in healthcare.

The paramedical students expressed a positive attitude toward AI, which they see as having the potential to greatly improve their education and make it more effective, efficient, and responsive to the changing demands of the healthcare industry.

A similar study finding from Buabbas et al. (2023) identified that the majority of paramedical students expressed positive attitudes towards the potential benefits of AI in medical education and believed that it would make learning easier. Overall, a positive attitude towards AI is marked by hope for a brighter future where AI contributes positively to society.

Furthermore, the paramedical students somewhat agreed that the Philippine healthcare system is currently well prepared to deal with challenges related to AI. Thus, in terms of preparedness, the Philippine healthcare system is ready to handle challenges related to AI.

AI is increasingly being integrated into the healthcare sector in the Philippines. Numerous startups and private companies are developing AI-powered healthcare solutions, including telemedicine platforms, diagnostic tools, and personalized health monitoring systems. As the government and private sector continue to invest in digital healthcare technologies and regulatory frameworks are established, the use of AI in healthcare is expected to increase, thus, improving healthcare outcomes for the Filipino people (Upadhyay, 2022). The Philippines is still in the early stages of AI adoption and utilization, but it is heading toward a good start if students, like the respondents of this study, feel positive about it.

Table 2
Respondents' Attitude towards Artificial Intelligence
n=282

Variable	M	SD	Remarks
Attitude	2.79	.66	Positive

Scale: 3.26-4.0(Very Positive); 2.51-3.25(Positive); 1.76-2.50 (Negative); 1.0-1.75 (Very Negative)

Respondents' Utilization of Artificial Intelligence in Laboratory Courses

Table 3 shows the paramedical students' utilization of artificial intelligence in laboratory courses. The data obtained resulted in an average weighted mean of 2.77, which is interpreted as "highly utilized." It implies that most of the paramedical student-respondents of this study are highly utilizing artificial intelligence in their laboratory courses.

The results suggest a significant engagement with AI tools among paramedical students. The high utilization could be attributed to several factors, including the increasing integration of AI technologies in medical education and the perceived benefits, such as enhanced learning experiences and improved efficiency in laboratory tasks. Moreover, the paramedical students agreed that it was easy to get AI to do what they wanted it to do. They highly utilize AI in their laboratory courses because of its ease of use.

For instance, Zawacki-Richter et al. (2019) conducted a comprehensive review of AI applications in higher education and found that ease of use was a prevalent theme in the successful implementation of AI tools. They noted that when AI applications are designed with the end-user in mind, they can significantly improve engagement and facilitate complex tasks that might otherwise be challenging for students.

Likewise, paramedical students highly utilize AI in their laboratory courses because of the influence of their environment. Specifically, they are those they see fit as supervisors (e.g., instructors). If laboratory tasks involved researching, students were encouraged by instructors to use Grammarly and Turnitin to check

the grammar and the originality of their work. Because of this, the students are likely more open to using these AI-powered applications. In fact, a study by Chao (2019) found that the perceived support from instructors and peers greatly enhances students' willingness to engage with e-learning technologies, including AI. Similarly, Al-Emran et al. (2018) highlighted that social influence is a critical determinant in the acceptance and usage of AI tools among students, emphasizing the role of faculty members in encouraging or discouraging technology use.

Table 3
Respondents' Utilization of Artificial Intelligence in Laboratory Courses
n=282

Variable	M	SD	Remarks
Utilization	2.77	.69	Highly Utilized

Scale: 3.26-4.0(Very Highly Utilized); 2.51-3.25(Highly Utilized); 1.76-2.50 (Less Utilized); 1.0-1.75 (Least Utilized)

Significant Relationship between the Respondents' Level of Knowledge and their Utilization of Artificial Intelligence in Laboratory Courses

The Pearson's-r correlation was used to test the significant relationship between the paramedical students' level of knowledge and utilization of artificial intelligence in laboratory courses. As shown in Table 4, the level of students' knowledge and utilization of artificial intelligence in laboratory courses showed no significant relationship, as evidenced by the p-value of 0.66. It means that there is no significant relationship between the variables mentioned above.

Paramedical students can still utilize AI in laboratory courses whether they have a high level of knowledge of AI or not. The students' level of knowledge did not determine their choice to utilize AI in their laboratory courses. It means that regardless of the student's level of knowledge, their decision to utilize AI does not depend on this variable.

Although it might come as a surprise to learn that the respondents' high level of knowledge of AI is not correlated to their decision to utilize AI highly, this is not

impossible. For example, in a study conducted by Seo et al. (2021), they discovered that while students welcomed AI's usefulness in their classes, especially for its quick response and personalized guidance, they were also worried about AI's inevitable inaccuracies or misleading tendencies that can cause a negative impact on their grades. In the same study, issues about AI's excessive data collection that can cause privacy problems also became one of the reasons why students are hesitant to fully embrace AI in their classes.

