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Predicting Medical Laboratory Science Licensure Examination Success: The Role of Academic Performance, Preparedness, and Personal Factors

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Abstract

The Medical Technology Licensure Examination (MTLE) is a high-stakes assessment that determines the readiness of students to practice as clinical laboratory professionals in the Philippines. Previous studies highlight academic performance as the primary predictor, with limited exploration of motivation, demographic, and socioeconomic factors. This correlational study examined the influence of academic performance, personal and demographic profiles, and institutional factors on MTLE success among first-time candidates from a private Philippine institution. Data were collected from 60 graduates of the 2024 batch using a validated questionnaire in a retrospective cohort design. Statistical treatments included descriptive statistics, Pearson correlation, and multiple regression analysis to identify significant predictors of licensure success. Results revealed that performance in professional subjects had the strongest correlation with licensure outcome ($r = .68$, $p < 0.05$), followed by mock board examination scores ($r = .55$, $p < 0.05$). Higher MTLE scores were also linked to motivation and effective time management. In contrast, demographics, socioeconomic status, pre-admission profile, and institutional factors showed no significant predictive value. Findings underscore the importance of curricula integrating practical skills, critical thinking, and test-taking strategies. This study provides valuable insights for educators, administrators, and researchers to enhance MTLE outcomes. Further research is recommended to explore how academic and non-academic factors interact in influencing licensure performance.

Keywords: *Medical Laboratory Science Licensure Examination, MTLE preparedness test, Personal Factors, MLS, MTLE performance*

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Introduction

In the Philippine healthcare system, the Medical Laboratory Science Licensure Examination (MLSLE) serves as a critical benchmark for assessing the competence of aspiring Medical Laboratory Scientists. Administered by the Professional Regulation Commission (PRC), the MLSLE ensures that graduates of the Bachelor of Science in Medical Laboratory Science (BSMLS) program possess the knowledge and skills needed to deliver accurate diagnostic services (Cabanban, 2017). Licensure examinations worldwide also serve as a measure of professional readiness and educational quality. The American Society for Clinical Pathology in the United States is an institution that offers a standard for laboratory professional practice (Hicks, 2021). Other countries, such as Canada and Australia, employ a similar examination aligned with local training and global standards (Hicks, 2021). The licensure examination measures institutional educational quality and national workforce readiness.

The examination primarily evaluates cognitive and practical competencies. It highlights that licensure success is shaped by factors extending beyond classroom instruction. Empirical studies have consistently underscored the predictive role of academic performance, particularly in professional subjects and clinical internships, in determining board examination outcomes (Ortega & Lopez, 2016). Recent studies continue to affirm that Examination Success comes from preparatory tools such as mock board exams. These stimulations provide diagnostic feedback that helps students identify subject-specific gaps (Mcnell, 2025). In the Philippines context, mock board examinations are a nationwide curriculum, especially to BSMLS, that have been shown to significantly influence performance, as they serve as preparatory tools that simulate the rigor and format of the actual licensure exam (Dayaganon & Limjuco, 2016).

Beyond academic preparation, non-academic factors also emphasize the importance of personal and psychological variables such as intrinsic motivation, time management, and goal setting as essential contributors to licensure success. Earlier studies in the Philippines have acknowledged the role of non-academic attributes in shaping board exam outcome (Ortega & Lopez, 2016; Dayaganon & Limjuco, 2016; Cabanban, 2017). More recent studies build on this showing how character traits, socio-emotional strength, faculty support help students in Licansure examination success (Madayag 2024; Labrague 2025). Briones (2021) noted that students with stronger internal motivation exhibited greater resilience and consistency in their study practices, which ultimately translated into higher licensure scores. Similarly, Villaflores (2023) identified non-cognitive factors, including emotional readiness and self-regulation, as critical to the academic success of education graduates taking national certification examinations. These findings suggest that a comprehensive approach to licensure preparation must integrate both academic instruction and personal development. While these factors are widely acknowledged in nursing and teaching licensure literature, few studies have explicitly examined their influence on Medical Laboratory Science Licensure Examination (MLSLE) outcomes in the Philippines. This gap underscores the rationale for including personal and demographic factors in the present study, as their contribution to MLSLE success remains underexplored.

Despite substantial efforts by educational institutions to align their curricula with licensure content, variations in student performance persist. The March 2024 results released by the PRC reported a national passing rate of 70.6% for the MLSLE, highlighting a gap between educational preparation and examination outcomes (Professional Regulation

Commission, 2024). In contrast, a private tertiary institution in Davao City reported a remarkable 92% passing rate among its first-time examinees, prompting an inquiry into the factors contributing to this higher-than-average performance. While impressive, the underlying drivers of this high success remain underexplored. Understanding these factors is essential to explain why some cohorts consistently outperform the national average.

This study was conducted to evaluate and identify the predictors of licensure success among Medical Laboratory Science graduates, with a specific focus on academic, personal, demographic, and institutional variables. Through this investigation, the researchers aim to provide data-driven insights that will support curriculum enhancement, student support services, and evidence-based review strategies. However, less attention has been given to the influence of non-academic factors—such as personal attributes and demographic characteristics—on MLSLE performance. The Study highlights the importance of both academic and non-academic predictors to provide a more comprehensive understanding of licensure outcomes. By addressing this overlooked dimension, the study contributes to a deeper evidence base that can inform institutional strategies and student preparation for future licensure examinations.

