

DEVELOPMENT AND VALIDATION OF LEARNING MATERIALS FOR BEAUTY AND NAIL CARE SERVICES

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Abstract: This study aimed to design and develop digital learning materials for Beauty and Nail Care Services among Technical-Vocational-Livelihood (TVL) students at Rodriguez National High School. Specifically, it identified the most challenging learning competencies, determined the most helpful design features, and developed a digitized instructional application to enhance competency mastery. A developmental research design was employed, involving twenty-five (25) TVL students who participated through interviews and competency assessments. Data gathered were analyzed, reorganized, and utilized as the basis for developing a Beauty and Nail Care mobile application.

The results revealed that students achieved an overall mastery level of 85.80% (Mastered). While most competencies were mastered, selected areas such as nail structure, basic nail design application, and certain manicure and pedicure procedures showed “Nearly Mastered” results, indicating the need for reinforcement. In terms of design features, visual aids, multimedia interactivity, and self-paced learning were rated Highly Helpful, with step-by-step visual guides, diagrams, and video demonstrations emerging as the most effective tools for improving comprehension and engagement.

Based on these findings, a Beauty and Nail Care App was developed, integrating lessons, procedures, and visual resources aligned with curriculum competencies. The application supports accessible, engaging, and self-paced learning, enabling repeated lesson review and improved skill acquisition. The study concludes that the app is an effective instructional tool that enhances learner engagement, promotes independent learning, and bridges the gap between theory and practice. It is recommended that the application be integrated into classroom instruction and supported with continuous teacher training and remedial learning strategies.

Keywords: *Digital Learning, Materials, TVL Students, Beauty & Nail Care Services.*

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Chapter 1

THE PROBLEM

Introduction

Beauty and Nail Care services encompass a range of practices aimed at enhancing personal appearance and hygiene through techniques such as manicuring, hairstyling, and skincare treatments. These services not only aim to beautify but also contribute to physical wellness, psychological confidence, and social interaction, making them integral to self-care routines and personal identity.

The shift towards the K-12 curriculum reforms in the Philippines emphasize the need for diverse learning modalities to develop comprehensive skills and competencies, particularly within Technology Livelihood Education programs (Sepulveda, 2022). Based on Republic Act No. 10533 (Enhanced Basic Education Act of 2013), our law mandates that the education system should develop lifelong learning, competence, critical thinking skills, and global competitiveness. These provisions legally strengthened the idea of diverse, creative, digital learning materials which are central to subjects like Technology and Livelihood Education.

In the context of Technical-Vocational-Livelihood (TVL) education, effective instructional materials are crucial for skill acquisition. This developmental research addresses the need for optimized digital learning resources for TVL students specializing in Beauty and Nail Care services at Rodriguez National High School.

The study aims to design digital material that align with the curriculum's practical demands, ensuring students achieve competency in essential skills. By focusing on evidence-based design principles, this study contributes to the enhancement of vocational training methodologies in the digital age. Furthermore, this study seeks to integrate multimedia content, interactive tutorials, digital modules, quizzes, and visual aids, meticulously aligned with the K-12, TESDA, and DepEd Beauty & Nail Care curriculum guidelines (Lacanilao, 2023).

Additionally, this study contributes to several United Nations Sustainable Development Goals, particularly those focused on education, employment, and well-being. It strongly supports SDG 4: Quality Education by creating relevant, competency-based instructional materials that enhance students' knowledge and

technical skills in beauty and nail care, ensuring inclusive and effective learning opportunities. The study also aligns with SDG 8: Decent Work and Economic Growth, as it prepares learners for employability, entrepreneurship, and livelihood opportunities in the beauty service industry. In addition, it contributes to SDG 3: Good Health and Well-being by promoting proper hygiene, sanitation, and safe practices essential in personal care services, thereby protecting both practitioners and clients. Furthermore, by encouraging the use of appropriate materials and safe procedures, the study relates to SDG 12: Responsible Consumption and Production, supporting responsible use of products and sustainable service practices. Thus, this study underscores the role of quality educational resources in developing skilled, health-conscious, and economically productive individuals.

Whereas the beauty care component of the TVL track provides clearly defined curricula and competency standards aligned with national guidelines, there remains a significant gap in understanding how these are actually implemented at the school level. This is particularly evident in smaller or rural institutions such as Rodriguez National High School in Cadlan, Pili, Camarines Sur, where contextual realities can influence the delivery of instruction. Factors such as limited facilities and equipment, varying levels of teacher training and industry exposure, and restricted access to updated instructional materials may affect how effectively students acquire the intended skills. Moreover, without sufficient localized research, it becomes difficult to determine whether students are meeting the prescribed competencies or to identify specific challenges and best practices within the school. As a result, the absence of school-based evidence may lead to generalized interventions that do not fully address the unique needs of learners and teachers in such contexts, underscoring the importance of conducting localized studies to bridge the gap between curriculum standards and actual classroom practice.

Predominantly, this study seeks to bridge several gaps such as the empirical evidence in terms of technical and practical skills, what competencies are mastered or what competencies are they weak. It will transcend the limitations imposed by scarce physical resources

and practical exposure, thereby augmenting the instructional efficacy of Beauty & Nail Care education through accessible digital mediums (Herlambang et al., 2022). This approach is particularly critical for vocational subjects where hands-on training is paramount, as digital tools can bridge gaps when traditional practical experiences are limited (Macalikod & Simpall, 2025).

Therefore, this study titled “Development and Validation of Learning Materials for Beauty and Nail Care Services” aims to develop digital learning materials to address existing gaps in instructional resources and improve student proficiency in Beauty & Nail Care Services. Thus, the researcher deemed it important to conduct this study on Designing Digital Learning Materials for Beauty & Nail Care Services.

Theoretical Framework

In the evolving landscape of vocational education, the integration of digital learning materials offers promising opportunities to enhance skills acquisition and service competency. This study is grounded in a theoretical framework that draws from established learning theories and instructional-design models.

The Digitized Theory, as proposed by Kalantzis-Cope and Gagnon (2020) is a foundation of modern digital communication and information transmission. Kalantzis-Cope vision of multi-modal communication, enabling learners to engage with meaning through text, image, audio, and interactive media. The learning materials are designed for a skills-based subject (Beauty and Nail Care), where understanding is best achieved through visual demonstration, step-by-step procedures, and real-time application. The Digitized Theory supports this because it emphasizes that learners construct meaning more effectively when they engage with multiple modes of learning such as videos, images, simulations, and interactive content, rather than relying solely on traditional printed modules. Therefore, grounding your study in this theory strengthens its justification for developing technology-enhanced, multi-modal instructional materials, making learning more accessible, engaging, and aligned with 21st-century education demands.

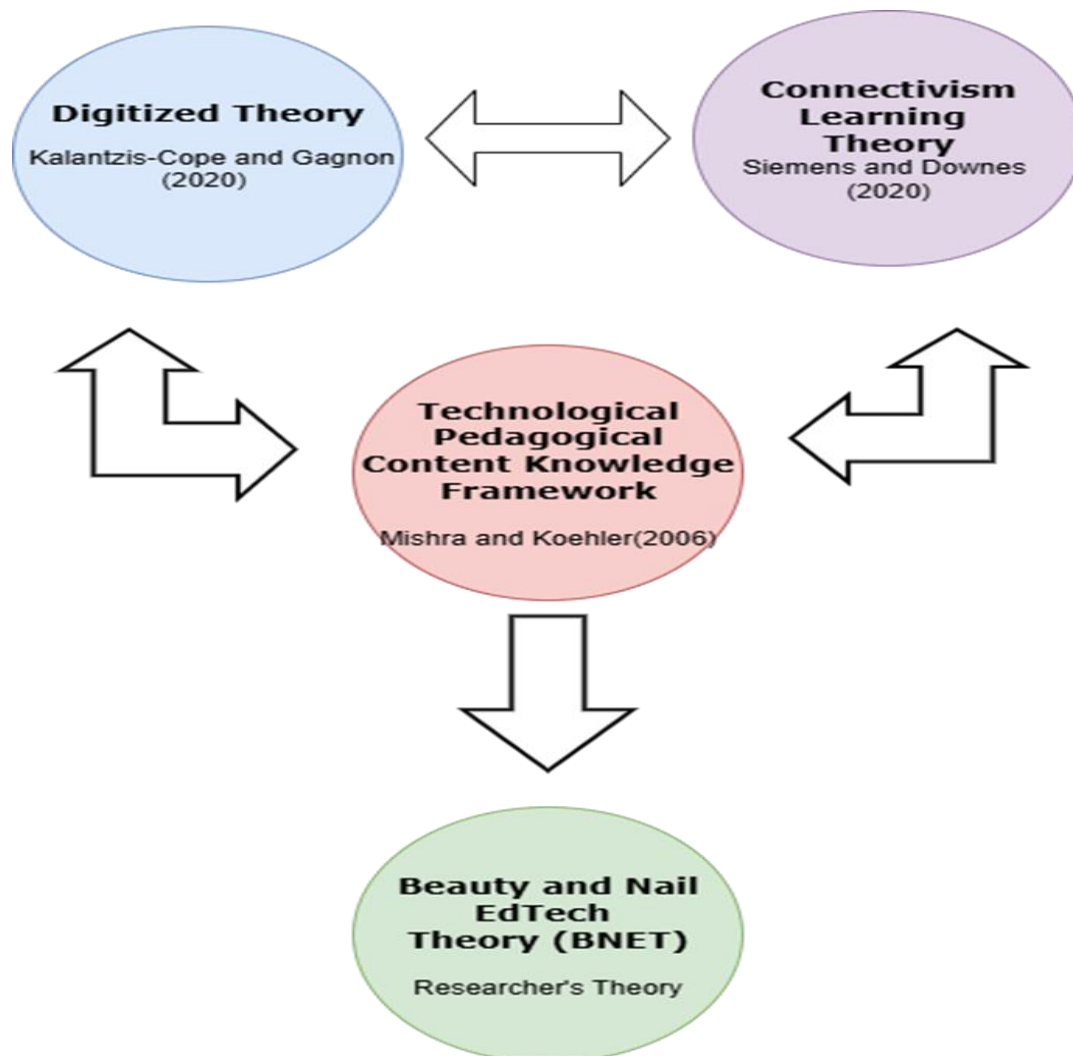


Figure 1

Theoretical Paradigm

Connectivism Learning Theory of Siemens and Downes (2020), proposed the highlights that employing well-designed digital learning materials is appropriate, even when learning may be found in advanced technical devices such as digital tools, modules, and online resources. Students can engage with the content by connecting to media, tutorials, videos, and other external resources. This supports the notion that digital artifacts and technologies are a component of the knowledge network. Using connectivism can help ensure the materials do not just deliver content, but also help students navigate, adapt, and keep learning in a field which evolves over time.