Table 4
Significant Relationship Between the Respondents' Level of Knowledge and their Utilization of Artificial Intelligence in Laboratory Courses

Variables	<i>r</i> value	<i>p</i> value	Decision
Knowledge and Utilization	.00	.66	Do not reject Ho

Ho: There is no significant relationship between the level of knowledge and the utilization of artificial intelligence in laboratory courses.

*Note: Probability Value Scale: ** $p < 0.01$ (Highly Significant); * $p < 0.05$ (Significant); $p > 0.05$ (Not significant)*

Significant Relationship between the Respondents' Attitude and their Utilization of Artificial Intelligence in Laboratory Courses

The Pearson's-r correlation was used to test the significant relationship between the paramedical students' attitude and utilization of artificial intelligence in laboratory courses. As shown in Table 5, the level of students' knowledge and utilization of artificial intelligence in laboratory courses showed no significant relationship, as evidenced by the p-value of 0.67. It means that there is no significant relationship between the variables mentioned above.

The results revealed that although the paramedical students' attitudes toward AI are positive, they also clearly emphasized that their positive attitude toward AI does not significantly affect their intention to utilize AI in laboratory settings. It only suggests that while fostering positive attitudes toward AI is important, it is just one piece of a puzzle in the successful adoption and utilization of AI in laboratory courses.

These findings are in line with a previous study from Mousavi Baigi et al. (2023), which highlighted that paramedical students generally have nuanced attitudes toward AI. They discovered that while the majority of the students show positive attitudes, their acceptance and fear level hovers around the midpoint of the scale, suggesting a balanced perspective. Additionally, they concluded that paramedical students with positive attitudes toward AI may be more inclined to learn about it, potentially leading to higher AI literacy. It indicates that these students are likely to have a more critical view of the exaggerated, negative portrayals of utilizing AI due to their better understanding of its benefits and risks (Laupichler et al., 2024).

Table 5
Significant Relationship Between the Respondents' Attitude and their Utilization of Artificial Intelligence in Laboratory Courses

Variables	<i>r</i> value	<i>p</i> value	Decision
Attitude and Utilization	.000	.67	Do not reject Ho

Ho: There is no significant relationship between the attitude and the utilization of artificial intelligence in laboratory courses.

*Note: Probability Value Scale: ** $p < 0.01$ (Highly Significant); * $p < 0.05$ (Significant); $p > 0.05$ (Not significant)*

CONCLUSIONS AND RECOMMENDATIONS

This section wraps up the study by providing conclusions, offering recommendations for students and institutions, and proposing areas for future research.

Conclusions

Based on the findings of the study, the following conclusions are made:

1. The paramedical students of this study have a high level of knowledge of artificial intelligence (AI), particularly about AI's ability to provide quality improvement recommendations in healthcare. In these students' view, AI's recommendations can be broadly implemented and deliver benefits across different specialties within hospitals and healthcare practices.
2. Most of the paramedical students also showed a positive attitude towards AI in the healthcare industry, mostly because of its potential to improve their education. They see AI as a way to make learning more effective, efficient, and adaptable to the evolving healthcare industry.
3. Additionally, it was concluded that the paramedical students highly utilized AI in their laboratory courses, indicating that the application of AI tools is common in educational settings. AI's ease of use boosts their intention to use AI in their laboratory courses.
4. Surprisingly, no significant correlation was seen between the level of knowledge and utilization of AI in laboratory courses among paramedical students. It indicates that strong existing knowledge about AI does not directly affect the student's utilization of AI in laboratory settings.
5. Moreover, no significant relationship was found between attitude and utilization of artificial intelligence in laboratory courses among paramedical students. This indicates that a positive attitude towards AI does not directly influence the students' decision to utilize AI in their laboratory courses.

Furthermore, this suggests that other factors, outside of the students' level of knowledge and attitude, may impact the students' actual usage of AI tools.