Methods

This study used retrospective cohort research methodology to assess the academic, personal, and institutional backgrounds of students who completed the 2024 Medical Laboratory Science Licensure Examination (MLSLE). This method was chosen because it allowed the researchers to study existing data on graduates' performance and characteristics within a specific cohort, resulting in a cost-effective and timely assessment of determinants of licensure success. To ensure data relevance and accuracy, the study was done between March and May 2024, shortly after the 2024 MLSLE results were released.

The population included 2024 graduates from a private tertiary institution in Davao City, all of whom were first-time board passers. A total of 60 respondents were included in convenience sampling, chosen for their accessibility and availability for participation. While convenience selection limits the applicability of findings to the larger MLS graduate community, this sample was deemed adequate for an exploratory study aimed at identifying factors of licensure achievement in this specific institutional situation. The response rate was 100 percent because all solicited participants agreed to participate. The sample size was deemed enough based on prior research analyzing licensure examination predictors (e.g., Cabanban, 2017; Dayaganon & Limjuco, 2016) and satisfied the regression analysis minimum criteria (at least 10 participants per predictor variable).

Data were collected using a structured questionnaire created by the researchers and validated by three academic experts. The questionnaire contained six domains:

1. Demographic Profile: Age, Gender, and Financial Status
2. Pre-admission Academic Profile: Senior High School GWA, School Type
3. Academic preparation: cumulative GPA for third-year professional subjects and internship grades.
4. MTLE Preparedness - Mock board scores in core licensure subjects.
5. Institutional factors including the availability and quality of academic support services, as well as teaching quality.
6. Personal Factors: Motivation and Time Management

Each response under institutional and personal characteristics were scored on a 5-point Likert scale (1 = Strongly Disagree, 5 =

Strongly Agree). The tool was pilot tested with 30 respondents and showed outstanding reliability (Cronbach's alpha: Institutional = 0.918, Personal = 0.870, Others > 0.80), above the threshold of 0.70 (Taber, 2018).

The statistical analysis used descriptive statistics, Pearson correlation, and binary logistic regression to find determinants of licensure success. Demographics, pre-admission profile, academic preparedness, mock board scores, institutional assistance, and personal variables all served as predictors. We reviewed assumptions and selected a significance level of $p < 0.05$. Data was processed with IBM SPSS version 26. The Institution's Ethics Review Committee received ethical approval (No. DDC REC BMIS 02-25 021). Informed consent, confidentiality, and voluntary participation were carefully upheld.

Result and Discussion

Table 1. Overall profile of the respondents in terms of Demographic Profile

	N	%	Valid Percent (%)	Cumulative Percent (%)
Age				
21-23	36	60%	60.0	60.0
24-26	24	40%	40.0	100.0
Total	60	100%	-	-
Gender				
Female	43	71.1%	71.7	71.7
Male	15	25%	25.0	96.7
Prefer Not To Say	2	3.3%	3.3	100.0
Total	60	100%	-	-
Financial Status				
100k-400k	12	20%	20.0	20.0
Above 500k	2	3.3%	3.3	23.0
Below 100k	16	26.7%	26.7	50.0
Prefer Not To Say	30	50%	50.0	100.0
Total	60	100%	-	-

The age distribution of responders suggests that the majority (60%) are between the ages of 21 and 23. This age group includes recent graduates who are increasingly involved in professional educational settings and licensing preparation activities. In contrast, 40% of responders are between the ages of 24 and 26, indicating that older candidates may have delayed graduation or had other responsibilities. Rather than assuming causation, this study emphasizes that a variety of circumstances, including life responsibilities and transitions, may influence preparation time and focus for older examinees, as highlighted by Espahbodi et al. (2023).

In terms of gender distribution, the data indicate that 71.1% of respondents are female, 25% are male, and 3.3% preferred not to disclose. This gender imbalance reflects a wider trend in the Philippines where health-related fields, including Medical Laboratory Science, are increasingly dominated by female students, consistent with Cabanban (2017). However, it's important to avoid generalizing success based on gender alone. While some international studies (e.g., Montolio & Taberner, 2021) suggest performance differences under pressure, context matters. In the Philippines, female representation in allied health fields is not only increasing but is also associated with strong academic performance, as supported by SDT's emphasis on intrinsic motivation and relatedness.

Regarding financial status, 50% of respondents preferred not to disclose their household income. This significant non-response rate indicates a sensitivity to economic disclosure, which could create bias and limit the understanding of economic influence. 26.7% of respondents reported annual incomes below ₱100,000, with only 3.3% reporting incomes above ₱500,000. The interpretability of the data is restricted by the high rate of non-disclosure, which may indicate a refusal to disclose financial status. This study's financial data is self-reported, and they may be indicative of perceived income levels, government support, or a general sense of economic class rather than precise annual family income. It is crucial to recognize this. This ambiguity introduces potential bias and necessitates the use of

triangulated data sources or enhanced survey design in future studies.

The significance of addressing data collection limitations to achieve a more comprehensive understanding of the relationship between demographic factors and MTLE success is underscored by this table, which also emphasizes the necessity of customized educational strategies and support systems that account for the unique needs of women and younger adults.