Technical Pedagogical Content Knowledge Framework. Proposed by scholars Mishra & Koehler in (2006) wherein this approach emphasizes that complex, contextual knowledge across multiple overlapping areas is necessary for effective technology-assisted instruction. There are intersections and connections between content Knowledge, Pedagogical Knowledge, and Technological knowledge that in a coherent way can match student needs, local context, and resource constraints. By integrating TPACK in this study, it makes sure that the materials are not merely "digitizing" information but also doing it in a way that is pedagogically useful and considerate of local context, student learning, resource availability, etc.

This developmental study's design, execution, and assessment will be strengthened if all of the TPACK elements (CK, PK, TK, and

junctions) will be taken into consideration. In addition, data visualization for thematic patterns with the use of graphs, charts, and interactive maps is easily completed. By creating digital platforms that allow the readers to explore and interact with humanities research.

Beauty and Nail EdTech Theory (Researcher's Theory) is a wide-ranging framework with the goal of developing a digitized learning material for beauty and nail Care Services intended for the learners of Rodriguez National High School enrolled in TVL strand. This theory posits that effective learning materials in beauty and nail care must integrate hands-on procedural demonstrations, interactive multimedia (videos, high-resolution images), and assessment tools to bridge the gap between theory and practice.

This theory banks on three key aspects: First, content-aligned competency development, meaning that the digital materials reflect the competencies laid out in the Philippine TVL/NC II/NC III training regulations and DepEd curriculum guides like the use of nail care tools and equipment, maintaining tools, occupational health & safety, nail shaping, manicure/pedicure, nail design.

The materials will be structured so that each module or lesson targets specific learning objectives drawn from these competency standards.

Second, pedagogical structuring and learner engagement, which includes sequencing content from basic to more advanced skills,

providing scaffolding from guided demonstration to learner practice and feedback. Third, accessibility, relevance, and resource contextualization, the digital materials are designed to function under realistic constraints and be relevant to learners' context. The theory also emphasizes continuous evaluation: by piloting with students and teachers, collecting feedback, and making iterative revisions, the materials remain responsive to learner needs and evolving industry practices.

Conceptual Framework

The Conceptual Framework follows the system's approach showing the interrelationship of the Input, Process, and Output.

Input. The research topic represents the essential elements and resources needed to initiate the study and guide the development of

the digital learning materials. It seeks to identify which competencies students have mastered and which they struggle with provides direction for content design and focus areas in the digital materials. Furthermore, Theoretical framework and Methodologies collectively provide the foundation for developing high-quality, learner-centered digital materials that are contextually relevant to TVL students.

Process. In this phase ensures thorough evidence gathering, research methodologies specify data collection through surveys, interviews, and analyzing and categories. Platform design for the digital repository will be planned with the integration of interactive tools.

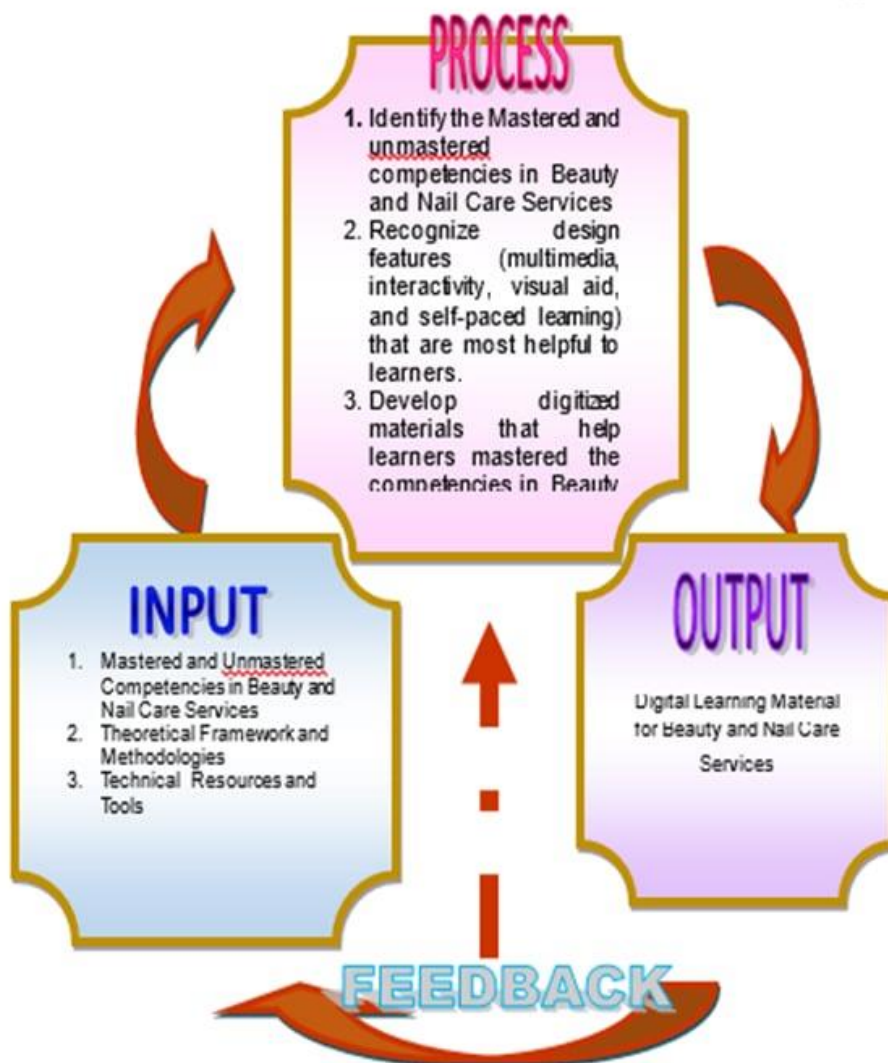


Figure 2
Conceptual Framework

Output. It embodies the culmination of the developmental process producing a structured, and user-friendly set of digital learning modules. These materials are designed to enhance students' knowledge and skills through multimedia learning experiences, provide flexible access to learning, both in and outside the classroom, Support blended learning approaches; and Help

students achieve mastery of competencies in Beauty and Nail Care Services.

Feedback. Any improvement in the input can be made based on the output for continuous improvement.

Statement of the Problem

Senior High School students at Rodriguez National High School specializing in Beauty & Nail Care are expected to achieve core competencies outlined in the DepEd / TESDA curriculum. However, feedbacks indicate that some students have difficulty mastering certain practical skills due to limited access to appropriate tools, inconsistent practice, or limited visual and interactive learning aids.

Specifically, it attempted to answer the following questions:

1. What learning competencies do students find most challenging in Beauty & Nail Care?
2. What design features (multimedia, interactivity, visual aids, self-paced learning) are most helpful to students?
3. What digital material can be developed to help learners enrolled in Beauty and Nail care master the competencies on the curriculum?

Assumptions of the Study

The following are the assumptions of the study research:

1. The core procedural competencies in Beauty & Nail Care Services such as tool maintenance, shaping nails, performing manicure & pedicure, and creating fancy nail designs are more likely to be found challenging by TVL students at Rodriguez National High School than the basic and common competencies
2. Digital learning materials for Beauty & Nail Care Services that include rich multimedia elements like videos, animations, and high-resolution visual aid, interactive features like quizzes, simulations of nail-care procedure, and self-paced learning option will be more effective in helping learners understand and master challenging competencies.
3. It is anticipated that a technology-mediated, competency-aligned digital learning materials created especially for the Beauty & Nail Care Services curriculum which includes interactive multimedia, video demonstrations, formative assessments, and simulations will greatly enhance TVL students' mastery of competencies at Rodriguez National High School.

Significance of the Study

This study on the Development and Validation of Learning Materials for Beauty and Nail Care Services is beneficial to the following:

TVL Students of Rodriguez National High School. It provides the learners more effective, engaging, and accessible digital learning materials. It helps them master the required competencies in Beauty & Nail Care. This may improve their skills, performance, confidence, and employability. Teachers of Beauty and Nail Care. They will acquire digital tools to help them teach. Additionally, it helps them better determine which design elements are most effective and which abilities students struggle with, which helps them make better plans.

School Administration. They can use the findings of this study to reform resource allocation, training of teachers handling the said subject, and improvements of curriculum delivery.

Curriculum Developers. The study's findings can inform broader policy and guidelines for integrating digital materials into TVL programs. They can use lessons learned to shape standards, required competencies, or material development for other schools.

Technical Education and Skills Development Authority. TESDA works closely with TVL strands, especially regarding certification, they can use improved digital materials to support students preparing for National Certificate assessments, aligning their competency levels with industry requirements.

Future Researchers. This study adds to the body of knowledge on educational technology, digital learning materials, and TVL education; It will offer methodological insights, design features, or theoretical contributions that can be utilized by future researchers who wish to conduct similar studies in the future.

Scope and Delimitation

This study focused on the development, and piloting of digital learning materials specifically designed for the Beauty & Nail Care Services strand under the TVL curriculum at Rodriguez National High School. The scope of the study includes selected competencies from the DepEd Beauty & Nail Care curriculum. Digital materials such as interactive videos, visual aids, and self-paced learning segments that is considered for design features. The development and feedback phases were conducted during the academic year SY 2025-2026. The materials were designed for use in classroom and blended learning settings.