Recommendations

Based on the findings and conclusions, the following recommendations are made:

1. Given the high knowledge, positive attitude, and high utilization of AI by paramedical students, it is recommended that they be encouraged to be responsible in incorporating AI resources effectively in educational contexts. By promoting responsible AI use, this can empower students to become not just skilled users of AI tools but also critical thinkers who can ensure these tools are used ethically and effectively to improve healthcare outcomes.
2. The Commission on Higher Education (CHED) may also assess the potential effectiveness of integrating AI into the curricula of paramedical programs and see how it can be applied properly. By identifying the respondents' current AI utilization intentions, educational transformation can become essential to optimizing the possibilities of AI technologies in laboratory settings. They may also partner with healthcare institutions to showcase the potential of AI across various specialties, as envisioned by the students.
3. Finally, future researchers may use this study as a foundation and groundwork for the continued exploration and development of AI's relevance in the healthcare industry. Furthermore, it is strongly suggested that future researchers conduct in-depth and further research to identify which factors beyond knowledge and attitude may directly influence student utilization of AI in their laboratory courses. They are also encouraged to explore how learning styles, prior experience with technology, and course structure might impact AI utilization by paramedical students.

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APPENDIX A Research Questionnaire

Knowledge about Artificial Intelligence Questionnaire

Directions: The following are statements that describes knowledge pertaining to artificial intelligence (AI). Read the words carefully and indicate your level of agreement to each statement by writing check (✓) on the column that best corresponds to your answer. Be guided by the following scale:

4 – Strongly Agree

2 – Disagree

3 – Agree

1 – Strongly Disagree

Statements	Responses			
	4	3	2	1
1. AI provides recommendations for quality improvement in practices/hospitals.				
2. AI provide documentation (e.g., updated medical records) about patients.				
3. AI formulates personalized medication prescriptions for patients.				
4. AI evaluates when to refer patients to other health professionals.				
5. AI provides empathetic care to patients.				
6. AI analyzes patient information to reach diagnoses.				
7. AI formulates personalized treatment plans for patients.				
8. AI conducts population health surveillance and outbreak prevention.				
9. AI analyzes patient information to establish prognoses.				
10. AI reads and interprets diagnostic imaging.				

APPENDIX A Cont'd

Attitude towards Artificial Intelligence Questionnaire

Directions: The following are statements that assesses attitude towards artificial intelligence (AI). Read the words carefully and indicate your level of agreement to each statement by writing check (✓) on the column that best corresponds to your answer. Be guided by the following scale:

4 – Strongly Agree

2 – Disagree

3 – Agree

1 – Strongly Disagree

Statements	Responses			
	4	3	2	1
1. AI will revolutionize healthcare practice.				
2. AI will improve medicine in general.				
3. Some human healthcare workers will not be reduced by AI in the foreseeable future.				
4. AI technology developments do not frighten me.				
5. New AI developments make medicine, in general, more exciting.				
6. My education is adequately preparing me for working alongside AI tools.				
7. Healthcare training should include training on AI competencies.				
8. AI technology does not threaten my future career.				
9. AI can help optimize the education of students.				
10. The Philippine healthcare system is currently well prepared to deal with challenges having to do with AI.				

APPENDIX A Cont'd

Utilization of Artificial Intelligence in Laboratory Courses Questionnaire

Directions: The following are statements that references the ways artificial intelligence (AI) is utilized by paramedical students. Read the words carefully and indicate your level of agreement to each statement by writing check (✓) on the column that best corresponds to your answer. Be guided by the following scale:

4 – Strongly Agree

2 – Disagree

3 – Agree

1 – Strongly Disagree

Statements	Responses			
	4	3	2	1
1. I use AI in my laboratory courses to enable me to accomplish tasks more quickly.				
2. I use AI to improve the quality of the laboratory tasks I do.				
3. I use AI because it can decrease the time needed for my laboratory-related responsibilities.				
4. Working with AI is not complicated, it is easy to understand what is going on.				
5. It is easy to get AI to do what I want it to do.				
6. In general, the university has supported the use of AI so I use it.				
7. My supervisor is very supportive of the use of AI for my laboratory tasks.				
8. AI is compatible with all aspects of my laboratory course.				
9. A specific person (or group) is available for assistance when I experience AI difficulties.				
10. I have the resources necessary to use AI.				

APPENDIX B Sample of Filled Out Questionnaire

KNOWLEDGE, ATTITUDE AND UTILIZATION OF ARTIFICIAL INTELLIGENCE AMONG PARAMEDICAL STUDENTS

A. Knowledge about Artificial Intelligence Questionnaire

Directions: The following are statements that describes knowledge pertaining to artificial intelligence (AI). Read the words carefully and indicate your level of agreement to each statement by writing check (✓) on the column that best corresponds to your answer. Be guided by the following scale:

4 – Strongly Agree

2 – Disagree

3 – Agree

1 – Strongly Disagree

Statements	Responses			
	4	3	2	1
1. AI provides recommendations for quality improvement in practices/hospitals.		✓		
2. AI provide documentation (e.g., updated medical records) about patients.	✓			
3. AI formulates personalized medication prescriptions for patients.			✓	
4. AI evaluates when to refer patients to other health professionals.			✓	
5. AI provides empathetic care to patients.				✓
6. AI analyzes patient information to reach diagnoses.		✓		
7. AI formulates personalized treatment plans for patients.		✓		
8. AI conducts population health surveillance and outbreak prevention.	✓			
9. AI analyzes patient information to establish prognoses.			✓	
10. AI reads and interprets diagnostic imaging.			✓	

APPENDIX B Cont'd

B. Attitude towards Artificial Intelligence Questionnaire

Directions: The following are statements that assesses attitude towards artificial intelligence (AI). Read the words carefully and indicate your level of agreement to each statement by writing check (✓) on the column that best corresponds to your answer. Be guided by the following scale:

4 – Strongly Agree

2 – Disagree

3 – Agree

1 – Strongly Disagree

Statements	Responses			
	4	3	2	1
1. AI will revolutionize healthcare practice.		✓		
2. AI will improve medicine in general.			✓	
3. Human healthcare workers will not be reduced by AI in the foreseeable future.				✓
4. AI technology developments do not frighten me.		✓		
5. New AI developments make medicine, in general, more exciting.			✓	
6. My education is adequately preparing me for working alongside AI tools.		✓		
7. Healthcare training should include training on AI competencies.			✓	
8. AI technology does not threaten my future career.	✓			
9. AI can help optimize the education of students.		✓		
10. The Philippine healthcare system is currently well prepared to deal with challenges having to do with AI.		✓		

APPENDIX B Cont'd

C. Utilization of Artificial Intelligence in Laboratory Courses Questionnaire

Directions: The following are statements that references the ways artificial intelligence (AI) is utilized by paramedical students. Read the words carefully and indicate your level of agreement to each statement by writing check (✓) on the column that best corresponds to your answer. Be guided by the following scale:

4 – Strongly Agree

2 – Disagree

3 – Agree

1 – Strongly Disagree

Statements	Responses			
	4	3	2	1
1. I use AI in my laboratory courses to enable me to accomplish tasks more quickly.		✓		
2. I use AI to improve the quality of the laboratory tasks I do.		✓		
3. I use AI because it can decrease the time needed for my laboratory-related responsibilities.		✓		
4. Working with AI is not complicated, it is easy to understand what is going on.		✓		
5. It is easy to get AI to do what I want it to do.			✓	
6. In general, the university has supported the use of AI so I use it.			✓	
7. My supervisor is very supportive of the use of AI for my laboratory tasks.			✓	
8. AI is compatible with all aspects of my laboratory course.		✓		
9. A specific person (or group) is available for assistance when I experience AI difficulties.	✓			
10. I have the resources necessary to use AI.		✓		

APPENDIX C Sampling Computation

Colleges (strata)	Program and Year Level	Population Size	Sample Size (50% per stratum)
College of Nursing, Midwifery and Radiologic Technology	Nursing:		297 x .50 = 148.5 rounded up to 149
	3 rd Year Level	166	
	4 th Year Level	95	
	Radiologic Technology:		
	2 nd Year Level	20	
	3 rd Year Level	16	
College of Medical Technology	Medical Technology:		197 x .50 = 98.5 rounded up to 99
	3 rd Year Level	111	
	4 th Year Level	86	
College of Dentistry	Dentistry:		67 x .50 = 33.5 rounded up to 34
	3 rd Year Level	38	
	4 th Year Level	29	
Total Sample Size			282

APPENDIX D Informed Consent Form



MISAMIS UNIVERSITY
Ozamiz City 7200, Philippines
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E-mail Address: mu@mu.edu.ph



MISAMIS UNIVERSITY
Ozamiz City
College of Nursing, Midwifery and Radiologic Technology

RESEARCH INFORMED CONSENT FORM

Title

This study is titled "Knowledge, Attitude and Utilization of Artificial Intelligence in Laboratory Courses Among Paramedical Students" in partial fulfillment of the requirements for the degree of Bachelor of Science in Radiologic Technology.

Researchers

This study is to be conducted by Christina Prira B. Bacus, Samantha Nicole G. Angot, Jasmine Grace R. Elian, Ted Nichole B. Jalalon, and Leah Mae B. Metillo, who are pursuing the degree in Bachelor of Science in Radiologic Technology at Misamis University College of Nursing, Midwifery and Radiologic Technology with Dr. Sammy B. Taghoy as the adviser. The researchers can be contacted through this mobile number +639305851098 or email address christinaprirabacus@gmail.com, ejasminegrace67@gmail.com, and samanthanicoleangot@gmail.com.