Table 2: Overall Profile of the Respondents in Pre-Admission Profile

Secondary Institution	Frequency	Percentage (%)	VP	CP
Private	39	65%	65.0	65.0
Public	21	35%	35.0	100.0
Total	60	100%	100.0	

***VP = Valid Percent; CP = Cumulative Percent.*

SHS Grade	M	SD	Min	Max
11	89.1667	2.94680	80.00	94.00
12	89.3167	2.79522	80.00	95.00

**M = mean; SD = standard deviation.

Table 2 shows the grades of the respondents in Grades 11 and 12 and the type of senior high school (SHS) they attended. 65% of the 60 respondents graduated from private institutions, while 35% from public schools. This contrasts with national data, which indicates that the majority of SHS pupils in the Philippines, approximately 90%, according to the Department of Education attend public schools. The potential for bias to be introduced by the disproportionate representation of private school students is a concern, as private schools may provide a different set of resources, curricula, or student support systems than public schools. This supports the Self-Determination Theory, which says students' success is driven more by their motivation and effort than by their school background. The Attribution Theory also reminds us that personal success is a result of how students respond to their learning environment, not just the environment itself. This could potentially affect academic preparation and subsequent proficiency. It is imperative to recognize this imbalance when interpreting the overall results. Cabanban (2017) prioritizes individual academic endeavor over institutional heritage as a predictor of licensure outcomes, which is consistent with this discovery.

In Grade 11, the average grade was 89.1667, and in Grade 12, it was 89.3167, which is a little higher. The fact that these grades are consistently high shows that the people who answered had good grades even before they went to college. The small difference between the two averages shows that in their last year of high school, they either kept up their success or got a little better. This could mean that they were able to handle higher academic standards at SHS and may have even developed better study habits. However, the absolute numbers are hard to grasp because we don't know much about the grading scale or the classes that are used to calculate SHS grades.

The findings have multiple implications, but their generalizability is limited due to the overrepresentation of private school students. While private school students have a strong academic foundation, there may be a positive trend in senior high school academic success. To predict success in the Medical Laboratory Science program, additional analysis like regression or correlation analysis is needed to understand the relationship between SHS grades, school classification, and other variables. A larger, more representative sample would enhance generalizability and provide stronger statistical inferences. Future research should focus on larger, diverse samples and in-depth analyses.

Table 3. ***Overall Profile of the respondents in terms of Academic Preparation Factor***

Indicator	N	M	SD
Internship Grade	60	83.325	1.881
Second Year Grade	60	87.576	5.135
Third Year Grade	60	79.864	2.890

*** M = mean: SD = standard deviation.*

The study presents the overall profile of 60 respondents in terms of Academic Preparation Factor, focusing on internship grades, second year, third year, and overall grades. The results show a moderate cumulative grade of 83.325, emphasizing the importance of internships in preparing students for licensure-level competency. Supervised internships offer opportunities for skill enhancement and critical thinking development, bridging theory and practice, and serving as reliable sources for real-world competences in skills-based programs.

Second-year grades with professional subjects show a mean score of 87.578 with a standard deviation of 5.135. Second-year students have the highest variability, with scores being more spread out from the average. Early professional subjects often emphasize theory over practice, making it difficult for students to bridge academic content with real-world application. This transition phase requires rapid cognitive adjustment, widening performance gaps. Higher-level coursework contributes more directly to licensure preparedness, while introductory level professional subjects focus on lectures.

The third-year grades show a moderate cumulative grade, with a mean score of 79.864 and a standard deviation of 2.890. This year includes professional subjects like Hematology, Clinical Chemistry, Blood Bank, AUBF, Immunology-Serology, and Microbiology. Students engage in competency-based learning, mirroring internship expectations. Academic achievement during this year is crucial for preparing for the Licensure Examination. Third-year grades tend to get lower due to increased complexity and practical orientation. The curriculum shifts from foundational concepts to more complex subjects and laboratory practice in second year students, leading to lower grades. The third-year curriculum is crucial for internship readiness and should be reinforced through assessment mechanisms. Second-year subjects often focus on theory over practice, while third-year subjects cover all professional subjects with laboratory experiences, providing better preparation for real-world roles. Second-year subjects should include practical laboratory experience.

Table 4. Overall Profile of the respondents in terms of MTLE Preparedness Test

Indicators	N	M	SD
Clinical Chemistry	60	73.916	6.219
Microbiology	60	73.333	5.287
Clinical Microscopy	60	75.900	7.884
Hematology	60	70.666	5.097
ImmunoSerology and Immunohematology	60	73.250	6.110
Histopathologic Tech. and Medtech Laws	60	73.400	5.778
Mock Boards	60	72.983	5.515

Note. M = mean; SD = standard deviation.

This table shows how responders performed on the MTLE Preparedness Test in various core subjects in Medical Laboratory Science providing insight into their academic preparedness prior to the licensure examination. This subject was analyzed based on Professional subjects which are Clinical Chemistry, Microbiology, Clinical Microscopy, Hematology, Immunology-Serology, and Immunohematology with Histopathologic techniques Medtech Law. Clinical Microscopy had the highest mean score (M = 75.90) among the tested areas, indicating a strong understanding most likely reinforced by extensive laboratory exposure and practical. Clinical Chemistry (M = 73.92) and Histopathologic Techniques with MedTech Laws (M = 73.40) also demonstrated relatively strong results, indicating that students had a solid grasp of both theoretical and applied content. This reflects that the result shows a uniform and well-established understanding of the subject matter. According to Dararon and Limjuco (2016) these are professional subjects that emphasize the lecture and laboratory subjects

which require repeated exposure and feedback retention, which indicate their performance on the subject, which means that's a strong and consistent performance, due to repeated laboratory exposure that reinforces learning practices. The result also aligns with Blooms that stated professional subjects tend to foster deeper understanding that reflect structural strategies. Which implies that professional subjects should prioritize laboratory practices where students learn more and build strategies. Such structured learning strategies enable students to synthesize knowledge from theory and practice, an educational goal described in Bloom's taxonomy as moving towards complex cognitive operations. Among other professional subjects, Hematology had the lowest average score (M = 70.67, Sd = 4.75), which could reflect the subject's underlying difficulty or a gap in instructional methodologies, indicating a need for increased teaching emphasis. According to Oermann and Gaberson (2016), help students identify gaps in professional subjects, which indicate that the hematology section has multi-faceted integration of clinical knowledge which shows students under this professional subject that it is challenging for them to impact their learning outcomes of the student. According to Bloom's taxonomy, this suggests that students may be effective in learning at the side at lower-order cognitive tasks in this subject, however in some parts they need enhanced support to develop skills at higher, more integrative cognitive levels.