However, the study is delimited in several ways. It is confined to one school (Rodriguez National High School), which may limit the generalizability of the findings to other schools with different resources, demographics, or infrastructure. Only a subset of competencies was addressed—those deemed most difficult by students and so some competencies in the curriculum may be beyond the study's immediate reach. The study assumes that technological resources such as access to devices, internet connectivity, and multimedia equipment are sufficient; limitations in these may affect implementation. Long-term outcomes, such as performance on industry certification or job placement after graduation, are outside the scope of this developmental study. Feedback is limited to teachers, students, and selected experts;

Definition of Terms

For clarification of terms used in this study, various terminologies are defined for better understanding.

Beauty and Nail Care refer to the specialized subject under the Technical-Vocational-Livelihood (TVL) Track (Home Economics strand) in Senior High School, which covers competencies such as use and maintenance of tools and equipment; practicing occupational health & safety procedures; nail shaping; performing manicure and pedicure; and creating fancy nail designs. It is the subject matter for which the digital learning materials will be developed.

TVL Students are the learners enrolled in the Technical-Vocational-Livelihood Track at Rodriguez National High School, specifically those taking the Beauty & Nail Care Services specialization. These are the primary beneficiaries and users of the materials that will be developed.

Digital Learning Materials refers to digital learning resource that will be created to assist students in learning Beauty & Nail Care competencies, including e-modules, video demonstrations,

interactive multimedia, high-resolution visual aids, self-paced learning segments, and quizzes. These resources are intended for use in the classroom or for self-directed learning on digital devices.

Digitalization is the process of converting the lessons in Beauty and Nail care into digital formats like texts, audio, picture, and other multimedia formats.

Competencies are the specific learning outcomes or skills specified in the Beauty & Nail Care curriculum guide (DepEd) that students are expected to master.

Mastery is the level of achievement wherein students can perform the specified competency correctly and independently, demonstrating both theoretical understanding and practical skill, with minimal guidance or error.

Usability refers to the ease with which students and teachers can use the digital learning materials for Beauty and Nail Care. This covers clarity of navigation, user interface, how intuitive the design is, how easily students can access content (online/offline), and how reliably the materials function on available devices.

Feedback is the Information collected from key informants (teachers, experts) after they have used or reviewed the digital learning materials. This includes perceptions of usefulness, engagement, clarity, visual appeal, effectiveness, and suggestions for improvement.

Developmental Study is type of research design used in this study referring to the process of designing, developing, testing, and refining educational materials over time to ensure that the final output/product meets the learning needs to the TVL- Beauty and Nail Care Students enrolled at Rodriguez National High School

Review of Related Literature

The following studies were primarily taken from non-print sources and existing studies; it is supplemented and justified by literature and studies that offered helpful information and insights to design and develop a digital product for Beauty and Nail Care Services.

Beauty and Nail Care Competencies

A Strategic Intervention Material (SIM) in Nail Care was rated by experts as very highly acceptable as learning material ($M = 4.551$, $SD = 0.447$), indicating strong readiness for classroom use in Beauty Nail Care Services. Students who used the SIM demonstrated a higher academic performance ($M = 85$, $SD = 8.02$, Very Satisfactory) compared to those who did not use it ($M = 81$, $SD = 7.03$, Satisfactory). This improvement was statistically significant ($t = -2.030$, $p = 0.047$), confirming the positive effect of SIM utilization on student performance. In addition, students evaluated the SIM as effective ($M = 2.772$, $SD = 0.439$) in terms of content clarity, comprehensibility, and usefulness. In general the findings indicate that the SIM is a valid, effective, and impactful instructional material that enhances student learning outcomes in Beauty Nail Care Services (Estipona, 2024)

In a study reveals that students in the Beauty Education program at Semarang State University exhibit a good level of knowledge and skills in various beauty treatments, such as hair washing, blow drying, perming, and manicure/pedicure. However, certain areas, particularly cream baths, require further improvement to meet industry standards. The PRIGEL program, which integrates practical internships with formal education, has proven effective in enhancing students' competencies by providing real-world

experience that allows them to apply theoretical knowledge in practical settings. This integration prepares students to better meet the demands of the beauty industry, equipping them with both hard and soft skills essential for professional success. Despite the positive outcomes, the study emphasizes the need for ongoing development in specific skills and procedures to ensure that students can effectively satisfy client expectations and industry requirements (Apriyani, 2024).

Digital Advancement, Pedagogy and Integration

The rapid evolution of pedagogical approaches, particularly in vocational fields like beauty and nail care, necessitates a thorough examination of how digital learning materials can enhance skill acquisition and theoretical understanding (Lee & Kwon, 2022). This review specifically investigates the integration of digital pedagogy and technology to support the unique demands of Technical and Vocational Education and Training in this specialized domain (Chen & Chan, 2024).

According to a study about "Empowering Vocational Education through Digital Technology: Innovating the Teaching Landscape" (2024). The 21st century approach includes an analysis of various digital methods such as blended learning, simulation-based learning, and game-based learning, which are increasingly prevalent in TVET contexts (Chen & Chan, 2024). The effectiveness of these methods is further explored through a Connectivist lens, emphasizing the interconnectedness of knowledge and experience in fostering comprehensive learning outcomes.

Additionally, the study addresses challenges such as resource disparities and the need for enhanced digital literacy among educators to fully leverage these advancement. The analysis also delves into how emerging technologies like Artificial Intelligence, Virtual Reality, and Augmented Reality are transforming vocational training, addressing both the opportunities and challenges they present for skill development and employability (Ghosh & Ravichandran, 2024).

Empirical Evidence on Digital Learning

Recent empirical studies underscore the importance of designing digital instructional media tailored to vocational and technical subjects like beauty and nail care. For example, a descriptive study examining Beauty-Nail Care students in the Philippines found that the availability of materials, tools and equipment significantly influenced their performance in core competencies; students' performance in "core" competency clusters was significantly related to the availability of equipment whereas basic and common competencies were not, pointing to a gap in resource-supported learning that digital materials might help mitigate (Ypanto, 2022).

Similarly, a study of a cosmetology vocational course using Augmented Reality (AR) modules the "Makeup AR" study demonstrated that students who used the AR-based learning approach achieved significantly higher learning effectiveness compared to an e-book only group (Lee et al., 2021). These findings support the notion that digital learning materials with immersive or interactive elements can enhance both competence development and student self-efficacy while reducing cognitive load in hands-on vocational contexts.

Furthermore, a recent investigation into competency-based learning materials in nail care education revealed that interactive modules and simulated scenarios markedly improved students'

engagement and alignment with industry standards, albeit with caution about implementation constraints such as equipment, connectivity and instructor readiness (Largo, 2024). Thus, these studies provide a solid empirical base for developing digital learning materials in beauty and nail care education indicating not only that digital pedagogy matters, but which features highlight the contextual barriers (resources, digital literacy) the study must address for the TVL strand at Rodriguez National High School.

Competency-Based Learning and Curriculum Alignment

The competency-based learning (CBL) paradigm places students' mastery of well-defined competencies at the center of instructional design, as opposed to the conventional time-based learning progression. According to academics, competency definition mapping to linked curriculum, instruction, and assessment techniques is emphasized by CBL frameworks.

Over the past few years, competency-based learning has garnered much interest as a more modern approach to New Age learning systems. It is framed by the notion that learner outcome is what a learner should be able to do or master as a result of their learning experiences are the point of true measurement and ultimate evaluation. This builds upon the previous learning frameworks oriented around content authoring, creating curricula and instructor delivery methodologies that were heavily reliant on standard grading systems, essentially graded in terms of how much content was consumed and subsequently retained by the learner as emphasized on the study of Dunagan and Larson (2021).

In digital environments, effective CBL materials embody modular design, clear measurable objectives, authentic tasks and self-paced pathways that features characteristic of "competency-based learning materials (CBLMs)". Furthermore, because competency-based models place a strong emphasis on mastery, the digital materials should include feedback and remediation loops. This will enable students to go back and review modules until they reach proficiency. Online CBL studies have demonstrated that feedback practices have a significant impact on student success.

In addition, in the context of beauty and nail-care vocational education, curriculum alignment with competency frameworks and the instructional materials being designed is very important. In the Philippines for instance, within the Department of Education (DepEd) K to 12 Technical-Vocational-Livelihood (TVL) track, the subject "Beauty/Nail Care Services (NC II)" outlines clear learning outcomes and competencies such as: selecting and preparing tools, disinfecting/sanitizing, trimming and filing nails, and applying creative nail designs. The literature on interventions in this domain illustrates that when learning materials such as Strategic Intervention Materials are developed and aligned to these competencies, student performance improves.

This alignment underscores the importance of making sure that the digital learning materials that will be developed reflect not only the beauty/nail-care curriculum items, but also the competency standards, performance standards, and assessment criteria established by the educational or industry framework. Without this alignment, digital materials risk being loosely connected to curriculum goals and hence may under-serve mastery of skills.

Design and Features of Effective Digital Learning Materials

In accordance with Saad et. al (2023), the creation of the IsMind mobile app demonstrated how important mobile learning is for improving formative assessment. Their study underscores that

while mobile applications provide flexibility and enhance student motivation, there remains a scarcity of tools specifically tailored for assessment purposes. To fill this gap, the researchers used an evolutionary prototyping approach within the Software Development Life Cycle (SDLC) to combine content, pedagogy, and technology to make a useful learning tool. The IsMind app has different kinds of interactive questions, like drag-and-drop, multiple choice, and matching, that keep students interested and engaged. The results also showed that the app is a good and useful way to teach and test learning, giving future developers of educational mobile apps a clear set of rules to follow.

Correspondingly, the study of Taqwina et. al (2023) about development of e-module learning media based on flipbook makers in the department of cosmetology and beauty concluded that the e-module based on flipbook maker was stated to be valid, practical and effective as one of the learning media for the hand, foot and nail care course. In sum, their works on the digital learning materials optimize cost-efficiency while maintaining high pedagogical impact.