Purpose of the Research

This study aims to determine the level of knowledge, attitude, and utilization of artificial intelligence in laboratory courses among paramedical students. The following are the specific objectives: 1) Describe the knowledge on artificial intelligence among paramedical students; 2) Assess the attitude towards artificial intelligence among paramedical students; 3) Determine in what way paramedical students utilize artificial intelligence in laboratory courses; 4) Explore the relationship between the level of knowledge and utilization of artificial intelligence in laboratory courses among paramedical students; and 5) Explore the relationship between the level of attitude and utilization of artificial intelligence in laboratory courses among paramedical students.

Description of the Research

This study is a descriptive-correlational type of research that involves the collection of data from the population of interest to examine the knowledge, attitude and utilization of artificial intelligence in laboratory courses among paramedical students. The descriptive-correlational design tries to explain the relationship between two or more variables without making any claims about cause and effect. Within approximately one (1) month, modified questionnaires are to be administered to collect quantitative data necessary for the study. Also, the correlational analysis will provide insights into the associations between these variables, offering a full understanding of the status and interconnections within the specified context.

APPENDIX D Cont'd



MISAMIS UNIVERSITY
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E-mail Address: mu@mu.edu.ph



Potential Benefits

This study will be beneficial in addressing how artificial intelligence is being applied in educational institutions particularly by paramedical students. Furthermore, the outcomes of this study will be significant to the following individuals and organizations: 1) *Paramedical Students*. Through this study, paramedical students will gain mindfulness of the prevalence of AI especially in the healthcare industry. 2) *Commission on Higher Education (CHED)*. It will also serve as a tool for CHED to assess the potential effectiveness of integrating AI into the curricula of paramedical programs and how it can be applied responsibly. 3) *Future Researchers*. The study will provide a solid foundation for future researchers, laying the groundwork for continued exploration and development regarding AI's relevance in the healthcare industry. By focusing on the knowledge, attitude, and utilization of AI in laboratory courses among paramedical students, the study will serve as a catalyst for innovation and progress within the healthcare sector and paramedical education.

Confidentiality

In the conduct of the study, full confidentiality will be assured. No information that discloses your identity will be released or published without your specific consent to the disclosure and only imperatively necessary. The materials that contained the raw information derived from you will be destroyed after data processing within a given period.

Publication

The results of this study may be published in any form for public and scholarly consumption or used in classrooms instruction to enrich learning and generate more knowledge for future research.

Participation

Your participation in this study must be voluntary and you have the right to withdraw if you feel uncomfortable in the process of gathering information from you.

Informed Consent

Given the information above, I confirm that the potential harms, benefits, and alternatives have been explained to me. I have read and understood this consent form, and I understand that I am free to withdraw from my involvement in the study any time I deem it to be necessary or to seek clarifications for any unclear steps in the research process. My signature indicates my willingness to participate in the study.

Printed Name and Signature of the Research Respondent

Date

APPENDIX E Approved Letters of Consent



MISAMIS UNIVERSITY
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College of Nursing, Midwifery and Radiologic Technology
Tel No. +63 88 521-0367 / Telefax No. +63 88 521-2917
E-mail Address: mu@mu.edu.ph



April 5, 2024

DR. JESUS G. OCAPAN JR.

Dean, College of Nursing, Midwifery and Radiologic Technology
Misamis University

Dear Dr. Ocapan:

Good day!

The undersigned are 3rd year students of Misamis University, Ozamiz City taking up Bachelor of Science in Radiologic Technology and are currently working on a research study titled "KNOWLEDGE, ATTITUDE AND UTILIZATION OF ARTIFICIAL INTELLIGENCE IN LABORATORY COURSES AMONG PARAMEDICAL STUDENTS." This study aims to determine the level of knowledge, attitude, and utilization of artificial intelligence in laboratory courses among paramedical students. With this, they would like to ask for an approval from your good office to allow them to conduct the study. It will be conducted in Misamis University from April to May 2024.

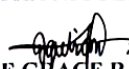
Rest assured that all information derived herein will be treated with utmost confidentiality.

Thank you very much and God bless.