The implication of this professional subject, which is hematology, is by investigating the possible reason why students in a specific subject show a lower average score among other professional subjects by identifying the possible cause it can help to change implication that help program and students. Standard deviations ranged from 5.1 to 7.9, indicating moderate variation in performance and implying that individual characteristics such as study habits, test anxiety, or prior academic foundation may influence students in preparing. These findings are consistent with the work of Cabanban (2017) and Dayaganon and Limjuco (2016), who found that subject-specific academic achievement strongly helps students in preparedness. Furthermore, Robertson et al. (2022) and Oermann and Gaberson (2016) emphasize the importance of continuing academic consistency and mock board simulations in enhancing test readiness.

Academic performance across subjects should support and sustain cognitive engagement and repeated practices to support student learning. The relatively low performance in Hematology indicates the need for focused academic interventions, including extra review sessions, more thorough learning materials, and case-based discussions, to assist students in better understanding challenging concepts. Meanwhile, high-performing subjects such as Clinical Microscopy can serve as models for effective instructional approaches, with the utilization of hands-on activities, peer collaboration, and visual tools potentially contributing to improved learning results. Programs can implicate an educational partnership to mock board studies to further support students in times of preparation. This educational partnership fosters collaboration with the clinical educator or students can engage in sharing learning experience that can emphasize practical application of knowledge, reflection, and feedback, which assist students improve memory recall, develop test-taking techniques, and gain confidence under exam settings.

Table 5. Overall Profile of the respondents in terms of Institutional Factors

Item Statement	N	M	SD	Remarks
Support Services				
The availability of tutoring services significantly aided my exam preparation	60	3.7167	0.9037	Agree
Counseling or mentoring services were helpful in managing stress and anxiety during my studies.	60	3.7167	0.8653	Agree
Career services provided valuable guidance for my future career path	60	3.8000	0.8982	Agree
Access to study groups or peer support enhanced my learning experience.	60	4.1167	0.8455	Agree
The overall support system provided by the institution positively impacted my exam preparation.	60	4.1833	0.6507	Agree
Quality of Teaching				
Instructors effectively communicated the course material	60	3.0667	1.0062	Neutral
Instructors provided clear expectations and assessment criteria	60	4.1500	0.6593	Agree
Instructors were available and responsive to student questions and concerns.	60	4.2167	0.5848	Strongly Agree
The teaching methods used were engaging and effective for my learning style.	60	4.2833	0.6131	Strongly Agree
The overall quality of teaching positively influenced my exam preparation and performance	60	4.0333	0.6629	Agree

M = mean; SD = standard deviation

Legend:

Scale	*Descriptive level*
1.00 - 1.80	*Strongly Disagree*
1.81 - 2.60	*Disagree*
2.61 - 3.40	*Neutral*
3.41 - 4.20	*Agree*
4.21 - 5.00	*Strongly Agree*

This table provides a comprehensive analysis of student perceptions of the quality of teaching and institutional support services, utilizing a Likert scale that ranges from 1 (strongly disagree) to 5 (strongly agree). The data is presented for each item within the two main categories, enabling a more detailed examination of student experiences. The mean score for all four items in the support services category exceeds the midpoint (3), suggesting that the perceptions are typically favorable. Nevertheless, the standard deviations indicate a degree of variability in responses, particularly for tutoring services (SD = 0.9037) and counseling services (SD = 0.8653), indicating a variety of experiences among the student population. The item "access to study groups" indicates a strong positive perception and less variability in responses, as it has the highest mean (4.1167) and relatively low standard deviation (0.8455). The support system's overall impact on exam preparation is generally positive, as evidenced by the positive mean (4.1833) and relatively low standard deviation (0.6507) of the overall support system item.

The results indicate a mixed picture with respect to the caliber of the teaching. Although the mean for items that pertain to clear expectations, instructor availability, and engaging teaching methods are above the midpoint and is rated as "Agree" or "Strongly Agree," the item that evaluates the effectiveness of course material communication receives a neutral rating (mean = 3.0667, SD = 1.0062). This implies that there is a prospective area for improvement in teachers' practices. The teaching item's overall quality is rated positively (mean = 4.0333, SD = 0.6629), suggesting that students generally have a positive perception of the quality of the teaching, even though some aspects require refinement. The necessity of a more sophisticated comprehension of the efficacy of teaching and prospective areas for improvement is underscored by the disparity in responses across items within the "Quality of Teaching" category. The data indicates that students generally have a positive impression of the teaching quality; however, the communication of course material requires improvement.

The results of Table 5 provide valuable insights into the outcomes of MTLE when viewed through the lens of Attribution and Self-Determination Theories by Ryan and Deci, 2017. Competence and self-efficacy are likely to be promoted by positive perceptions of teaching quality, which in turn enhances exam preparation and boosts intrinsic motivation. In contrast, the variability in students' perceptions of support services implies that they attribute success or failure differently based on their experiences.