Trends and Innovations

Choi (2022) findings indicated that the present age, the social and economic structures are rapidly shifting to a digital base. In the cosmetics and beauty field, "contactless industry" which is grafted into the digital technology has been on the issues. In the field of education, educational standard is increasing through digital transformation using "Edu-Tech". Her study explored a new paradigm of beauty education to respond to the digital transformation era.

As noted by Indaryanti et.al (2025), their study integrates a research and development methodology to create a mobile application-based learning medium for Grade X Vocational High School students, employing the 4-D model, which encompasses the phases of define, design, develop, and disseminate. This model is widely used in educational innovation because it has a systematic way of developing, testing, and putting new products into use. Their findings revealed that the developed application achieved a validity score of 90.33%, indicating that it is highly appropriate for instructional use. This means that it is easy to use and works well in real classrooms. The application received a score of 87.29% for effectiveness, which shows that it is very good at improving learning outcomes. These results show that mobile application-based learning media is not only valid and useful, but also very effective. This supports its use as a new teaching tool in vocational high school education.

Challenges and Barriers in Implementing Digital Learning

Despite numerous benefits, implementation of digital technologies in TVET elicits specific challenges. One significant hurdle is the digital divide in terms of infrastructure, in which disparities in access to technology and reliable Internet connectivity can limit opportunities for students living in developing nations lagging behind in digital technologies, particularly these nations' rural or underserved areas as emphasized by (Mthabela, 2024). In another study, Equipment costs, electricity infrastructure issues, and lack of experience among teachers are major obstacles. Each of these challenges plays a significant role in the digital transformation initiatives' overall effectiveness in TVET (Shambare & Jita, 2025).

Digital education is severely hampered in emerging economies with irregular or insufficient access to electricity, in which frequent

power outages can impair online learning and make it difficult for students and teachers to access instructional resources consistently (Singun, 2025). This issue is particularly pronounced in rural areas where infrastructure may be lacking. Reliance on digital platforms for education requires a stable power supply, which is often not available, thereby exacerbating digital divides and limiting access to quality education. Specifically, one significant challenge is the expense associated with acquiring the necessary technological equipment. The costs of computers, tablets, and other digital resources needed for effective online learning pose a barrier for many educational institutions (Mhlanga, 2024). This challenge is compounded by ongoing expenses for technology updates and maintenance, which can be financially burdensome for TVET institutions operating on tight budgets. If institutions cannot effectively integrate digital technologies into their curricula due to high equipment costs, digital education's potential benefits may be restricted significantly (Mesuwini & Mokoena, 2023).

Yet another related article by Niwamanya (2025) mentioned that digital divide and fostering digital transformation within TVET systems in developing nations. It highlights that while digital transformation is imperative for TVET to meet Industry demands and enhance lifelong learning, developing nations face significant obstacles, such as inadequate digital infrastructure, unstable power supplies, high digital equipment costs, and a shortage of digitally proficient educators. As a result, the digital gap between developing and developed nations worsens inequalities by denying marginalized populations access to technology (Perumal & Orji, 2024).

Student Engagement, Motivation, and Learning Outcomes

Academic Motivation refers to learners' desire as reflected in their approach, persistence, and level of interest regarding the subject when competence is judged against a standard of performance or excellence (Hu et al., 2021). It could also be equated to the interest of an individual learner to engage in the learning experiences offered (Hulleman et al., 2016). In the study of Tick (2025) response to the rapid proliferation of digital learning platforms within contemporary educational landscapes, this investigation aimed to determine their influence on student motivation and learning outcomes, ultimately providing actionable recommendations for improvement. Recognizing the transformative potential of these platforms, which encompass online courses, virtual classrooms, and educational applications, Her research revealed a positive correlation between the use of digital learning platforms and enhanced learning outcomes and motivation, attributed to increased access to resources and interactive learning opportunities. However, the survey also highlighted concerns related to course design, quality, and recognition, indicating potential limitations.

Consequently, the study concludes that while digital learning platforms demonstrably contribute to improved student engagement and achievement, optimizing course design and multimedia content, enhancing overall quality and recognition, and implementing personalized learning pathways are crucial for addressing identified challenges and maximizing the effectiveness of these platforms in the digital age.

Similarly, in a related study by Saputra and Oktarina (2023), the electronic modules created in their study greatly influenced and increased student learning outcomes and motivation. In conclusion, student engagement, motivation, and learning outcomes in digital

and vocational learning contexts underscores several important insights that are highly relevant to the development of digital learning materials for beauty and nail care services. All of these studies encourage interactive participation by means of realistic simulations and digital activities and involvement.

Furthermore, it ensure strong alignment with competencies and curriculum so that the digital experience translates into tangible professional readiness and improved outcomes.

Synthesis of the State-of-the-Art

It is important to create and design a digital material for Beauty and Nail Care Services that will be utilized in academe specifically in TVL-SHS students to ensure that both the learners and the teachers keep up in the utilization of the available resources and technology that is more accessible and flexible. As evidenced by the many academic works and studies that provide insights into the importance and integrating digitalization and technology in the learning process on the 21st century.

All of the aforementioned research are crucial to in the development of an appropriate digital material, how such materials respond not only to the technological imperative of our era but also the pedagogical and vocational alignment required for 21st-century learners. Research into web-based learning in vocational contexts demonstrates that online media provide learners with flexibility, interactivity and increased accessibility particularly conducive to practical-skills domains in which learners can revisit demonstrations, pause and replay processes, and engage in self-paced mastery.

Furthermore, the integration of digital learning within vocational curricula aligns with the call to arm students with 21st century competencies which are increasingly expected in technical-vocational educational settings.

In the specific context of Beauty and Nail Care Services, the related literature that was collected suggests that digital materials have the potential to bridge the gap between classroom instruction and using industry-standard processes or equipment: through multimedia demonstrations, interactive checklists, simulations, and the capacity for self-review, learners can gain heightened procedural competence. At the same time, teachers and institutions can leverage these resources to optimize instructional time, provide differentiated support, and enhance alignment with national competency frameworks and standards.

However, the literature also warns that the success of such digital interventions is contingent upon factors like infrastructural readiness, teacher digital literacy, and context-specific adaptation like local internet connectivity, device access, language and cultural relevance. Therefore, in designing digital materials for Beauty and Nail Care Services, the synthesis of the literature implies that the dual priorities of practical vocational alignment and 21st-century digital pedagogy must drive the development process and be considered to ensure that resources are not only accessible and flexible but firmly rooted in real-world vocational tasks and learner-centred design.

Research Gap

Even though a wide range of written material has been written about the digital learning materials in vocational education and technical Vocational Livelihood specialization, there are still many research gaps that highlight the need for more studies. By

examining previously published readings, several gaps have been identified during this conversation. Although there is a substantial body of academic work on the designing digital learning Materials, there are no published studies that concentrate on the development of digital learning materials that focuses on Beauty and Nail Care Services in Rodriguez National High School. Significant gaps remain when it comes to digital learning materials specifically designed for hands-on, service-oriented vocational fields such as beauty and nail care

Furthermore, research shows that students in beauty and nail care programs often face resource shortages such as tools, equipment, materials which hamper competency development (Ypanto,2022). Thus, it is beneficial to develop a material that will be accessible and flexible for the learners with the aide of digital devices that will help increased the learners' competencies.

The goal of this study is to complete and design a digital learning materials and to create a digitize archive that will improve the learning competencies of the learners enrolled in Beauty and Nail Care Service at Rodriguez National High School-Senior High School Department. Utilize and disseminate them for educational reasons and to increase academic understanding of difficult areas and topic related to the subject that is entailed on the curriculum guide. Hence, this is the gap that the present research wished to bridge.

By addressing this gap, the study does not only contribute to the development of new learning materials but also promotes the integration of technological knowledge into modern educational frameworks. Through digitalization, the research aspires to create a material that can be improved as the needs arise and as the world step forward in advance for the future generations. Ultimately, this endeavor highlights the vital role of technology in the teaching and learning process.

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Chapter 2

RESEARCH METHODOLOGY

This chapter includes the methods used, the key informants, respondents, the data-gathering tools, validation tool and statistical tool and treatment used in the study to analyze what type of digital materials will be developed for beauty and Nail Care services.

Research Design

This study adopted a developmental research design wherein the researcher systematically designs, develops, implements, and evaluates a digital learning material product tailored for the Beauty & Nail Care Services strand under the TVL track. Developmental research is particularly appropriate when the goal is to create an instructional product, process or program in an educational context (Richey & Klein, 2005).

The TPACK framework was followed in the design of digital learning materials by emphasizing the integration of three interrelated knowledge domains: technological knowledge (TK) refers to the ability to choose and use digital tools that support learning; pedagogical knowledge (PK) refers to the effective methods and strategies for teaching vocational skills; and content

knowledge (CK) is the core subject matter of Beauty & Nail Care Services.

First, the researcher conducted a needs-analysis phase to identify which Beauty & Nail Care competencies the TVL students at Rodriguez National High School find most challenging and map the existing teaching practices and available technology (Addressing the CK, PK, and TK).

Next, the design and development phase will produce digitized material, videos, interactive visuals, and self-paced lessons that reflect the content domain (CK), adopt pedagogically sound strategies for vocational skill development (PK), and leverage appropriate technology aligned with student access and resource constraints (TK).

The study seeks not only to develop digitized materials but to ensure that they are pedagogically grounded, content-valid, and technologically appropriate for the TVL context.

Key Informants

A diverse group of key informants was drawn to provide rich and informed perspectives integral to the design and development of the digital learning materials. The key informants include TVL teachers handling Beauty and Nail Care Services, ICT Coordinator, Master Teachers or expert in the field was also interviewed for the feedback that put emphasis on the content, pedagogy, technology in context of the material that was developed.

Respondents

Twenty-five (25) students of Beauty and Nail Care Services enrolled at Rodriguez National High School were asked to answer the questionnaire to know their perspective regarding the application that was developed for the subject

Research Tools and Procedure

The researcher secured a permit to conduct study and send the request letter to the key informants and ask permission to administer an interview. The researcher assured that the participants' responses were treated with strict confidentiality. An interview guide was used in conducting the interview. The data gathered from the interview will be helpful in the development of the digital material for Beauty and Nail Care Services.

