# A Quantitative Study on the Perceived Learning Effectiveness between the Online and Traditional Internship of Medical Technology Students

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**Abstract:** While internship is essential in developing skills and a valuable learning experience, the COVID-19 pandemic has affected the education system including the shift from traditional to online internship. This study aims to find out if there was a significant difference in the perceived learning effectiveness between traditional and online internships for Medical Technology students. The respondents of the study were Medical Technology interns from a university in Manila. The interns from the Academic Year 2019-2020 represented the traditional internship batch. On the other hand, the interns from the Academic Year 2020-2021 represented the online internship batch. In addition, to measure the perceived learning effectiveness of the two methods in terms of participation, motivation and goal achievement, skill acquisition, knowledge retention, critical decision making and problem-solving, and interpersonal communication, and team cooperation, survey questionnaires through Google Forms were distributed to a total of 206 respondents in which AY 2019-2020 is the internship year of 41.3% (n=85), and AY 2020-2021 is the internship year of 58.7% (n=121). The quantitative analysis using Mann-Whitney U-test showed a significant difference in the aspect of the following: a) participation of students ($z = -10.6$, $p < 0.001$), b) motivation and goal achievement ($z = -11.1$ $p < 0.001$), c) skill acquisition ($z = -11.3$ $p < 0.001$), d) knowledge retention ($z = -10.8$, $p < 0.001$), e) critical decision making and problem-solving($z = -10.8$, $p < 0.001$), and interpersonal communication ($z = -10.7$, $p < 0.001$). The findings of this study suggest that the perceived learning effectiveness of traditional internship is significantly higher than online internship.

**Key Words: —** ***Online Internship, Traditional Internship, Perceived Learning Effectiveness, Participation of Students, Motivation and Goal Management, Skill Acquisition, Knowledge Retention, Interpersonal Communication and Team Cooperation, Critical Decision Making and Problem Solving.***

## I. INTRODUCTION

The internship is a period during the fourth or the fifth year in the students' education wherein they earn work experience given by both the educator and the employer. This is the first-hand experience of students wherein the technical skills learned inside the four walls of the classroom is applied in the workplace. Several factors are considered necessary in practical skills such as students' participation, motivation and goal achievement, skill acquisition, knowledge retention, critical decision-making and problem-solving, and interpersonal communication and team cooperation. Clinical internship is vital in education in the medical field which makes the full acquisition of patient interaction and communication skills by the students [1]. Hence, internship plays a vital role in Medical Technology. Schools and universities around the world have been closed due to the COVID-19 pandemic. This had a significant impact on the educational system, from restrictive traditional learning to flexible, accessible, and innovative online learning, electronic learning technologies have changed learning [2]. Internship, as part of the education and learning process, was affected by the COVID-19 pandemic and has shifted to online platforms.

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A traditional internship is characterized by lectures, learning activities, and preceptorship conducted in a didactic manner and a face-to-face setting [3][4]. According to Aurilio et al. [5], the conventional clinical internship plays a vital role in healthcare as it gives students first-hand experience of what they will be expecting in their respective fields. On the other hand, Quinto [6] identified that clinical internships for allied health programs are important for medical students to improve clinical skills and critical thinking capabilities. Online internship, like a traditional internship, is designed to provide opportunities for learners to associate and apply theoretical knowledge into practice. Virtual internships can be characterized by the involvement of student interns in performing practices in the professional field through online simulations [7]. It is further elaborated by Oner [8] that a virtual internship is where participants engage in collaborative work as professionals whilst being in a computer-mediated environment.

### *1.1 Participation of Students*

For an internship program to be successful, one aspect to look at is the involvement of the interns on the program. The participation of the students on the program does not focus solely on the academic factors, but it also encompasses the non-academic factors. As stated by Luchaninov et al. [9], initiative development is necessary for senior students to be able to work successfully and cooperate with colleagues for their professional field. Traditional internship has provided opportunities for interns to experience real life cases and hands-on experience which could help them develop certain skills needed for future job employment. According to the studies of Prianto et al. [10] and Barnwell [11], involvement of interns has a great effect towards life skill and has contributed to the overall career development of the interns. Furthermore, these studies have shown that firsthand experience indeed has a great impact on the intern's future employment. On the other hand, according to six students interviewed by Saxon [12], the application of research studies and projects has become a highlight of their virtual internship experience.