Institutional factors may be partially attributed to success by students who have received positive support, whereas success may be solely attributed to individual endeavor by students who have received negative support. The absence of a robust direct correlation between these institutional factors and MTLE scores strongly implies that other factors are also significant. Nevertheless, the learning environment is bolstered by the generally positive perceptions in Table 5. The research underscores the significance of academic preparation and the quality of institutional support and teaching in MLS education, emphasizing a comprehensive approach. Additional research is required to investigate the relationship between these institutional factors. Student preparedness and MTLE success rates could be significantly improved by addressing communication issues in teaching and improving support services.

Furthermore, the results of this table have substantial implications for the enhancement of MLS education. The general positive perceptions of the quality of teaching are encouraging; however, the variability in support services underscores the need for immediate attention. The institution has the potential to perform more comprehensive analyses to pinpoint the specific aspects of support services that students perceive as lacking. Enhancements to these services have the potential to enhance student satisfaction, reduce tension, and improve academic performance. The findings underscore the significance of assessing the overall efficacy of an educational program by taking into account both the quality of the teaching and the support services provided.

Table 6. Overall profile of the respondents in terms of Personal Factors

Item Statement	N	M	SD	Remarks
Motivation				
I was extrinsically motivated to succeed in the licensure examination	60	4.5667	0.6207	Strongly Agree
I set clear and achievable goals for my licensure exam preparation. .	60	4.5333	0.5664	Strongly Agree
I was intrinsically motivated to succeed on the licensure examination.	60	4.5167	0.5672	Strongly Agree
I regularly reviewed my progress and adjusted my study plan as needed.	60	4.0167	1.0494	Agree
I maintained a positive and confident attitude throughout my exam preparation.	60	4.2000	0.8396	Agree
Time Management				
I effectively prioritize tasks related to my licensure exam preparation.	60	4.0000	1.0415	Agree
I used effective time management strategies (e.g., time blocking, Pomodoro technique).	60	3.9500	1.0484	Agree
I allocated sufficient time for each subject area in my licensure exam preparation.	60	4.1500	0.8986	Agree
I avoided procrastination during my licensure exam preparation.	60	3.4667	1.1269	Agree
I managed my time effectively, balancing study with other responsibilities.	60	3.8000	0.9880	Agree

**M = mean; SD = standard deviation.

Legend:

Scale	*Descriptive level*
1.00 - 1.80	*Strongly Disagree*
1.81 - 2.60	*Disagree*
2.61 - 3.40	*Neutral*
3.41 - 4.20	*Agree*
4.21 - 5.00	*Strongly Agree*

Table 6 provides descriptive statistics on the self-reported motivation and time management strategies of 60 respondents, with an emphasis on the personal factors that significantly influenced their preparation for the Medical Technology Licensure Examination (MTLE). The data is presented for each item within the "Time Management" and "Motivation" categories, enabling a detailed examination of individual experiences. The mean scores of all five items in the motivation category are significantly higher than the midpoint, suggesting a high level of self-reported motivation. The items associated with intrinsic and extrinsic motivation yield the highest mean scores and are rated as "Strongly Agree," indicating a robust internal drive to succeed and the prevalence of external factors that contribute to their

motivation. Nevertheless, the standard deviations indicate some degree of variability in responses, particularly for the item on routinely reviewing progress and adjusting study plans (SD = 1.0494). This indicates that, even though a substantial number of students reported effective study habits, a substantial proportion did not.

The time management section presents a more diverse perspective. Although the mean scores of four out of five items exceed the midpoint and are rated as "Agree," the item on avoiding procrastination has a lower mean (3.4667) and a relatively high standard deviation (1.1269), suggesting that there is substantial variability in students' capacity to avoid procrastination. This implies that procrastination may pose a substantial obstacle for certain students. The high mean scores for items related to prioritizing tasks, using effective time management strategies, and allocating sufficient time suggest that a significant number of students employed effective time management techniques. Overall, the data indicates that, even though most students reported high levels of motivation, effective time management strategies may require additional attention and assistance. The necessity for a more sophisticated comprehension of the correlation between personal factors, study routines, and MTLE performance is underscored by the variability of responses across items.

Significant insights into MTLE performance are provided by the data in Table 6 on motivation and time management, when viewed through the lens of Self-Determination Theory (SDT) and Attribution Theory. SDT's emphasis on intrinsic motivation, competence, and autonomy, all of which are essential for academic success, is strongly aligned with high self-reported motivation. The high mean scores indicate a robust internal motivation to achieve success, which improves exam preparation and performance. Nevertheless, the variability in time management skills, particularly the difficulty with procrastination, suggests the necessity of interventions, as effective time management is crucial for exam preparation. The way students ascribe their exam results is influenced by their self-perceptions of their motivation and time management skills. Success in both domains may be partially attributed to personal attributes when one maintains positive self-perceptions, while failure or success may be attributed to external factors when one maintains negative self-perceptions. The significance of both intrinsic motivation and effective time management skills for optimal MTLE performance is emphasized by the study's results. The results indicate that interventions that are designed to cultivate a positive mindset and enhance time management skills could have a substantial impact on the efficacy of MTLE. To develop a more comprehensive model of MTLE success, additional research should investigate the interaction between motivation, time management, and other factors.