Interview Guide

The primary method for gathering data for this study was the Interview guide. Participants was interviewed face-to-face in a controlled manner. The various sections of the questionnaire were utilized to collect specific data .The data that was collected from interviewed participants was recorded , and was made sure that all necessary data were accurately and consistently gathered.

Preparation of the Interview Guide. In the preparation of interview guide, the researcher developed a guide and questions anchored to the question in the statement of the problem, to ensure that an effective and appropriate output will be developed.

Validation of the Interview Guide. Validation of the Interview Guide was done by the adviser for corrections and further revisions, and to determine the validity of the questionnaire.

Administration of the Interview Guide. After the Interview Guide and the validation of the instrument, the researcher requested an approval from the Dean of Graduate School for the

administration of the data collection. The permit secured was given to the respective selected areas where the study will be conducted.

Validation Tool

A self-made questionnaire was developed by the researcher to gather relevant data aligned with the objectives of the study. Since questionnaires must ensure accuracy and consistency in measuring the intended variables, the instrument underwent validation to establish its reliability and validity .

The drafted questionnaire was carefully reviewed, checked, and validated by the research adviser to ensure clarity, appropriateness, and alignment with the research goals before it was administered to the respondents for data collection.

Data Analysis, Statistical Tool and Treatment

The study employed a mixed-methods approach to data analysis, involving both quantitative and qualitative techniques to achieve a holistic understanding of the development, implementation, and evaluation of the digital learning materials.

For quantitative data, Descriptive statistics using the mean, and percentage summarized student performance on competencies, and student perceptions of digital materials. Moreover, Qualitative data gathered from the interview was analyzed to extract deeper insights into usability, student experiences, design challenges, and the contextual conditions regarding the digital learning material, Bernard (2017).

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Chapter 3

DEVELOPMENT AND VALIDATION OF LEARNING MATERIALS FOR BEAUTY AND NAIL CARE SERVICES

This chapter presents, analyzes, and interprets data gathered to provide answers to the problems. Three (3) problems in the study were answered and explained.

Learning Competencies students find most challenging in Beauty & Nail Care

This section presents the results on the learning competencies that students in Beauty and Nail Care Services consider difficult. These critical dimensions are also important in determining the specific skill deficiencies and learning difficulties of TVL students at Rodriguez National High School. The data were obtained through interviews and surveys, probing into basic (specific skills a student needs to master) and core competencies (skills embedded in these courses, as stipulated in the DepEd and TESDA curricula).

Table 1 shows that the average weighted mean based on the findings demonstrates effective instruction, as evidenced by all competencies being verbally interpreted as mastered.

In the Nail Structure competency under the procedures for basic manicure and pedicure services, learners achieved an average mastery level of 83.43%, indicating Mastered. Three out of five items were mastered, with Item 3 recording the highest.

Table 1A: Basic Nail Care

NAIL STRUCTURE						
Item No.	No. of correct answer per item	Mastery (per item)	Level	Interpretation	Mastery Level (per competency)	
	30	85.71		Mastered	Procedures of basic manicure and pedicure services 1.1 Nail structure	
	25	71.43		Nearly Mastered		
	33	94.29		Mastered		
	26	74.29		Nearly Mastered		
	32	91.43		Mastered		
Average=83.43				Mastered		
NAIL SHAPE						
Item No.	No. of correct answer per item	Mastery (per item)	Level	Interpretation	Mastery Level (per competency)	
	31	88.57		Mastered	Procedures of basic manicure and pedicure services 1.3 Nail shapes	
	28	80		Mastered		
	36	100		Mastered		
	23	65.71		Nearly Mastered		
	34	97.14		Mastered		
Average=86.29				Mastered		

APPLICATION OF BASIC NAIL DESIGNS					
Item No.	No. of correct answer per item	Mastery (per item)	Level	Interpretation	Mastery Level (per competency)
	33	94.29		Mastered	PERFORM MANICURE AND PEDICURE (PMP)
	24	68.57		Nearly Mastered	2.Application of basic nail designs
	29	82.86		Mastered	
	25	71.43		Nearly Mastered	
	31	88.57		Mastered	
	30	85.71		Mastered	
		Average =81.90		Mastered	

Score at 94.29%, followed by Item 5 at 91.43% and Item 1 at 85.71%. However, Items 2 (71.43%) and 4 (74.29%) were only Nearly Mastered

In Nail Shape, learners demonstrated the highest performance with an average of 86.29% (Mastered). Notably, one item achieved a perfect score of 100%, while other items yielded 97.14%, 88.57%, and 80%, all within the Mastered level. However, one item recorded 65.71% (Nearly Mastered)

Meanwhile, in the Application of Basic Nail Designs, the average mastery level is 81.90% (Mastered), which, although still within the Mastered range, is the lowest among the three competencies. Four items posted Mastered scores (94.29%, 88.57%, 85.71%, and 82.86%), while two items fell into the Nearly Mastered range (68.57% and 71.43%).

The results imply that learners have generally attained a high level of competency across all three areas of nail care, as evidenced by mastery-level scores in Nail Structure (83.43%), Nail Shape (86.29%), and Application of Basic Nail Designs (81.90%). This suggests that most learners understand nail shape concepts and classifications well, as evidenced by several high-performing items, including a perfect 100%. However, the presence of items that are only nearly mastered highlights specific areas where learners may benefit from targeted support or instructional reinforcement.

In Nail Structure, high mastery scores (94.29%, 91.43%, 85.71%) demonstrate strong conceptual knowledge, while the Nearly Mastered scores (71.43% and 74.29%) indicate ongoing struggles with certain foundational concepts. Similarly, for Application of Basic Nail Designs, mastery is achieved for most items, but lower scores (68.57% and 71.43%) indicate challenges with procedural

execution and design. Thus, varied performance suggests areas that would benefit from further instructional focus.

Collectively, the score variability, from 65.71% to 100%, reflects inconsistent mastery among learners, highlighting areas where targeted instructional support could raise achievement to a more uniform level.

Table 1B shows that the first set of items under Procedures of Basic Manicure and Pedicure Services and Nail Diseases and Disorders, the mastery levels ranged from 71.43% to 100%, with most items falling within the Mastered level (77.14%, 97.14%, 82.86%, 88.57%, 100%, 80%, 85.71%, and 94.29%). However, two items obtained 71.43% and 74.29%, which are verbally interpreted as Nearly Mastered, indicating slight gaps in specific areas. The overall average mastery level is 85.14%, which is verbally interpreted as Mastered, reflecting strong learner understanding of the competency.

For the second set under Nail Diseases, the mastery levels per item were 91.43%, 77.14%, and 97.14%, all of which fall under the Mastered level. The average mastery level is 88.57%, which is also verbally interpreted as Mastered, indicating consistent, high performance across all items in this competency.

These findings indicate that learners generally achieve high competency, as reflected in overall mastery levels of 85.14% and 88.57%. Most items are mastered, demonstrating effective instruction in procedure and knowledge of nail disorders. However, the presence of Nearly Mastered scores (71.43% and 74.29%) suggests some areas require reinforcement to consolidate understanding and achieve consistent mastery.

Table 1B: Identifying Nail Disorder and Disease

NAIL DISORDERS					
Item No.	No. of correct answer per item	Mastery (per item)	Level	Interpretation	Mastery Level (per competency)
	27	77.14		Mastered	Procedures of basic manicure and pedicure services
	34	97.14		Mastered	1.2 Nail diseases and disorders
	29	82.86		Mastered	
	31	88.57		Mastered	
	26	74.29		Nearly Mastered	
	35	100		Mastered	

28	80	Mastered		
30	85.71	Mastered		
33	94.29	Mastered		
25	71.43	Nearly Mastered		
Average =85.14		Mastered		
NAIL DISEASES				
Item No.	No. of correct answer per item	Mastery Level (per item)	Interpretation	Mastery Level (per competency)
32		91.43	Mastered	Procedures of basic manicure and pedicure services
27		77.14	Mastered	1.2 Nail diseases and disorders
34		97.14	Mastered	
Average =88.57		Mastered		

These results imply the need for targeted instructional reinforcement focused on the least mastered items to ensure more consistent learning outcomes. Teachers should address gaps using remediation activities, guided practice, and focused demonstrations. Applying effective strategies from Nail Diseases to other competencies could help. Addressing minor gaps and sustaining high mastery will support more uniform and deeper competency development.

Table 1C shows the learners' test results fTable 1C displays learner test results for Hand/Foot Spa Machine, Tools, and Supplies. Mastery levels range from 71.43% to 100%. Most items are mastered (82.86%, 88.57%, 100%, 80%, 85.71%, 94.29%, 91.43%, 77.14%). Two items (74.29% and 71.43%) are Nearly Mastered.

The average mastery level is 84.57%. Levels per item range from 74.29% to 100%, with most items interpreted as Mastered (97.14%, 82.86%, 88.57%, and 100%), while one item obtained 74.29%, interpreted as Nearly Mastered. The average mastery level is 88.57%, which is verbally interpreted as Mastered, indicating consistently high performance in this competency.

These results suggest learners have achieved high competency in identifying and handling hand/foot spa machines, tools, supplies, and equipment, with overall mastery levels at 84.57% and 88.57%. While most items were mastered, the Nearly Mastered scores (71.43% and 74.29%) in both sets indicate that some topics need additional focused practice to ensure comprehensive mastery.