As face-to-face internship is prohibited, virtual laboratories, journal summaries, and case presentations were used as an alternative. These online activities ensure the continuing education of the learners despite the lack of hand-on experience. Thus, according to ChanLin et al. [13], the online internship journal system has helped interns recall past experiences with the Learner Information System aiding in the sharing of knowledge and experience.

### *1.2 Motivation and Goal Achievement*

Motivation is a driving factor of an individual's behavior. Liu, Wang, and Ryan [14] defined motivation as a positive pressure that can influence, control, and maintain the behaviors that affect the achieving specific objectives, which denotes that it has a great impact on the outcomes of an activity performed with or without it. Despite the lack of studies as to the impact of motivation from strategies in higher education, which promotes learning in students with different coping mechanisms as Cheung [14] emphasizes, learning behaviors can be accounted for by the student's learning strategies in combination with motivation for development [15]. Motivation is also defined as the intellectual growth from clear goals and learning from effective strategies [16]. The goal achievement orientations are associated with developing and maintaining competence, demonstrating and acquiring skills, avoiding deterioration of proficiencies in learning, and having confidence in performing these attributes even in the presence of other people [17]. Moreover, according to Nolen and Haladyna [18], the goal achievement theory identifies students' achievement behaviors including consequences of emotional, motivational, cognitive, and behavioral characteristics as the primary reason behind differences between students' intellectual achievements and skill capacity. Bradshaw et al. [19] additionally states that shared experiences often influence group identity; and in relation to this, individuals in a group, particularly during the internship, support one another by providing support by means of physical and psychological when encountering either personal or professional challenges.

### *1.3 Skill Acquisition*

Singh [20] defines skill acquisition as the voluntary use of motor skills to accomplish a task. This is based on putting one's theoretical knowledge into practice. Professional degree programs, especially in the medical field, can also help students develop skills. This is an important part of the clinical laboratory. Students who participated in a 12-month internship program were satisfied with their outcomes, according to Silliman et al. [21]. The interns were able to learn and gain skills through on-site and online training. Besares-Dayaganon and Limjuco [22] state that clinical skills are essential in medical technology because they allow one to perform and interpret various technical tests. Medical technologists could also ensure quality control in the clinical laboratory. Bradshaw et al. [19] found that traditional face-to-face internships helped students develop their skills. Internship programs in the Philippines are similar to boot camps in that they allow students to experience

the workplace of their chosen field. Boot camps were used in the study to help students improve their cognitive and technical skills to match those of residents. Kassam et al. [23] believe that boot camps or internships are ideal for honing students' skills. However, interns' satisfaction with online internship programs was diverse. Skills are virtually simulated in this setup. Shaw et al. [24] found that virtual simulation helped PT interns improve their clinical skills. Students gained confidence in using these skills during patient interactions. The results of the study made by Rourke [25], which showed that the students' psychomotor skills improved using virtual simulation software, need to be validated by other researchers, since nursing programs require the collaboration of both theoretical learning and traditional clinical application.

### *1.4 Knowledge Retention*

Knowledge retention, in psychological definition, refers to the person's ability to recall and retain information based on the mental process of recognition. Internship is an effective assessment model which aims to provide students with cognitive and technical skills as well as an opportunity to learn and apply theoretical knowledge into practical application. Similarly, its main objective is to ensure that the student executes an accurate and detailed laboratory examination and makes decisions based on proper reasoning using evidence-based medicine [26]. Simulation training mitigates ethical tensions while helping the student resolve practical dilemmas. It improves the student's performance and aids in the retention of core clinical skills [27]. According to Zeglen and Rosendale [28], the new information will be lost if not processed immediately into the long-term memory. The flexibility of time provided by virtual internship allows the student to repeat lectures and discussions at their own convenience. In spite of the popularity and advantages brought by online internship, Muljana and Luo [29] insist that online learning receives low retention rates. This has been further supported by the article of Lindsey et al. [30] which states that the personalized learning in traditional face-to-face discussion results in significantly greater knowledge retention rate than does the one-size-fits-all approach used in asynchronous online class.