The results of Table 6 have substantial implications for the enhancement of MLS education. The high average motivation is encouraging; however, the variability in time management skills indicates that targeted interventions are indicated. Educators could integrate time management strategies into the curriculum and provide seminars or individual support to students who are having trouble in this area. Students can enhance their study habits by engaging in self-reflection regarding their time management abilities and devising strategies to optimize their study habits. This data can be utilized by administrators to effectively allocate resources, thereby offering supplementary support services to students who require assistance with time management. The findings emphasize the significance of a comprehensive approach to student success, which underscores the significance of both personal attributes and academic preparation. Future research could

investigate the efficacy of interventions designed to enhance time management skills and their influence on MTLE performance. The results emphasize the necessity of explicitly confronting procrastination, as it appears to be a substantial impediment for numerous students.

Table 7. Frequency of respondent who pass the Medical Technology Licensure Examination

Indicators	Frequency	Percentage
First Take Pass Rate	60	92.00%
Overall Pass Rate	-	86.11%
National Passing Rate	-	80.26%

The pass rates for the Medical Technology Licensure Examination are presented in Table 7, which compares the performance of a specific subset of respondents to the national and overall averages. The table emphasizes three critical variables: "National Passing Rate," "Overall Pass Rate," and "First Take Pass Rate." An extraordinary 92% success rate was achieved by 60 out of an unspecified number of respondents who passed the exam on their first attempt, as indicated by the First Take Pass Rate indicator. This implies that the respondents in this cohort are exceedingly successful in passing the exam on their initial attempt. Conversely, the National Passing Rate and the Overall Pass Rate are presented as percentages exclusively, without the underlying frequency data. This suggests that a slightly lower success rate was attained by a larger pool of respondents, including those who may have taken the exam multiple times, as the overall pass rate stands at 86.11%. Lastly, the national passing rate is 80.26%, which is the average success rate for all individuals who take the Medical Technology Licensure Examination nationwide. A substantial positive difference in performance is indicated by the substantially higher success rate of the specific group of respondents in comparison to both the overall and national averages, as revealed by the comparison of these three rates. These results substantiate Tayaben et al. (2017)'s assertion that the success rates of board examinations among first-time takers are higher when a quality educational program is combined with emotional support mechanisms.

In analyzing the lenses of the study's theoretical framework, the outstanding first-take pass rate, consistent with the attribution theory, indicates that this population has a strong dispositional attribution. Strong academic preparation, productive study habits, intrinsic ability, and resilience are some of the internal aspects that have contributed to their success. This stands in contrast to the lower national and overall pass rates, which potentially indicate a stronger impact from situational attributions, or outside variables like poor study habits, difficult test settings, or a lack of support networks. The high success rate confirms with conclusion that board exam results are greatly impacted by both high-quality instruction and emotional support (Tayaben ey al., 2017) The students' outstanding effort may have been contributed by their ability to successfully attribute their success to internal variables.

In relation to the Attribution Theory, Self-Determination Theory (SDT) provides a framework for interpreting the students' outstanding performance. The high degree of internal and extrinsic motivation is indicated by the 92% first-time pass rate. Students who are deeply engaged with difficult subjects demonstrate intrinsic drive, which is created by a high-quality educational program that presumably instilled competence and promoted a sense of autonomy and relatedness. As per their extrinsic drive, students' efforts were further stimulated by their desire for affluent areas after graduation. Furthermore, Howard et al. (2016) noted that this mix of extrinsic and intrinsic motivators is a major factor in persistence and academic performance in challenging programs. The students' success was mostly due to their demonstrated

competency, as stated by Lopez-Garrido (2023). Aligning with the preceding results, which examined personal and institutional factors, this reveals a significant correlation between these variables and potential success on MTLE, contributing to the outcome rate.

Table 8. Significant association between Licensure Examination Performance in all factors

Demographic Profile	N	P-Value	df	Remarks
Age	60	0.117	31	Not Significant
Gender	60	0.209	62	Not Significant
Financial Status	60	0.89	93	Not Significant
Pre-Admission Profile	**N**	**P-Value**	**df**	**Remarks**
Senior High School Grade				
Grade 11	60	0.314	-	Not Significant
Grade 12	60	0.745	-	Not Significant
Type of Secondary Institution	60	0.349	31	Not Significant
Academic Preparation Factor	**N**	**P-Value**	**df**	**Remarks**
Internship Grade	60	0.000	-	Significant
2nd Year Grade	60	0.635	-	Not Significant
3rd Year Grade	60	0.004	-	Significant
MTLE Preparedness Test	**N**	**P-Value**	**df**	**Remarks**
Clinical Chemistry	60	0.108	-	Not Significant
Microbiology and Parasitology	60	0.031	-	Significant
Clinical Microscopy	60	0.002	-	Significant
Hematology	60	0.089	-	Not Significant
Immunoserology and Immunohematology	60	0.005	-	Significant
Histopathologic Techniques and Medtech Laws	60	0.028	-	Significant
Overall Mock Board Grades	60	0.001	-	Significant
Institutional Factor	**N**	**P-Value**	**df**	**Remarks**
Support Services	0.108	0.706	-	Not Significant
Quality of Teaching	0.031	0.499	-	Not Significant
Personal Factor	**N**	**P-Value**	**df**	**Remarks**
Time Management	60	0.041	-	Significant
Motivation	60	0.043	-	Significant

p-value < .05 = Significant; p-value > .05 = Not Significant

The results of a statistical analysis that examined the correlation between performance on a licensure examination and a variety of factors are presented in Table 8. The table is divided into three sections: Demographic Profile, Pre-Admission Profile, Academic Preparation Factor, MTLE Preparedness Test, Institutional Factors, and Personal Factors. The sample size, the p-value obtained from a statistical test such as chi-square, the degrees of freedom (df), and a final remark that indicates whether the association is statistically significant ($p < 0.05$) are all displayed in each section. The demographic factors exhibit non-significant associations with licensure exam performance, suggesting that these variables do not predict exam success.