Table 1C: Identifying and Manipulating Nail Care Tools, Equipment and Supplies

HAND/FOOT SPA MACHINE, TOOLS, AND SUPPLIES					
Item No.	No. of correct answer per item	Mastery Level (per item)	n	Interpretation	Mastery Level (per competency)
29		82.86		Mastered	PERFORM HAND AND FOOT SPA (HS)
31		88.57		Mastered	
26		74.29		Nearly Mastered	5. Hand/foot spa machine, tools, supplies and equipment
35		100		Mastered	
28		80		Mastered	
30		85.71		Mastered	
33		94.29		Mastered	
25		71.43		Nearly Mastered	
32		91.43		Mastered	
27		77.14		Mastered	
Average=84.57			Mastered		
HAND/FOOT SPA EQUIPMENT					
Item No.	No. of correct answer per item	Mastery Level (per item)	n	Interpretation	Mastery Level (per competency)

			PERFORM HAND AND FOOT SPA (HS)
34	97.14	Mastered	
29	82.86	Mastered	5. Hand/foot spa machine, tools, supplies and equipment
31	88.57	Mastered	
26	74.29	Nearly Mastered	
35	100	Mastered	
Average 88.57		Mastered	

These results imply that, while instructional, they indicate generally effective instruction but point to a need for focused support for less mastered items. Teachers should provide remediation, more demonstrations, and hands-on practice. The high scores on most items show that current strategies work and should continue, but refining them will help close minor learning gaps and ensure greater competency. The importance of designing digital instructional media tailored to vocational and technical subjects, such as Beauty and Nail Care Services. However, contrasting evidence from Ypanto (2022) revealed that the availability of materials, tools, and equipment significantly influenced students' performance in core competencies, while it had no significant effect on basic and common competencies. This suggests that hands-on resource availability plays a more critical role in the development of higher-level practical skills, whereas foundational

competencies may rely more on instruction and theoretical understanding.

This results somehow links with the study of Ypanto (2022) that the availability of materials, tools and equipment significantly influenced students' performance in "core" competency clusters, whereas basic and common competencies were not, pointing to a gap in resource-supported learning that digital materials might help mitigate.

Table 1D presents learners' test results for Safety Precautions and Sanitation Procedures, with mastery levels ranging from 71.43% to 100%. Most items are verbally interpreted as Mastered (100%, 80%, 85.71%, 94.29%, 91.43%, 77.14%, 97.14%, and 82.86%). One item obtained 74.29%, interpreted as Nearly Mastered, while another item with 71.43% is interpreted as Unmastered. The overall average mastery level is 85.43%, which is verbally interpreted as Mastered.

Table 1D: Occupational Safety and Health in Nail Care

SAFETY PRECAUTIONS AND SANITATION PROCEDURES						
Item No.	No. of correct answer per item	Mastery Level (per item)	Interpretation	Interpret	Mastery Level (per competency)	
	26	74.29	Nearly Mastered		PERFORM MANICURE AND PEDICURE (PMP)	
	35	100	Mastered		Application of basic nail designs	2.
	28	80	Mastered		Safety precautions	2.1
	30	85.71	Mastered			
	33	94.29	Mastered			
	25	71.43	Unmastered			
	32	91.43	Mastered			
	27	77.14	Mastered			
	34	97.14	Mastered			
	29	82.86	Mastered			
Average = 85.43			Mastered			
CLIENT SAFETY AND COMFORT						
Item No.	No. of correct answer per item	Mastery Level (per item)	Interpretation	Interpret	Mastery Level (per competency)	

			PERFO RM FOOT SPA (FS)
32	91.43	Mastered	
25	71.43	Nearly Mastered	
31	88.57	Mastered	Client safety and comfort
28	80	Mastered	1.3 foot and nail analysis
33	94.29	Mastered	
30	85.71	Mastered	
33	94.29	Mastered	
27	77.14	Mastered	
34	97.14	Mastered	
30	85.71	Mastered	
Average = 86.57		Mastered	

For Client Safety and Comfort, the mastery levels per item range from 71.43% to 97.14%. The majority of items are verbally interpreted as Mastered (91.43%, 88.57%, 80%, 94.29%, 85.71%, 94.29%, 77.14%, 97.14%, and 85.71%), while one item with 71.43% is interpreted as Nearly Mastered. The average mastery level is 86.57%, which is verbally interpreted as Mastered.

Based on the results presented, it can be inferred that learners generally demonstrate a strong level of competency in Safety Precautions and Sanitation Procedures and in Client Safety and Comfort, as reflected in the overall mastery levels of 85.43% and 86.57%, both of which are verbally interpreted as Mastered. This suggests that most learners have successfully acquired the essential knowledge and skills required to perform manicures, pedicures, and foot spa services. However, the presence of a Nearly Mastered item (74.29%) and an Unmastered item (71.43%) in Safety Precautions and Sanitation Procedures, as well as a Nearly Mastered item (71.43%) in Client Safety and Comfort, indicates that specific safety-related competencies remain weak and inconsistent among competencies.

These findings imply the need for strengthened instructional reinforcement on safety protocols, sanitation practices, and client care procedures, as these areas are critical in real salon or workplace settings. Teachers may need to implement more intensive demonstrations, repetition of safety procedures, and competency-based drills to ensure full mastery, especially on the least-performed items. While overall performance is satisfactory, addressing these gaps is essential to ensure consistency, accuracy,

and adherence to safety standards, thereby improving learners' readiness for actual industry application.

Table 1E shows the competency test results for students in Hand Spa Treatment, with mastery levels ranging from 71.43% to 100%, and most items interpreted as Mastered (88.57%, 80%, 100%, 85.71%, 94.29%, 77.14%, 97.14%, and 82.86%). However, two items obtained 71.43% and 74.29%, both interpreted as Nearly Mastered. The overall average mastery level is 85.14%, which is verbally interpreted as Mastered.

For Steps in Giving Hand/Foot Spa Treatment, the mastery levels per item range from 71.43% to 100%, with most items interpreted as Mastered (82.86%, 91.43%, 80%, 100%, and 94.29%), while one item obtained 71.43%, interpreted as Nearly Mastered. The average mastery level is 86.67%, which is verbally interpreted as Mastered.

Based on the findings, we can infer that learners demonstrate a generally high level of competency in both Hand Spa Treatment and the Steps in Giving Hand/Foot Spa Treatment, as reflected in the overall mastery levels of 85.14% and 86.67%, both of which are verbally interpreted as Mastered. This suggests that learners have sufficiently acquired the knowledge and skills required to perform spa procedures. However, the presence of Nearly Mastered items (71.43% and 74.29%) in Hand Spa Treatment and a Nearly Mastered item (71.43%) in procedural steps indicates that there are specific areas where learners still exhibit inconsistent understanding and performance, particularly in some procedural or technical aspects.

Table 1E: Nail Care Treatment

HAND SPA TREATMENT					
Item No.	No. of correct answer per item	Mastery Level (per item)	(per	Interpretation	Mastery Level (per competency)
25	3	71.4		Nearly Mastered	PERFORM HAND AND FOOT SPA (HS)
31	7	88.5		Mastered	
28		80		Mastered	9. Hand spa treatment
35		100		Mastered	

26	9	74.2	Nearly Mastered	
30	1	85.7	Mastered	
33	9	94.2	Mastered	
27	4	77.1	Mastered	
34	4	97.1	Mastered	
29	6	82.8	Mastered	
Average = 85.14			Mastered	
STEPS IN GIVING HAND/FOOT SPA TREATMENT				
Item No.	No. of correct answer per item	Mastery Level (per item)	Interpretation	Mastery Level (per competency)
29	6	82.8	Mastered	PERFORM HAND AND FOOT SPA (HS)
32	3	91.4	Mastered	7. Steps in giving hand/foot spa treatment
25	3	71.4	Nearly Mastered	
28		80	Mastered	
35		100	Mastered	
33	9	94.2	Mastered	
Average = 86.67			Mastered	

The findings imply the need for targeted remediation and skills reinforcement, especially for the least mastered competencies, to ensure full procedural accuracy and consistency. Teachers may enhance learning through step-by-step demonstrations, repeated hands-on practice, and performance-based assessments to strengthen weak areas. While overall mastery is satisfactory, addressing these gaps is essential to ensure that learners achieve complete proficiency and confidence in performing hand and foot spa treatments in real-world settings.

Table 1F, the summary of Beauty and nail Care learners' level of competency, shows mastery levels ranging from 81.90% to 88.57%, all of which are verbally interpreted as Mastered. Specifically, Procedures of Basic Manicure and Pedicure Services recorded 83.43% (Mastered) for Nail Structure, 86.86% (Mastered) for Nail Shapes, and 85.14% and 88.57% (both Mastered) for Nail Diseases and Disorders. In Hand and Foot Spa (HS) competencies, the Hand/Foot Spa Machine, Tools, Supplies, and Equipment obtained 84.57%, 88.57%, and 85.43% (all Mastered), while Safety Precautions under Manicure and Pedicure recorded 85.43% (Mastered).

The Pre-hand Spa Treatment registered 87.14% (Mastered), Hand Spa Treatment 85.14% (Mastered), Client Safety and Comfort (Foot and Nail Analysis) 86.57% (Mastered), and Steps in Giving Hand/Foot Spa Treatment 86.67% (Mastered). Lastly, Safety Precautions in Application of Basic Nail Designs obtained 81.90% (Mastered). The overall average mastery level is 85.80%, which is verbally interpreted as Mastered.

The findings indicate that learners demonstrate a consistently high level of competency across all TVL nail care competencies, as reflected in an overall average mastery level of 85.80%, which is verbally interpreted as Mastered. All competency areas fall within the 81.90% to 88.57% range, suggesting that learners have successfully acquired the essential knowledge and skills in manicure, pedicure, and hand-and-foot spa procedures. The relatively close range of scores also implies a balanced level of performance across competencies, with no area falling below the mastery threshold.

For Steps in Giving Hand/Foot Spa Treatment, the mastery levels per item range from 71.43% to 100%, with most items interpreted as Mastered (82.86%, 91.43%, 80%, 100%, and 94.29%), while one item obtained 71.43%, interpreted as Nearly Mastered. The average mastery level is 86.67%, which is verbally interpreted as Mastered.