### *1.5 Interpersonal Communication and Team Cooperation*

Communication competency is a significant skill that healthcare practitioners should have and demonstrates professionalism in terms of behaviors, ethics, and attitude [31]. Undergraduate healthcare students are often given situations where they have to work with a team composed of diverse people as a part of a professional's accountability is their ability to work efficiently and in harmony with others through effective communication [32]. There is a need for the capacity to convey messages quickly and appropriately in different kinds of situations; and in these cases, those who have strong communication and cooperative skills are the ones that can oversee team progress. There are things that face-to-face interactions can provide that online interactions cannot, such as having more dynamic conversations and relationships aside from it being an ideal environment for comprehensive and efficient communication [33][34]. On the other hand, online internship provides options that offer students flexibility in time and space for reflection while having synchronous interactions that are used to catch up with face-to-face setting's interactions by providing the same environment where mutual presence is established.

### *1.6 Critical Decision Making and Problem Solving*

Critical thinking is related to being consistently involved in activities. Critical thinking abilities, such as actively reflecting and evaluating one's personal thinking, are important to establish, it is a central objective in higher education [35]. Many employers believe that new graduates are unprepared to enter the workforce and are unable to apply information and skills such as critical thinking to the real work setting [36]. Therefore, an internship is vital to enhance the intern's critical decision-making and problem-solving skills because it provides the ideal work setup for their future profession. Heidari and Ebrahimi [37] indicated in their study that there is a significant relationship between critical thinking and decision-making for the Emergency Medicine students. In addition, they mentioned the aspects influencing the decision-making skills of the medical emergency employees were relating to patient, environment, coworkers, interpersonal conflicts, effectiveness of the team supervisor, knowledge of other workers, and moral problems. To apply in the context of the Medical Technology profession, Besares-Dayaganon and Limjuco [22] enumerated the six core competencies of medical technologists that are gained through the Philippines' Medical Technology educational and learning system. Among these core competencies include problem solving and analytical decision-making. The researchers specified it as the capability of a medical technologist to use critical judgment when dealing with a wide range of operational and technical issues. The medical technician shall be engaged in resolution concerning quality control and assurance, instrument and procedure

selection, preventative maintenance, safety protocols and reagent procurement, test selection, testing methods and statistical data.

## II. METHODOLOGY

### *2.1 Research Design*

The researchers used a comparative research design to determine the difference in the perceived learning effectiveness between the traditional internship and the online internship programs of the BS Medical Technology students. The researchers collected data from the two student batches who experienced different types of internship programs at the same time. This design enabled the objective observation of the variables affecting their perception on the effectiveness of learning in an internship program and the comparison of the two internship settings. Following the comparative method, the data gathered were collected through the use of a standardized questionnaire and collated in the form of statistics. The researchers first analyzed the factors affecting learning and the perceived learning effectiveness of an internship mode and their quality, as well as the perceived effectiveness of the internship program in each respective platform. They then compared the results for the face-to-face internship and online internship to allow the generalized and unbiased description of the findings.

### *2.2 Subjects*

The purposive sampling method was the sampling technique used by the researchers to achieve a more scientific outcome that could be used to represent the entirety of the population. The researchers chose the Medical Technology interns from the universities in Manila, Philippines. The target population of the researchers were the interns from the Academic Year 2019-2020 and 2020-2021. The Academic Year 2019-2020 interns were the batch who underwent face-to-face internship. On the other hand, the Academic Year 2020-2021 interns were the batch who underwent an online internship. Two groups of BS Medical Technology students were the subjects to be considered in this study. Group A consists of students who underwent a face-to-face internship setting. Group B, on the other hand, are students who underwent an online internship setting. 85 respondents were taken from Group A and 121 respondents will be taken from group B. This study solely focused on Medical Technology internship. Other professional development internship programs will be excluded from this study. In addition, the students were regular enrolled students who experienced at least 6 months of clinical internship program. The researchers utilized the Cochran formula to calculate the sample size needed for the study. The researchers gathered the data through the use of online platforms. The study was conducted for a period of nine months.