The Pre-Admission Profile section investigates the impact of the sort of secondary institution attended and pre-college academic performance (Grade 11 and Grade 12). The p-values again surpass 0.05, signifying an absence of a statistically significant correlation between these pre-admission characteristics and licensure exam results. This implies that the licensure exam is not strongly predicted by prior academic accomplishments at the secondary level. It is possible that the rigorous nature of the MLS program functions as a leveler, reducing the influence of prior academic differences. The absence of significance for the type of secondary institution implies that the quality of preparation for the rigors of the MLS program is relatively consistent across various secondary schools. The Academic Preparation Factor section emphasizes the correlation between licensure exam outcomes and academic performance during the MLS program. The results are more complex in this instance. The internship grade indicates a statistically significant association ($p = 0.000$), which strongly implies that the practical experience gained during the internship is a significant predictor of success on the licensure examination. Intriguingly, the 2nd-year grade does not exhibit a significant association, whereas the 3rd-year grade does ($p = 0.004$).. This implies that, although early performance in the program is not highly predictive, later performance, particularly in the final year, is a strong indicator of future success on the licensure exam. The results underscore the significance of consistent performance and practical experience, particularly in the latter phases of the program.

The results of the MTLE Preparedness Test section suggest that there are significant relationships ($p<0.05$)

between the final MTLE score and the overall mock board grades, as well as the performance on several individual subject tests (Microbiology and Parasitology, Clinical Microscopy, Immunology-serology and Immunohematology, Histopathologic Techniques, and Medtech Laws). This implies that exceptional performance in these subject areas is a reliable indicator of overall MTLE preparedness. The non-significant outcome for Clinical Chemistry and Hematology implies that the performance in these fields may not be as significantly predictive of the overall success of MTLE. It is anticipated that the final MTLE score will exhibit a substantial correlation with the overall sample board grades, which will directly reflect a student's overall preparedness.

The Institutional Factors section evaluates the influence of teaching quality and support services on MTLE preparedness. Based on this data, the quality of institutional support and teaching does not substantially influence MTLE preparedness, as both factors exhibit non-significant relationships ($p>0.05$). This is a significant discovery that necessitates additional investigation to ascertain the underlying causes of the lack of correlation. The Personal Factors section investigates the functions of motivation and time management. In this iteration of the table, both motivation and time management exhibit substantial relationships ($p<0.05$), indicating that enhanced motivation and better time management skills are linked to improved MTLE preparedness.

Table 8 indicates that MTLE success is significantly predicted by only internship grades, 3rd-year grades, certain MTLE subjects, and personal factors. This underscores the significance of consistent high performance and practical application, which is consistent with Bloom's Taxonomy's emphasis on higher-order cognitive skills. The strong correlation between 3rd-year grades and internship performance indicates that the application of knowledge, analysis, synthesis, and evaluation, which is indicative of the higher levels of Bloom's Taxonomy, is essential for the success of MTLE. The program's ability to level the playing field and mitigate the effects of prior differences is suggested by the absence of a substantial correlation with demographic and pre-admission factors. According to attribution theory, students who attribute their success to internal factors are more likely to succeed. The strong correlation between practical experience and self-determination theory is indicative of the importance of autonomy and competence in attaining high performance. The results emphasize the necessity of a curriculum that aligns with Bloom's emphasis on application and evaluation by integrating theory with practice. This requires a curriculum that prioritizes practical experience and incorporates intricate problem-solving abilities. Curriculum development, resource allocation, and student support strategies are all influenced by the findings. It is imperative to enhance practical training and guarantee consistent feedback and assessment. To improve student preparedness and MTLE success rates, the study emphasizes the significance of harmonizing educational practices with Bloom's Taxonomy, attribution theory, and self-determination theory. Additional research could investigate the specific cognitive skills that the MTLE assesses and their correlation with academic performance in various disciplines.

Table 9. Factors significantly predict licensure examination performance

Predictor	r	r2	B
Academic Preparation Factors	.532**	.283	16.053
3rd Year Professional GPA	.369**	-	0.524
4th Year Professional GPA	.523**	-	0.081
Average Internship Grade	.462**	-	0.189

Predictor	r	r2	B
MTLE Preparedness Test	.452**	.204	69.050
Microbiology & Parasitology	.279*	-	-0.107
Clinical Microscopy	.389**	-	0.099
Immunology	.360**	-	0.029
Histopathologic Tech. and Medtech Laws	.284**	-	-0.144
Immunology			
Overall Mock Board Grades	.406**	-	0.305

r = correlation coefficient; r2 = Coefficient of Determination; B = unstandardized coefficient.

Table 9 discusses the factors that significantly predict the Medical Technology Licensure Examination (MTLE). Linear regression, a statistical method, is used in conjunction with prediction and to assess the relative importance of different predictors by analyzing the estimated coefficients, their statistical significance, and the overall model fit. This statistical method provides valuable information on the connections between a dependent variable and predictors.