Based on the findings, we can infer that learners demonstrate a generally high level of competency in both Hand Spa Treatment and the Steps in Giving Hand/Foot Spa Treatment, as reflected in the overall mastery levels of 85.14% and 86.67%, both of which are verbally interpreted as Mastered. This suggests that learners have sufficiently acquired the knowledge and skills required to perform spa procedures. However, the presence of Nearly Mastered items (71.43% and 74.29%) in Hand Spa Treatment and a Nearly Mastered item (71.43%) in procedural steps indicates that there are specific areas where learners still exhibit inconsistent understanding and performance, particularly in some procedural or technical aspects.

Table 1F: Summary of Nail Care Competencies

COMPETENCIES		MASTERY LEVEL AVM	VI	Rank
1	Procedures of basic manicure and pedicure services structure	1.1 Nail 83.43	<i>Mastered</i>	5
2	Procedures of basic manicure and pedicure services shapes	1.3 Nail 86.86	<i>Mastered</i>	2
3	Procedures of basic manicure and pedicure services diseases and disorders	1.2 Nail 85.14	<i>Mastered</i>	7
4	Procedures of basic manicure and pedicure services diseases and disorders	1.2 Nail 88.57	<i>Mastered</i>	4
5	PERFORM HAND AND FOOT SPA (HS) 5. Hand/foot spa machine, tools, supplies and equipment	84.57	<i>Mastered</i>	4
6	PERFORM HAND AND FOOT SPA (HS) 5. Hand/foot spa machine, tools, supplies and equipment	88.57	<i>Mastered</i>	4
7	PERFORM HAND AND FOOT SPA (HS) 5. Hand/foot spa machine, tools, supplies and equipment	85.43	<i>Mastered</i>	6
8	8. PERFORM MANICURE AND PEDICURE (PMP) 2. Application of basic nail designs Safety precautions	85.43	<i>Mastered</i>	6
9	PERFORM HAND AND FOOT SPA (HS) 8. Pre-hand spa treatment	87.14	<i>Mastered</i>	7
10	PERFORM HAND AND FOOT SPA (HS) 9 Hand spa treatment	85.14	<i>Mastered</i>	
11	PERFORM FOOT SPA (FS) Client safety and comfort foot and nail analysis	1.3 86.57	<i>Mastered</i>	4
12	PERFORM HAND AND FOOT SPA (HS) 7. Steps in giving hand/foot spa treatment	86.67	<i>Mastered</i>	3
13	PERFORM MANICURE AND PEDICURE (PMP) 2. Application of basic nail designs 2.1 Safety precautions	81.90	<i>Mastered</i>	1
AVERAGE		85.80	<i>Mastered</i>	

Design Features (Multimedia, Interactivity, Visual Aids, Self-Paced Learning) Are Most Helpful to Students

The effectiveness of digital learning materials is greatly influenced by the design features embedded within them, as these elements shape how learners engage with content and develop competencies. In the context of skill-based education such as Technology and Livelihood Education (TLE), particularly in areas like beauty and nail care services, the integration of multimedia, interactivity, visual aids, and self-paced learning plays a vital role in enhancing understanding and performance. Multimedia elements, including videos and audio, provide concrete demonstrations of procedures, while interactive components promote active participation and deeper learning. Visual aids support clarity and retention of concepts, especially for procedural tasks, and self-paced learning allows students to progress according to their individual abilities and learning styles. Therefore, identifying which of these design features are most helpful to students is essential in developing effective, learner-centered digital instructional materials that respond to their needs and improve overall learning outcomes.

Table 2A shows that the Video demonstrations of nail care procedures help learners understand lessons better obtained a

weighted mean of 4.72, interpreted as Highly Helpful and ranked 1 while the Animated tutorials improving understanding of step-by-step procedures obtained a weighted mean of 4.68, interpreted as Highly Helpful and ranked 2, the Audio explanations (voice-over) making lessons easier to follow obtained a weighted mean of 3.80, interpreted as Helpful and ranked 3. The average weighted mean of Multimedia Interactivity is 4.40, which is verbally interpreted as Highly Helpful.

Based on the presented findings, it could be inferred that learners perceive multimedia instructional materials as highly effective in enhancing their understanding of nail care lessons, as reflected in the overall average weighted mean of 4.40, verbally interpreted as Highly Helpful. Among the indicators, video demonstrations (weighted mean 4.72, Highly Helpful, Rank 1) and animated tutorials (weighted mean 4.68, Highly Helpful, Rank 2) are the most effective in supporting learning, suggesting that visual and step-by-step instructional formats significantly improve comprehension. In contrast, audio explanations with a weighted mean of 3.80 (Helpful, Rank 3) are perceived as less effective than visual-based strategies, though still beneficial.

Table 2A: Multimedia, Interactivity

Indicators	Weighted Mean	Interpretation	Rank
1. Video demonstrations of nail care procedures help me understand lessons better.	4.72	Highly Helpful	1
2. Audio explanations (voice-over) make lessons easier to follow.	3.80	Helpful	3
3. Animated tutorials improve my understanding of step-by-step procedures.	4.68	Highly Helpful	2
Average Weighted Mean	4.40	Highly Helpful	

Legend: Highly Helpful (4:21-5:00), Helpful (3:41-4:20), Moderately Helpful (2.61-3.40), Less Helpful (1.81-2.60), Not Helpful (1:00-1.80)

These results imply that teaching in nail care education is best supported by visually rich and demonstration-based instructional materials, which should be prioritized in lesson delivery. Educators are encouraged to integrate more video demonstrations and animated tutorials to maximize learner understanding and engagement. While audio explanations remain useful, they should be used as supplementary rather than primary instructional tools. Strengthening the use of multimedia-rich strategies may further enhance learner comprehension, procedural accuracy, and overall skill mastery in technical-vocational education.

The present study is similar with the study of Largo (2024) of the positive impact of competency-based learning materials on student engagement and motivation. Incorporating interactive and learner-centric elements fosters a more engaging educational experience, with gamified features and real-world case studies capturing students'

interest. However, it offers valuable insights for educators, policymakers, and industry stakeholders navigating the complexities of integrating competency-based strategies in nail care education.

Table 2B shows weighted mean values ranging from 4.60 to 4.72, with corresponding verbal interpretations of Helpful to Highly Helpful. Specifically, High-resolution images help learners understand procedures clearly, obtaining a weighted mean of 4.60, interpreted as Highly Helpful and ranked 2.

On the other hand, step-by-step visual guides are helpful in learning tasks, obtaining a weighted mean of 4.72, interpreted as Helpful and ranked 1, while diagrams and illustrations improve comprehension, obtaining a weighted mean of 4.72, interpreted as Highly Helpful and ranked 1. The average weighted mean is 4.68, which is verbally interpreted as Highly Helpful.

Table 2B: Visual Aids

Indicators	WM	VI	Rank
1. High-resolution images help me understand procedures clearly.	4.60	Highly Helpful	2
2. Step-by-step visual guides are helpful in learning tasks.	4.72	Helpful	1
3. Diagrams and illustrations improve my comprehension.	4.72	Highly Helpful	1
Average Weighted Mean	4.68	Highly Helpful	

The findings indicate that learners have a very high level of agreement that visual instructional materials significantly enhance their understanding of learning tasks, as reflected in the overall weighted mean of 4.68, which is verbally interpreted as Highly Helpful. Among the indicators, step-by-step visual guides with a weighted mean of 4.72, similar to diagrams and illustrations, obtained the highest ratings, both indicating strong learner preference for structured and visual representations of procedures. Meanwhile, high-resolution images with a weighted mean of 4.60 also received a high rating, though slightly lower than the other indicators, suggesting it is still effective but comparatively less influential.

These results imply that instructional materials in technical-vocational education are most effective when they are visually structured, step-based, and illustration-rich, as these significantly support learner comprehension. Teachers are encouraged to prioritize the use of step-by-step visual guides, diagrams, and illustrations in lesson delivery to maximize understanding and skill acquisition. While high-resolution images remain useful, enhancing them with procedural sequencing and explanatory visuals may further improve their instructional value and learner engagement.

The rent study was supported by the study of Indaryanti et al. (2025) highlights that mobile application-based learning media, developed through the 4-D model, is highly valid and effective for vocational education, as reflected in its high validity (90.33%) and effectiveness (87.29%) ratings. This strong performance underscores the crucial role of visual aids embedded in the application, which contributes to its ease of use and impact on learning outcomes. Through presenting content through images, guided procedures, and interactive visuals, the application helps learners better understand complex concepts and skills. This finding affirms that visual aids are highly helpful, particularly in skill-based areas like Beauty and Nail Care, where learners rely on clear demonstrations and step-by-step visual guidance to master procedures. Thus, the study supports the integration of visually rich digital tools as an effective strategy for enhancing comprehension, engagement, and competency development in vocational learning.

Table 2C The indicators show weighted mean values ranging from 4.20 to 4.52, with corresponding verbal interpretations of Helpful to Highly Helpful. Preference for learning at one's own pace using digital materials had a weighted mean of 4.20, interpreted as Helpful,

and was ranked 3. The ability to replay lessons obtained a weighted mean of 4.52, interpreted as Highly Helpful and ranked 1. Self-paced modules allowing review of difficult topics obtained a weighted mean of 4.32, interpreted as Highly Helpful and ranked 2. The average weighted mean for self-paced learning is 4.34, which is verbally interpreted as Highly Helpful.

The findings suggest that learners generally perceive self-paced digital learning features as highly beneficial, as reflected in the overall weighted mean of 4.34, which is interpreted as Highly Helpful. Among the indicators, the ability to replay lessons, with a

weighted mean of 4.52 (Highly Helpful, Rank 1), is most valued, suggesting that repetition significantly supports understanding. This is followed by self-paced modules for reviewing difficult topics, which have a weighted mean of 4.32 (Highly Helpful, Rank 2), indicating that learners appreciate opportunities to revisit complex content. Meanwhile, preference for learning at one’s own pace, with a weighted mean of 4.20 (Helpful, Rank 3), though positive, is comparatively lower, implying that independent pacing alone may not be equally preferred by all learners.