### *2.3 Data Measure/Instrumentation*

An online survey consisting of questions adopted by the researchers from questionnaires based on the relevant literature was deployed through google forms to measure the medical technology students' perception on the effectiveness of the implementation of the internship program in their curriculum. The survey was constructed using a 4-point Likert scale in which a rating of "1" means poor, a rating of "2" means fair, while "3" is a rating for good, and lastly, a rating of "4" means excellent. Particularly, the survey evaluated the perceived learning effectiveness of the traditional and online internship in terms of six learning factors namely participation of students, motivation and goal achievement, clinical skill acquisition, knowledge retention, critical decision-making and problem solving, and interpersonal communication and team cooperation. The online survey questionnaires were accompanied with communication letters to acquaint the respondents on the content of the survey as well as the purpose of the study and the statement of confidentiality of the information to be provided by the participants, thus, the respondents were able to understand the significance of their participation in the study. In the same manner, informed consent was disseminated among the participants. The respondents can only proceed to answering the actual survey questionnaire after reading and agreeing to accept participation in the research. In line with this, respondents were provided with the option to reject participation after reading the informed consent.

### *2.4 Data Gathering Procedure*

This study was conducted by gathering the research data primarily through various online platforms. The primary sources were from an online survey through the use of Google Forms. The survey, following a Likert-scale questionnaire format, included closed-ended questions about internship and the factors influencing the perceived learning effectiveness of online and face-to-face learning. These factors included participation of students, motivation and goal achievement, clinical skill acquisition, critical decision-making and problem solving, knowledge retention, and interpersonal

communication and team cooperation. The consent and confidentiality forms were completed by all participants. The researchers had sole authority over the participants' data. The online surveys were disseminated to both the current medical technology interns who are taking their courses online and the past medical technology interns who underwent their internship in the physical laboratory, and this only took less than 15 minutes of their time. The participants were notified that there will be no incentives given at the end of this study. The data collection took about three months. The survey results were statistically analyzed to support the study's claims.

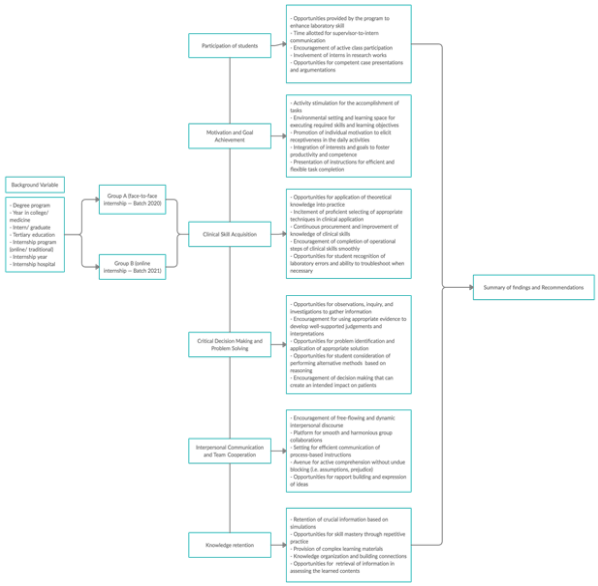


Fig.1. Conceptual Framework

### *2.5 Statistical Analysis*

The quantitative data collected were examined using the descriptive analysis and extensive statistical analysis to compare the factors that were provided. Descriptive included the computation for the following - frequency distribution, percentage distribution, median, and interquartile range. The median of the mean response was computed, and Table 1 would be used for the interpretation.

Table.1. Range and Verbal Interpretation of a Scale in the Utilized Likert-Scale

| Scale | Range | Verbal Interpretation |
|---|---|---|
| 1 | 1.00 to 1.75 | Poor |
| 2 | 1.76 to 2.50 | Fair |
| 3 | 2.51 to 3.25 | Good |
| 4 | 3.26 to 4.00 | Excellent |

Shapiro-Wilk Test was then performed in order to confirm if the data gathered are from a normal distribution. After such, the Mann-Whitney U test was utilized by the researchers to compare the differences between the perceived learning effectiveness of online and traditional face-to-face internship based on the data which is not normally distributed. Thus, this test was done using the SPSS program.