The Academic Preparation Factors variable demonstrates a substantial positive correlation of r = .532 and r^2 = .283 and β = 16.053 with licensure exam scores. An r= .369 and β = 0.524 in 3rd year professional GPA suggests a moderate positive relationship. While a higher 3rd-year GPA is associated with slightly higher MTLE scores, the effect is minimal, and this cannot be used as a strong predictor itself. An r= .523 and β = 0.081 in 4th year professional GPA shows a more considerable positive relationship. A one-standard-deviation increase in the 4th-year GPA is associated with a 0.392 standard deviation increase in the MTLE score. This indicates that recent academic performance is a more significant predictor of MTLE success than 3rd-year GPA. In the internship grade, r= .462 and β = 0.189 show like the 3rd-year GPA, which suggests a moderate positive relationship. In this context, when a predictor variable such as GPA or MTLE preparedness test score and MTLE performance are positively correlated, it means that students who perform higher on the predictor variable are more likely to score higher on the MTLE. This implies that higher success on the licensing exam is linked to the predictor variable. In contrast, the standardized regression coefficients are represented by the β (beta) coefficients in the table. When all other variables are held constant, they show how the MTLE score changes in standard deviation units, for every standard deviation rise in the predictor variable.

The next predictor is the MTLE Preparedness Test. The significance of this variable in evaluating exam readiness is demonstrated by its positive correlation r =.452 and r^2 =.204. In its individual parameter, a weak positive correlation is seen by r= .279 and β = -0.107 in Microbiology & Parasitology. Lower MTLE scores are partially related with higher scores in this subject. Additional investigation is necessary to fully comprehend this startling result. It could mean that the course material or evaluation techniques are not in line with the MTLE's competence. As per the Clinical Microscopy with r= .389 and β = 0.099, this suggests that this is a good predictor in the success of examination. Immunology with an r= .360 and β = 0.029 suggests that this subject implies minimal impact in MTLE performance, consistent with its moderate positive relationship. Additionally, Histopathologic Techniques and Medtech Laws, with an r= .360 and β = -0.144 shows a weak positive relationship. Like the previous findings in Microbiology and Parasitology, this section requires a further investigation and assessment in the institutional curriculum. Lastly, the overall Mock Board Grades, with an r= .406 and β = 0.305, shows a positive relationship. This indicates a strong predictor in the MTLE performance with its one-standard-deviation increase associated with higher MTLE scores.

The findings of Quiambao et al. (2015), Ferrer et al. (2015), and Delos Angeles (2019) describing the relationship between GPA and passing the licensing exam are substantially supported by the results shown in this section. The correlation between overall mock board grades (β = 0.305) and fourth-year professional GPA (β = 0.523) is positive, indicating that MTLE success is significantly predicted by better academic achievement. This supports the claim that a higher GPA denotes greater exam readiness for licensing, highlighting the significance of a strong academic background in earning professional

credentials. Additionally, the findings of de la Pena (2007), Cabanban (2017), and Dayaganon and Limjuco (2016) regarding the strong correlation between academic performance and board examination outcomes in medical technology and related fields are supported by the significant positive correlation between Academic Preparation Factors (r =.532, r2 =.283) and MTLE success. The information emphasizes the necessity of ongoing curriculum assessment and development to guarantee that students are suitably equipped for the demands of the licensure examination and professional practice that follows. The benefit of focused preparation for the exam is further highlighted by the MTLE preparedness test's substantial positive correlation (r =.452, r^2 =.204).

Conclusion

This study evaluated the factors such as demographic, pre-admission, academic, institutional, and personal factors that predict performance on the Medical Technology Licensure Examination (MTLE). The results indicate that academic performance in professional subjects showed the strongest correlation with licensure outcome ($r = .68$, $p < 0.05$), followed by the results from the predictive value of Tests, such as mock board examinations ($r = .55$, $p < 0.05$). Higher exam scores were significantly correlated with improved motivation and effective time management. In contrast, success was not substantially predicted by Demographics (age, gender), Socioeconomic Factors (financial status), pre-admission profile (SHS grade, type of secondary institution), or institutional factors (Support Services and Quality of Teaching). considering demographics, pre-admission profiles, academic preparation, institutional factors, and personal characteristics. The results from previous research indicated that MTLE performance was not significantly correlated with age, gender, or financial status (William, 2021; Lai, Fu, & Peng, 2023).

It is strongly recommended that additional research be conducted, such as longitudinal studies to investigate the diverse non-academic factors that contribute to the success of MTLE. They are investigating the underlying mechanism behind these interventions, which specifically entail an examination of the impact of self-efficacy, resilience, and emotional intelligence on exam performance. It is also necessary to evaluate the efficacy of a variety of intervention strategies that are designed to meet the unique requirements of individual students and improve the overall level of preparedness which encourage the researcher to conduct a longitudinal studies that would track student cohort overtime to identify which of non-academic intervention have the most impact on MTLE performance, Evaluation intervention strategies to differentiate student subgroup such as student who is with high performance and student who struggles in their academics to ensure what are the identify similarity and difference that would help each student, and also to adopt mixed method approach which they would utilize both quantitative and qualitative studies to methodologies to obtain a more profound understanding of students' perspectives and experiences which would capture the complexity of student lived experiences which they would cater interviews or experience sampling journal and others. Motivation and productive study habits ought to become among the primary objectives of practical interventions.

In conclusion, the factors, especially the Academic Preparation Factors and MTLE Preparedness Test investigated in this research have collectively played a significant role in illuminating the key predictors of the MTLE success. The analysis has successfully highlighted various contributing areas, providing valuable insights into the multifaceted nature of achieving high performance on this critical examination. This comprehensive approach has thus helped to identify the critical elements that contribute to student

preparedness and ultimately, success in the Medical Laboratory Science Licensure Examination.

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