Table 2C: Self-Paced Learning

Indicators	Weighted Mean	VI	Rank
1. I prefer learning at my own pace using digital materials.	4.20	Helpful	3
2. The ability to replay lessons helps me understand better.	4.52	Highly Helpful	1
3. Self-paced modules allow me to review difficult topics easily.	4.32	Highly Helpful	2
Average Weighted Mean	4.34	Highly Helpful	

These results imply that digital instructional design should prioritize features that enable content replay and easy lesson review, as these strongly enhance comprehension. Educators are encouraged to develop modular and flexible learning materials that learners can revisit as needed. Additionally, since self-paced learning is not the strongest preference, integrating guided instruction or blended learning approaches alongside digital materials may help accommodate diverse learner needs and further improve learning effectiveness.

The present study supports the use of digital, self-paced learning tools in enhancing competency-based training in beauty and nail care service such as the study of Chen & Chan (2024) emphasizes that digital approaches such as blended learning, simulation-based learning, and game-based learning enhance TVET by making instruction more flexible and learner-centered. It highlights that learning is strengthened through interaction with diverse digital resources and experiences.

Also, this study is directly relevant to self-paced learning in Beauty and Nail Care, study of Ghosh & Ravichandran (2024) where students can independently access step-by-step demonstrations, revisit procedures, and practice skills at their own pace, leading to better mastery of competencies. It was noted on the present and previous study that emerging technologies like Artificial Intelligence, Virtual Reality, and Augmented Reality improve skills development and employability.

Digitized Material (Beauty and Nail Care App)

The developed digital learning material for Beauty and Nail Care Services is a structured instructional mobile application designed to address the learning needs of TVL students by providing comprehensive, visual, and interactive content. It serves as a digital guide covering key topics such as nail anatomy, nail disorders, proper nail care procedures, safety practices, and the use of tools and equipment, along with step-by-step instructions for manicure, pedicure, and hand/foot spa services. The app’s content is anchored on assessment results, particularly focusing on least-mastered competencies like basic nail design and foundational knowledge, which are presented through slide-based lessons combining text,

images, and guided procedures to enhance both theoretical understanding and practical application.

The application improves learner engagement by utilizing clear visuals and organized content, encouraging active participation and self-paced learning. It

also functions as a supplementary instructional tool for teachers by providing ready-to-use, curriculum-aligned materials. As an innovation, the app strengthens the Senior High School TVL curriculum by promoting competency-based, learner-centered, and technology-integrated instruction, while bridging the gap between theory and practice through simulated real-life tasks. This enhances students’ readiness for employment or entrepreneurship in the beauty industry despite limitations in resources or laboratory access.

Furthermore, the initiative aligns with the United Nations Sustainable Development Goals, particularly SDG 4: Quality Education, SDG 8: Decent Work and Economic Growth, and SDG 9: Industry, Innovation, and Infrastructure, by promoting inclusive digital learning, developing employable skills, and integrating technology in education. In total, the app serves as a holistic learning tool that effectively connects theory with practice and addresses identified competency gaps in beauty and nail care services.

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2. The findings indicate that visual aids significantly enhance learner comprehension, with high-resolution images receiving a weighted mean of 4.60, interpreted as Highly Helpful and ranked 2. Step-by-step visual guides and diagrams both achieved a weighted mean of 4.72, also interpreted as Highly Helpful, ranking them 1. The overall average weighted mean for visual aids is 4.68, categorized as Highly Helpful. In the realm of multimedia interactivity, video demonstrations scored the highest with a weighted mean of 4.72, interpreted as Highly Helpful and ranked 1, while animated tutorials followed closely with a mean of 4.68, also Highly Helpful and ranked 2. Audio explanations, with a weighted mean of 3.80, were deemed Helpful and ranked 3, resulting in an average weighted mean of 4.40 for multimedia interactivity, classified as Highly Helpful. Regarding self-paced learning, the ability to replay lessons was rated the highest at 4.52, interpreted as Highly Helpful and ranked 1, while self-paced modules for reviewing difficult topics scored 4.32, also Highly Helpful and ranked 2. Preference for learning at one's own pace received a weighted mean of 4.20, categorized as Helpful and ranked 3, leading to an average weighted mean of 4.34 for self-paced learning, interpreted as Highly Helpful
3. The study developed a Beauty and Nail Care App as a digitized instructional material for TVL students, serving as a structured guide that integrates lessons, procedures, and visual aids on manicure, pedicure, hand/foot spa services, nail anatomy, disorders, tools, equipment, safety precautions, and step-by-step procedures. Also, findings show that the app supports engaging, accessible, and self-paced learning, allowing learners to review lessons repeatedly and improve understanding through visual and procedural guidance. It also promotes independent learning, learner engagement, and competency mastery, while serving as a curriculum-aligned teaching aid for teachers.

Chapter 4

SUMMARY, FINDINGS, CONCLUSIONS AND RECOMMENDATIONS

This chapter presents a summary of the methods and procedures adopted in this study. Also provided in this chapter are the findings, conclusions, and recommendations that are parallel with the problems stated at the beginning of the research.

Summary

The study aimed to design digital learning materials for beauty & nail care services among TVL Students at Rodriguez National High School with the goal of creating a technology inspired material from the collected data. To attain this end, the following problems were pursued. (1) What learning competencies do students find most challenging in Beauty & Nail Care? (2) What design features (multimedia, interactivity, visual aids, self-paced learning) are most helpful to students? (3) What digital material can be developed to help learners enrolled in Beauty and Nail Care master the competencies on the curriculum?

In addition, this study adopted a developmental research design to look at the Beauty and Nail care competencies students found challenging and develop an App to answer this gap. Developmental research is particularly appropriate when the goal is to create an instructional product, process or program in an educational context. Eligible participants were twenty-five (25) respondents composed of TVL (Beauty and Nail Care Services) students – from Rodriguez National High School was interviewed and tested to provide the learning competencies students find most challenging in Beauty & Nail Care and the design features (multimedia, interactivity, visual aids, self-paced learning) most helpful to students. The data collected were then rewritten, reinterpreted, and reorganized to create a narrative like flow for the (Digitization) App development.

Findings

This study revealed a number of important findings:

1. The findings show that students achieved an overall average mastery level of 85.80%, verbally interpreted as Mastered. Nail Structure obtained 83.43% (Mastered), with some items at 71.43% and 74.29% (Nearly Mastered). Nail Shape recorded 86.29% (Mastered), with a highest score of 100% (Mastered). Application of Basic Nail Designs had an average of 81.90% (Mastered), with lower scores of 68.57% and 71.43% (Nearly Mastered). Procedures of Basic Manicure and Pedicure Services obtained 85.14% (Mastered), with scores ranging from 71.43% (Nearly Mastered) to 100% (Mastered). Nail Diseases and Disorders achieved 88.57% (Mastered), with high scores of 91.43% and 97.14% (Mastered). Hand/Foot Spa Machine, Tools, and Supplies showed mastery levels ranging from 71.43% to 100%, all generally interpreted as Mastered, with lower values indicating areas needing reinforcement.

Conclusions

Based on the findings of this study the following conclusions are drawn:

1. The study concludes that students in Beauty and Nail Care Services demonstrated an overall mastered level of competency, with a mean mastery level of 85.80%. This indicates that learners have generally acquired the essential knowledge and skills required in the subject. However, the presence of Nearly Mastered scores in specific items, particularly in Nail Structure, Application of Basic Nail Designs, and selected procedures in manicure and pedicure, signifies that some foundational and technical skills still need reinforcement. In contrast, competencies such as Nail Shape, Nail Diseases and Disorders, and Hand/Foot Spa Machine, Tools, and Supplies showed higher mastery levels, reflecting effective instruction and stronger learner understanding in these areas. Overall, while competency levels are satisfactory, targeted remediation is necessary to address identified learning gaps and ensure consistent mastery across all areas.

2. The study concludes that visual aids, multimedia interactivity, and self-paced learning strategies are all highly effective in enhancing learner understanding, as reflected in overall weighted means ranging from 4.34 to 4.68, all interpreted as Highly Helpful. Specifically, step-by-step visual guides, diagrams, and video demonstrations emerged as the most effective tools, indicating that visual and procedural representations greatly support comprehension of complex lessons. Animated tutorials and high-resolution images further reinforce learning, while audio explanations, though slightly lower, remain helpful as supplementary materials. In terms of self-paced learning, features such as lesson replay and modular review significantly contribute to understanding, highlighting the importance of flexible and repeatable learning experiences. Overall, the findings confirm that a combination of visual, multimedia, and self-paced learning tools effectively improves learner engagement and comprehension in technical-vocational education
3. The study concludes that the developed Beauty and Nail Care App is an effective digitized instructional material for TVL students, as it integrates essential lessons, procedures, and visual aids aligned with Beauty and Nail Care competencies. The application successfully supports engaging, accessible, and self-paced learning, enabling learners to repeatedly review lessons and improve understanding through structured visual and procedural guidance. It also enhances independent learning, learner engagement, and competency mastery, while serving as a valuable curriculum-aligned instructional aid for teachers. In general, the app effectively bridges theory and practice in Beauty and Nail Care Services and contributes to improved learning delivery in technical-vocational education.

Recommendations

Based on the findings of this research, it is recommended that:

1. It is recommended that teachers provide remedial instruction and additional hands-on practice activities focusing on Nail Structure, Application of Basic Nail Designs, and selected manicure and pedicure procedures. Schools may also develop supplementary learning materials and performance-based drills to strengthen foundational and technical skills and ensure consistent mastery across all competencies.
2. It is recommended that teachers and instructional designers maximize the use of step-by-step visual guides, diagrams, and video demonstrations in teaching Beauty and Nail Care lessons. Schools should also integrate interactive and self-paced learning strategies, such as replay-able lessons and modular activities, to support varied learning paces and enhance learner comprehension, while using audio materials as supplementary support.
3. It is recommended that the Beauty and Nail Care App be fully integrated as a supplemental instructional tool in TVL classrooms to support competency-based learning. Teachers should be encouraged to use the app regularly to reinforce lessons, while administrators may provide continuous training and technical support to maximize its

use in enhancing learner engagement, independent learning, and mastery of competencies.

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