## III. RESULTS AND DISCUSSION

In order to determine the perception of the interns on the learning effectiveness of the internship program using different factors including students' participation, motivation and goal achievement, clinical skill acquisition, knowledge retention, critical decision-making and problem-solving, and interpersonal communication and team cooperation, the researchers disseminated survey questionnaires to individuals from AY 2019-2020 and AY 2020-2021 who have undergone traditional internship and online internship, respectively. The results of the survey will determine the perception of the interns on the internship program taken.

### *3.1 Demographic Profile*

Table.2. Frequency and Percentage Distribution of the Respondents in Terms of Sex

| Sex | Frequency | Percentage (%) |
|---|---|---|
| Female | 112 | 54.4 |
| Male | 79 | 38.3 |
| Prefer not to say | 15 | 7.3 |
| **Total** | **206** | **100** |

Found on Table 2 is the frequency and percentage distribution of the respondents in terms of sex. Table 2 depicts that most of the respondents are female. Out of 206 respondents, 54.4% are female, 38.3 are male, and 7.3% prefer not to say their sex.

Table.3. Frequency and Percentage Distribution of the Respondents in Terms of Internship Year

| Internship Year | Frequency | Percentage (%) |
|---|---|---|
| AY 2019-2020 | 85 | 41.3 |
| AY 2020-2021 | 121 | 58.7 |

| | | |
|---|---|---|
| **Total** | **206** | **100** |

***AY** Academic Year*

Found in Table 3 is the frequency and percentage distribution of the respondents in terms of internship year. Table 3 shows the internship year of most respondents is AY 2020-2021. Out of the total of 206 respondents, AY 2019-2020 internship year exhibits 41.3%, and AY 2020-2021 internship year exhibits 58.7%.

Table.4. Frequency and Percentage Distribution of the Respondents in Terms of Internship Program

| Internship Program | Frequency | Percentage (%) |
|---|---|---|
| Traditional (Face-to-Face) | 85 | 41.3 |
| Online | 121 | 58.7 |
| **Total** | **206** | **100** |

Found in Table 4 is the frequency and percentage distribution of the respondents in terms of internship program. Table 4 depicts that most of the respondents experienced an online internship program. Out of 206 respondents, 41.3% underwent a traditional internship program, and 58.7% underwent an online internship program.

### *3.2 Comparative Analysis of the Factors and Internship Methods*

*3.2.1 Preliminary Analysis:*

Table 5 displays the results of the Shapiro-Wilk Test for normality. The variables' distribution is significantly different from the normal distribution. Thus, the data are non-normal. The assumption of normality for independent samples t-test was not met. This suggests the use of a counter-part nonparametric test.

*3.2.2 Participation of Students*:

As shown on Table 6, the test rejects the null hypothesis since p-value is less than $\alpha = 0.05$ level of significance. Therefore, there is a statistically significant difference in the median perceived learning effectiveness on the aspect of participation of students between traditional internship and online internship ($z = -10.6$, $p < 0.001$). Half of Group A (Traditional Internship) has a mean response less than or equal to $Mdn = 3.80$ (Excellent) while half of Group B (Online Internship) has a mean response less than or equal to $Mdn = 2.60$ (Good). Furthermore, it was revealed that the distribution functions of the two groups are not equal. Moreover, it can be seen in Table 6 that the rank of Group A is higher than that of Group B. These indicate that the median perceived learning effectiveness on the aspect of participation of students from traditional internship is significantly higher than that of online internship.

The interns from the traditional internship program were involved in research works, given opportunities to enhance laboratory skills and were encouraged to have better communication and participation with fellow interns and their supervisors as compared to those interns from the online internship program. This abuts the stand of Barnwell [11] that the direct involvement of the interns contributes to the career development of an individual and enhances the learning experience especially for the interns from the traditional program.