Sincerely yours,


CHRISTINA PRIYA B. BACUS

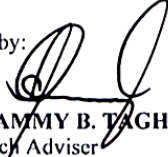

SAMANTHA NICOLE G. ANGOT


JASMINE GRACE R. ELIAU

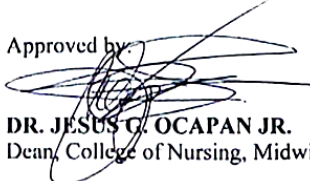

TED NICHOLAS B. JALALON


LEAH MAE B. METILLO
Researchers

Noted by:


DR. SAMMY B. TAGHO
Research Adviser

Approved by:


DR. JESUS G. OCAPAN JR.
Dean, College of Nursing, Midwifery and Radiologic Technology

APPENDIX E Cont'd



MISAMIS UNIVERSITY
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College of Nursing, Midwifery and Radiologic Technology
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April 15, 2024

DR. MARLO ENGELBERTO C. LASUTAZ

Dean, College of Dentistry
Misamis University

Dear Dr. Lasutaz:

Good day!

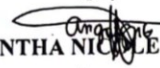
The undersigned are 3rd year students of Misamis University, Ozamiz City taking up Bachelor of Science in Radiologic Technology and are currently working on a research study titled "KNOWLEDGE, ATTITUDE AND UTILIZATION OF ARTIFICIAL INTELLIGENCE IN LABORATORY COURSES AMONG PARAMEDICAL STUDENTS." This study aims to determine the relationship between the level of knowledge, attitude, and utilization of artificial intelligence in laboratory courses among paramedical students. With this, the researchers would like to ask for an approval from your good office to allow them to conduct the study in your college department. From April to May 2024, a questionnaire will be given to the identified paramedical student-respondents to gather the desired data.

Rest assured that all information derived herein will be treated with utmost confidentiality.

Thank you very much and God bless.

Sincerely yours,


CHRISTINA PRIRA B. BACUS


SAMANTHA NICOLE G. ANGOT


JASMINE GRACE R. ELIAN


TED NICHOLE B. JALALON


LEAH MAE B. METILLO
Researchers

Noted by:


DR. SAMMY B. TAGHOY
Research Adviser

Approved by:


DR. MARLO ENGELBERTO C. LASUTAZ
Dean, College of Dentistry

APPENDIX E Cont'd



MISAMIS UNIVERSITY
Ozamiz City 7200, Philippines
College of Nursing, Midwifery and Radiologic Technology
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E-mail Address: mu@mu.edu.ph



April 15, 2024

MRS. EVANGELINE M. SEÑEDO
Dean, College of Medical Technology
Misamis University

Dear Mrs. Señedo:

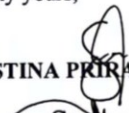
Good day!

The undersigned are 3rd year students of Misamis University, Ozamiz City taking up Bachelor of Science in Radiologic Technology and are currently working on a research study titled "KNOWLEDGE, ATTITUDE AND UTILIZATION OF ARTIFICIAL INTELLIGENCE IN LABORATORY COURSES AMONG PARAMEDICAL STUDENTS." This study aims to determine the relationship between the level of knowledge, attitude, and utilization of artificial intelligence in laboratory courses among paramedical students. With this, the researchers would like to ask for an approval from your good office to allow them to conduct the study in your college department. From April to May 2024, a questionnaire will be given to the identified paramedical student-respondents to gather the desired data.

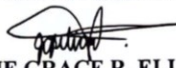
Rest assured that all information derived herein will be treated with utmost confidentiality.

Thank you very much and God bless.

Sincerely yours,


CHRISTINA PRIYA B. BACUS

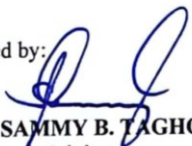

SAMANTHA NICOLE G. ANGOT


JASMINE GRACE R. ELIAN

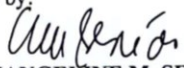

TED NICHOLE B. JALALON


LEAH MAE B. METILLO
Researchers

Noted by:


DR. SAMMY B. TAGHOY
Research Adviser

Approved by:


MRS. EVANGELINE M. SEÑEDO
Dean, College of Medical Technology

APPENDIX F Statistical Computations

Descriptive Statistics

	N	Mean	Std. Deviation
Knowledge	282	2.7663	.70416
Attitude	282	2.7918	.66078
Utilization	282	2.7745	.69245
Valid N (listwise)	282		

Correlations

		Knowledg e	Attitude	Utilizatio n
Knowledge	Pearson Correlation	1	.694**	.657**
	Sig. (2-tailed)		.000	.000
	N	282	282	282
Attitude	Pearson Correlation	.694**	1	.669**
	Sig. (2-tailed)	.000		.000
	N	282	282	282
Utilization	Pearson Correlation	.657**	.669**	1
	Sig. (2-tailed)	.000	.000	
	N	282	282	282