*3.2.3 Motivation and Goal Achievement:*

As shown in Table 6, the test rejects the null hypothesis since p-value is less than $\alpha = 0.05$ level of significance. Therefore, there is a statistically significant difference in the median perceived learning effectiveness on the aspect of motivation and goal achievement between traditional internship and online internship ($z = -11.1$ $p < 0.001$). Half of Group A (Traditional Internship) has mean response less than or equal to $Mdn = 3.80$ (Excellent) while half of Group B (Online Internship) has mean response less than or equal to $Mdn = 2.40$ (Fair). Furthermore, it was revealed that the distribution functions of two groups are not equal. Moreover, Table 6 shows that the mean rank of Group A is higher than that of Group B. These indicate that the median perceived learning effectiveness on the aspect of motivation and goal achievement from traditional internship is significantly higher than that of online internship.

Traditional internship students were more methodical and flexible in completion of tasks. Additionally, interns were able to execute the required skills and integrate more interests and goals in terms of its environmental setting and learning space as compared to a virtual internship. This backs up Bradshaw et al. [19] who stated that despite the stress and peers experienced inside the workplace, the interns were able to mold themselves into their stronger versions.

*3.2.4 Clinical Skill Acquisition:*

As shown in Table 6, the test rejects the null hypothesis since p-value is less than $\alpha = 0.05$ level of significance. Therefore, there is a statistically significant difference in the median

perceived learning effectiveness on the aspect of clinical skill acquisition between traditional internship and online internship ($z = -11.3$ $p < 0.001$). Half of Group A (Traditional Internship) has a mean response less than or equal to M*dn* = 3.80 (Excellent) while half of Group B (Online Internship) has mean response less than or equal to M*dn* = 2.40 (Fair). Furthermore, it was revealed that the distribution functions of two groups are not equal. Moreover, Table 6 shows that the mean rank of Group A is higher than of Group B. These indicate that the median perceived learning effectiveness on the aspect of clinical skill acquisition from traditional internship is significantly higher than that of online internship.

Traditional internships were able to provide the interns various opportunities to be involved in laboratory works and be able to enhance their clinical skills as compared to that of the online internship. This supports the studies of Bradshaw et al. [19] and Kassam et al. [22], which mentioned that the competency of the interns on certain skills were honed with the help of the direct interaction and exposure to the workplace.

*3.2.5 Critical Decision Making and Problem Solving:*

As shown in Table 6, the test rejects the null hypothesis since p-value is less than $\alpha = 0.05$ level of significance. Therefore, there is a statistically significant difference in the median perceived learning effectiveness on the aspect of critical decision-making and problem solving between traditional internship and online internship ($z = -10.8$, $p < 0.001$). Half of Group A (Traditional Internship) has mean response less than or equal to M*dn* = 3.80 (Excellent) while half of Group B (Online Internship) has mean response less than or equal to M*dn* = 2.60 (Good). Furthermore, it was revealed that the distribution functions of two groups are not equal. Moreover, Table 6 shows that the mean rank of Group A is higher than that of Group B. These indicate that the median perceived learning effectiveness on the aspect of critical decision-making and problem solving from traditional internship is significantly higher than that of online internship.

Traditional internship students were more consistent in terms of reflecting and evaluating their own thinking as compared to online internship students. As stated by DeNoyelles [35], cultivating critical thinking skills is difficult for courses offered online. Furthermore, interns were able to use more appropriate clinical evidence in supporting judgment and interpretations in clinical scenarios as compared to a virtual internship.

*3.2.6 Interpersonal Communication and Team Cooperation:*

As shown in Table 6, the test rejects the null hypothesis since p-value is less than $\alpha = 0.05$ level of significance. Therefore, there is a statistically significant difference in the median perceived learning effectiveness on the aspect of interpersonal communication and team cooperation between traditional internship and online internship ($z = -10.7$, $p < 0.001$). Half of Group A (Traditional Internship) has mean response less than or equal to M*dn* = 3.80 (Excellent) while half of Group B (Online Internship) has mean response less than or equal to M*dn* = 2.60 (Good). Furthermore, it was revealed that the distribution functions of two groups are not equal. Moreover, Table 6 shows that the mean rank of Group A is higher than that of Group B. These indicate that the median perceived learning effectiveness on the aspect of interpersonal communication and team cooperation from traditional internship is significantly higher than that of online internship.

As compared to the online internship, traditional internship was able to provide a platform to the interns for better communication, comprehension, interpersonal discourse, and collaborations. This corroborates the study of Abdel Meguid and Collins [33] which states that the communication between the instructor and the student aids in the development of a conducive learning environment which is beneficial to the students in acquiring more knowledge on certain skills.

*3.2.7 Knowledge Retention:*

As shown on Table 6, the test rejects the null hypothesis since p-value is less than $\alpha = 0.05$ level of significance. Therefore, there is a statistically significant difference in the median perceived learning effectiveness on the aspect of knowledge retention between traditional internship and online internship ($z = -10.8$, $p < 0.001$). Half of Group A (Traditional Internship) has mean response less than or equal to M*dn* = 3.80 (Excellent) while half of Group B (Online Internship) has mean response less than or equal to M*dn* = 2.40 (Fair). Furthermore, it was revealed that the distribution functions of two groups are not equal. Moreover, Table 6 shows that the mean rank of Group A is higher than that of Group B. These indicate that the median perceived learning effectiveness on the aspect of knowledge retention from traditional internship is significantly higher than that of online internship.

Traditional internship students were more able to recall, retain, and apply information as compared to online internship students. Moreover, interns were more able to retrieve

information and develop mastery skills through repetitive practice. This claim then supports the article of Lindsey et al. [30], which states that the one-size-fits-all instructional strategy utilized in online discussions held asynchronously leads to much less knowledge retention than personalized instructions held in face-to-face discussions.

### *3.3 Overall Perceived Effectiveness of Internship Program in Terms of Learning*

With the results of each factor, for the overall perceived effectiveness of the internship program in terms of learning, the null hypothesis is rejected; therefore, there is a statistically significant difference in the median perceived learning effectiveness. Additionally, the mean rank of Group A (traditional internship) is higher than Group B (online internship) which indicates that the median perceived learning effectiveness of traditional internship is significantly higher than of online internship.

Traditional internship conducted in a face-to-face hospital setting was more advantageous as compared to online internship. This finding is in line with the claim of an article of Aurilio et al. [5] which states that traditional internship plays a vital role in healthcare because it gives the students first-hand experience of what they will be expecting in their respective fields. Medical technology interns from the traditional internship program were more involved as they got to experience real-life cases and scenarios. Through these real-life experiences, the ability of the interns to reflect and evaluate one's own thinking is developed which was unfortunately lacking in online internships. Moreover, through these real-life cases, medical technology interns were able to apply theoretical knowledge into the clinical practice which then leads to mastery and acquisition of skills. This supports the article of Bradshaw et al. [19] which states that interns tend to be more confident as they get to experience different kinds of scenarios. Furthermore, Quinto [6] mentioned that traditional internships helped interns boost their motivational levels notably and favorably. The interns were able to confidently deliver the appropriate healthcare to their patients. In addition, interns were able to communicate effectively to patients as well as exchange thoughts and ideas with their colleagues. This idea can back up the claim of an article by Bengsten and Jensen [34] which states that there are things which face-to-face interactions can provide that online interactions cannot such as having more dynamic conversations and relationships, relating on a closer level to the other person, or being able to judge well other cues of interaction such as gestures and facial expressions.

On the other hand, the online internship is seen to be at disadvantage on these factors as reflected on a low median of the mean response. This may be due to the disconnection to reality which supports the study of Nguyen [38]. Lesser participation of students results in the lack of interaction, which shuts them down from reality. Furthermore, this disconnection may affect the clinical skills, including the skill acquisition and knowledge retention. Social skills, including critical decision-making and problem solving, and interpersonal communication, and team cooperation may also be affected due to the constant device and internet problems. This corroborates the study of Raina [39] wherein technical difficulties may delay the respective tasks being done by the intern. Lastly, motivation and goal achievement of the interns may be affected as distractions occur during the shift. As stated in the study by Winter et al. [40], the shift of the learner's attention has made an impact on their academic work.