** . Correlation is significant at the 0.01 level (2-tailed).

APPENDIX F Cont'd

Knowledge Descriptive Statistics

	N	Mean	Std. Deviation
1. AI provides recommendations for quality improvement in practices/hospitals.	282	3.1560	.82904
2. AI provide documentation (e.g., updated medical records) about patients.	282	3.0780	.89340
3. AI formulates personalized medication prescriptions for patients.	282	2.5887	.94753
4. AI evaluates when to refer patients to other health professionals.	282	2.6667	.88617
5. AI provides empathetic care to patients.	282	2.3440	.94254
6. AI analyzes patient information to reach diagnoses.	282	2.7589	.92341
7. AI formulates personalized treatment plans for patients.	282	2.6418	.92960
8. AI conducts population health surveillance and outbreak prevention.	282	2.8440	.85441
9. AI analyzes patient information to establish prognoses.	282	2.7979	.87974
10. AI reads and interprets diagnostic imaging.	282	2.7872	.94178
Valid N (listwise)	282		

APPENDIX F Cont'd

Attitude Descriptive Statistics

	N	Mean	Std. Deviation
1. AI will revolutionize healthcare practice.	282	2.8865	.87343
2. AI will improve medicine in general.	282	2.9433	.85015
3. Human healthcare workers will not be reduced by AI in the foreseeable future.	282	2.7021	.95257
4. AI technology developments do not frighten me.	282	2.7482	.94157
5. New AI developments make medicine, in general, more exciting.	282	2.7482	.89507
6. My education is adequately preparing me for working alongside AI tools.	282	2.7872	.89529
7. Healthcare training should include training on AI competencies.	282	2.8617	.90394
8. AI technology does not threaten my future career.	282	2.7092	.95104
9. AI can help optimize the education of students.	282	3.0000	.85204
10. The Philippine healthcare system is currently well prepared to deal with challenges having to do with AI.	282	2.5319	.97698
Valid N (listwise)	282		

APPENDIX F Cont'd

Utilization Descriptive Statistics

	N	Mean	Std. Deviation
1. I use AI in my laboratory courses to enable me to accomplish tasks more quickly.	282	2.9220	.85264
2. I use AI to improve the quality of the laboratory tasks I do.	282	2.8014	.87853
3. I use AI because it can decrease the time needed for my laboratory-related responsibilities.	282	2.8865	.86524
4. Working with AI is not complicated, it is easy to understand what is going on.	282	2.9539	.78328
5. It is easy to get AI to do what I want it to do.	282	2.9929	.83087
6. In general, the university has supported the use of AI so I use it.	282	2.5816	.95564
7. My supervisor is very supportive of the use of AI for my laboratory tasks.	282	2.5390	.92815
8. AI is compatible with all aspects of my laboratory course.	282	2.6596	.89546
9. A specific person (or group) is available for assistance when I experience AI difficulties.	282	2.6667	.90602
10. I have the resources necessary to use AI.	282	2.7411	.86469
Valid N (listwise)	282		

Knowledge about Artificial Intelligence Questionnaire

Reliability Statistics

Cronbach's Alpha	N of Items
.916	10

APPENDIX F Cont'd

Item-Total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
1	25.4667	46.671	.328	.923
2	25.5000	43.707	.477	.918
3	26.1667	37.661	.798	.901
4	26.2000	40.717	.708	.907
5	26.6667	40.851	.612	.912
6	26.0000	38.966	.773	.902
7	26.1000	37.472	.868	.896
8	26.1000	37.610	.792	.901
9	26.1333	38.464	.875	.897
10	26.3667	40.171	.605	.913

Attitude towards Artificial Intelligence Questionnaire

Reliability Statistics

Cronbach's Alpha	N of Items
.791	10

APPENDIX F Cont'd

Item-Total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
1	26.1333	19.913	.592	.756
2	26.0333	22.102	.385	.782
3	25.9667	21.482	.307	.798
4	26.4333	21.013	.527	.766
5	26.2000	19.959	.636	.751
6	25.7667	22.392	.325	.789
7	25.8000	21.890	.435	.776
8	26.3333	21.471	.383	.784
9	25.6000	21.834	.608	.764
10	26.1333	20.533	.539	.764

Utilization of Artificial Intelligence in Laboratory Courses Questionnaire

Reliability Statistics

Cronbach's Alpha	N of Items
.905	10

APPENDIX F Cont'd

Item-Total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
1	26.0667	34.340	.491	.907
2	26.1333	32.533	.762	.890
3	25.9333	33.444	.741	.892
4	26.0000	35.586	.457	.907
5	25.8667	36.120	.469	.906
6	26.5333	30.809	.758	.889
7	26.8667	31.982	.649	.897
8	26.5000	31.293	.823	.885
9	26.3667	31.895	.681	.895
10	26.2333	31.151	.814	.886

APPENDIX G Documentations



APPENDIX H Grammarly Report, and Turnitin Results

**Similarity Report ID:** oid:28447:66549597

PAPER NAME
BACUS, CHRISTINA PRIRA B_docx

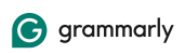
WORD COUNT 7475 Words	CHARACTER COUNT 43305 Characters
PAGE COUNT 35 Pages	FILE SIZE 51.0KB
SUBMISSION DATE Sep 10, 2024 9:31 AM GMT+8	REPORT DATE Sep 10, 2024 9:32 AM GMT+8

● **30% Overall Similarity**

The combined total of all matches, including overlapping sources, for each database.

- 16% Internet database
- 12% Publications database
- Crossref database
- Crossref Posted Content database
- 26% Submitted Works database

APPENDIX H Cont'd



Report: Knowledge, Attitude and Utilization of Artificial Intelligence in Laboratory Courses Among Paramedi...

Knowledge, Attitude and Utilization of Artificial Intelligence in Laboratory Courses Among Paramedical Students (1)

by Misamis University

General metrics

50,612	7,390	416	29 min 33 sec	56 min 50 sec
characters	words	sentences	reading time	speaking time

Score

99

This text scores better than 99% of all texts checked by Grammarly

Writing Issues

18	11	7
Issues left	Critical	Advanced

CURRICULUM VITAE

PERSONAL DATA

Name : Angot, Samantha Nicole G.
Date of Birth : August 20, 2002
Place of Birth : Pasig City, Manila
Home Address : Southwestern Poblacion, Calamba,
Misamis Occidental
Gender : Female
Civil Status : Single
Contact No : 09305237301
Email : samanthanicoleangot@gmail.com



EDUCATIONAL BACKGROUND

Elementary : Calamba Central School
Northern Poblacion, Calamba, Misamis Occidental,
Philippines
Secondary : Calamba National Comprehensive High School
D'BAN, Calamba, Misamis Occidental, Philippines
Senior High School : Misamis Occidental National High School
Science, Technology, Engineering, and Mathematics
Poblacion 1, Oroquieta City, Misamis Occidental,
Philippines
College : Misamis University
H.T. Feliciano St., Aguada, Ozamiz City, Philippines

CURRICULUM VITAE

PERSONAL DATA

Name : Bacus, Christina Prira B.
Date of Birth : June 20, 2003
Place of Birth : Maningcol, Ozamiz City
Home Address : RS Tan Village, Maningcol,
Ozamiz City, Misamis Occidental
Gender : Female
Civil Status : Single
Contact No : 09305851098
Email : christinaprirabacus@gmail.com



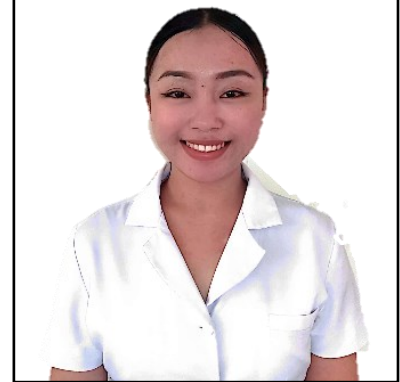
EDUCATIONAL BACKGROUND

Elementary : Maningcol Central School
Maningcol, Ozamiz City, Philippines
Secondary : Ozamiz City School of Arts and Trades
Maningcol, Ozamiz City, Philippines
Senior High School : La Salle University – Integrated School
Humanities and Social Sciences
La Salle St., Aguada, Ozamiz City, Philippines
College : Misamis University
H.T. Feliciano St., Aguada, Ozamiz City, Philippines

CURRICULUM VITAE

PERSONAL DATA

Name : Elian, Jasmine Grace R.
Date of Birth : September 2, 2002
Place of Birth : Tubod, Lanao del Norte
Home Address : Salvador, Lanao del Norte
Gender : Female
Civil Status : Single
Contact No : 09150013480
Email : ejasminegrace67@gmail.com



EDUCATIONAL BACKGROUND

Elementary : Salvador Central Elementary School
Salvador, Lanao del Norte, Philippines
Secondary : Salvador National High School
Salvador, Lanao del Norte, Philippines
Senior High School : Salvador National High School
Science, Technology, Engineering, and Mathematics
Salvador, Lanao del Norte, Philippines
College : Misamis University
H.T. Feliciano St., Aguada, Ozamiz City, Philippines

CURRICULUM VITAE

PERSONAL DATA

Name : Jalalon, Ted Nichole B.
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EDUCATIONAL BACKGROUND

Elementary : Labo Central School
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