Table.5. Shapiro-Wilk Test: Normality of the Variable

| Variable | SW Statistic | df | p-value | Decision | Remarks |
|---|---|---|---|---|---|
| Participation of Students | 0.952 | 206 | <0.001 | Reject Ho | Non-Normal |
| Motivation and Goal Achievement | 0.936 | 206 | <0.001 | Reject Ho | Non-Normal |
| Clinical Skill Acquisition | 0.922 | 206 | <0.001 | Reject Ho | Non-Normal |
| Critical Decision Making and Problem Solving | 0.937 | 206 | <0.001 | Reject Ho | Non-Normal |
| Interpersonal Communication and Team Cooperation | 0.924 | 206 | <0.001 | Reject Ho | Non-Normal |
| Knowledge Retention | 0.929 | 206 | <0.001 | Reject Ho | Non-Normal |
| Overall Perceived Effectiveness of Internship Program in Terms of Learning | 0.939 | 206 | <0.001 | Reject Ho | Non-Normal |

Table.6. Comparative Analysis of Mann-Whitney U-test and Perceived Learning Effectiveness on the Different Aspects between Traditional (Face-to-Face) Internship and Online Internship

| Dependent Variable | Internship Program | z-value | p-value | Decision | Remarks | Median of the Mean Response | Mean Rank |
|---|---|---|---|---|---|---|---|
| Participation of Students | Traditional (Face-to-Face) | -10.6 | <0.001 | Reject Ho | Significant | 3.80 | 155.7 |
| | Online | | | | | 2.60 | 66.8 |
| Motivation and Goal Achievement | Traditional (Face-to-Face) | -11.1 | <0.001 | Reject Ho | Significant | 3.80 | 158.1 |
| | Online | | | | | 2.40 | 65.2 |
| Clinical Skill Acquisition | Traditional (Face-to-Face) | -11.3 | <0.001 | Reject Ho | Significant | 3.80 | 159.1 |
| | Online | | | | | 2.40 | 64.4 |
| Critical Decision Making and Problem Solving | Traditional (Face-to-Face) | -10.8 | <0.001 | Reject Ho | Significant | 3.80 | 156.8 |
| | Online | | | | | 2.60 | 66.1 |
| Interpersonal Communication and Team Cooperation | Traditional (Face-to-Face) | -10.7 | <0.001 | Reject Ho | Significant | 3.80 | 156.2 |
| | Online | | | | | 2.60 | 66.5 |
| Knowledge Retention | Traditional (Face-to-Face) | -10.8 | <0.001 | Reject Ho | Significant | 3.80 | 156.9 |
| | Online | | | | | 2.40 | 66.0 |
| Overall Perceived Effectiveness of Internship Program in Terms of Learning | Traditional (Face-to-Face) | -11.2 | <0.001 | Reject Ho | Significant | 3.78 | 159.2 |
| | Online | | | | | 2.54 | 64.4 |

## IV. CONCLUSION

The focus of the researchers was to determine if there was a significant difference in the perceived learning effectiveness between traditional and online internships for Medical Technology students. The results of this study showed that the perceived learning effectiveness of traditional internships is significantly higher on all factors than online internships for Medical Technology students. The factors include participation of students, motivation and goal achievement, clinical skill acquisition, critical decision-making and problem solving, interpersonal communication and team cooperation, and knowledge retention. The null hypothesis of the study which indicates that there is no significant difference in the perceived learning effectiveness of traditional internship and online internship in terms of learning was rejected. Overall, findings suggested that the traditional internship programs yield a better perception on the effectiveness of the learning of the interns as compared to the online internship. Exposure to the actual laboratory setting showed the expectations and reality of the practice. As a result, interns' professional approaches are more encouraged to develop in traditional internships than online internships.

*Ethical Considerations:*

This research study has been approved by the University of Santo Tomas Faculty of Pharmacy Ethics Review Committee with a study protocol code FOP-REC-2021-02-192.

*Conflict Of Interest:*

The researchers declare no conflicts of interest in preparing the research. Thus, no external funding from any public, commercial, or non-profit sectors was received.

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