West Visayas State University
COLLEGE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY
La Paz, Iloilo City, Philippines

DECISION SUPPORT SYSTEM FOR FOOD INTAKE MONITORING AND DENTAL HEALTH PROFILING

An Undergraduate Thesis

Presented to the Faculty of the

College of Information and Communications Technology

West Visayas State University

La Paz, Iloilo City

In Partial Fulfillment

of the Requirements for the Degree

Bachelor of Science in Information Systems

by

Caesy L. Ladores

Jonela Marie P. Magbanua

Jericho Cleo D. Quilas

Julian Dave G. Sioting

Jemelyn D. Tesara

June 2024

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Approval Sheet

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Dr. Regin A. Cabacas Panel	Mr. Shem Durst Elijah Sandig Panel
Engr. Erwin Osorio Panel	Mr. Nikie Jo Deocampo Panel
Ms. Camille Aryne Sevillena Panel	Dr. Ma. Beth S. Concepcion Adviser

Concurred:

Dr. Regin A. Cabacas Chair, Information Systems	Dr. Ma. Beth S. Concepcion Dean

June 2024

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Caesy L. Ladores

Jonela Marie P. Magbanua

Jericho Cleo D. Quilas

Julian Dave G. Sioting

Jemelyn D. Tesara

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Abstract

In the realm of health and well-being, food intake habits and dental health are intricately linked. This abstract introduces a Decision Support System (DSS) designed to holistically monitor food intake and provide insights into an individual's dental health profile. The DSS employs decision rule-based algorithms to analyze food intake monitoring risk level and oral health risk level. By integrating these data, the DSS offers recommendations tailored to enhance both nutritional intake and dental hygiene. The system's analytics can foresee potential dental health issues based on dietary patterns, allowing for timely interventions. Furthermore, the DSS facilitates collaboration between nutritionists and dentists, fostering a multidisciplinary approach to holistic health management. Through its innovative features, this Decision Support System aims to revolutionize preventive care, promoting

optimal nutrition and superior dental health outcomes for individuals.

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CHAPTER 1 INTRODUCTION OF THE STUDY

Background of the Study and Theoretical Framework

Dental health is essential for overall well-being, with issues like cavities and gum disease negatively impacting eating and speaking functions. Good dental hygiene habits, such as regular brushing, flossing, and routine dental checkups are crucial. Dietary choices such as reducing sugar, moderating alcohol, and avoiding tobacco, also play a significant role (Block, 2021).

One of the primary factors contributing to dental health problems is the consumption of high-sugar and acidic foods and beverages. World Health Organization (2017) highlighted the significant impact of food intake on dental health. Regular consumption of sugary and acidic foods and beverages can lead to tooth enamel erosions and cavity formation.

Moreover, World Health Organization (2023) stated that Oral health encompasses the condition of one’s mouth, teeth, and facial structures that allow people to perform essential functions like eating, breathing, and speaking.

It also bears on psychosocial factors like self-confidence, well-being, and the ability to engage in social and work-related activities without experiencing pain, discomfort, or embarrassment. Oral health changes throughout life, from childhood to old age, are essential to overall health and assist individuals' active participation in society, thus enabling them to fulfill their potential.

Conquest et al. (2021) conducted a study on Oral Health Profiling for both Young and Older Adults with the goal of gaining a thorough understanding of the oral health status, identifying risk factors, and examining challenges faced by individuals in different age brackets. The researchers utilized oral examinations, questionnaires, and interviews to gather data, evaluating aspects such as dental caries, periodontal health, oral hygiene practices, and access to dental care. Through a comparative analysis of oral health profiles between young and older adults, the study seeks to uncover potential age-related distinctions and offer insights into patterns and trends in oral health.

For food intake monitoring, Berrocal et al. (2019) stated that the theory of food intake monitoring is the

collecting of data on types of food consumed, portion sizes, meal frequency, and overall dietary patterns. The relevance of this research to our study is that it can gather valuable data on an individual food intake. This information can be used to assess the risk factors associated with dental health such as excessive sugar consumption and provide recommendations for improving dental health. The findings and systematic literature review in this study can inform the development of the system. This review may highlight effective methods and technologies for monitoring of food intake.

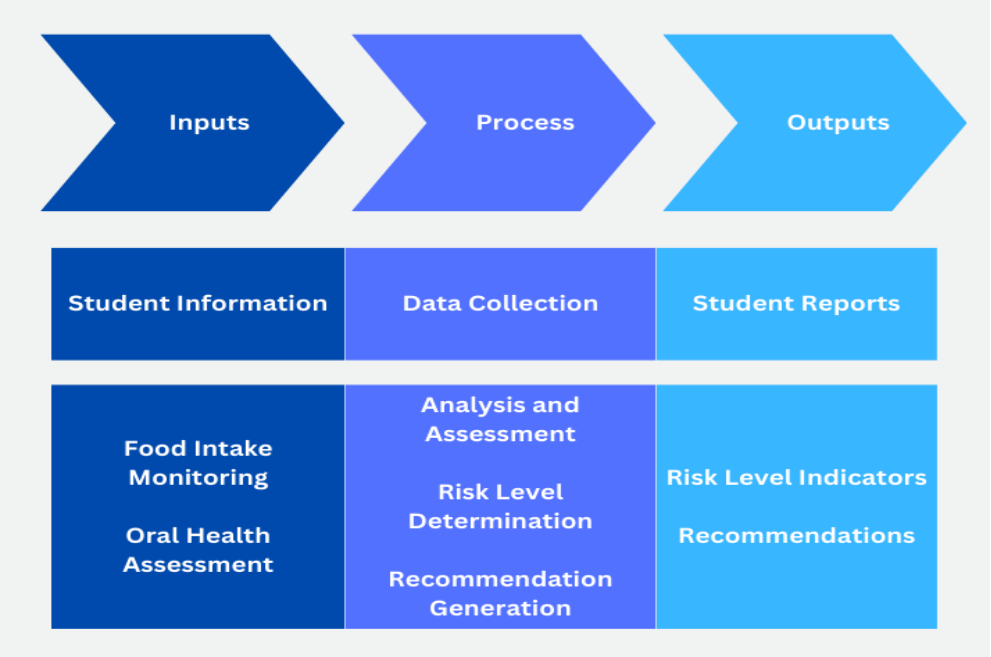


Figure 1. Systems Inputs and Outputs

The system is designed to manage and improve students' dietary habits and oral health. In the input stage, the system collects essential information about students, such as their personal details, what they eat, and their dental health history.

Next is the process stage, where the system gathers and examines the data to assess students' eating patterns and oral health. The outcome of this analysis helps to identify students who may be at risk of dental and food

issues. Based on this risk assessment, the system creates recommendations.

The output stage involves creating graphical reports. These reports summarize the findings and provide a clear indication of the student's risk for dental and food problems. The system then offers recommendations to help students improve their diet and dental care.

The current procedure at the West Visayas State University dental clinic, as described by affiliated dentist Dr. George N. Sibonga, relies on manual methods for appointment scheduling. The absence of a dental system presents several issues such as inaccurate record-keeping, inefficient data collection and analysis, and appointment scheduling difficulties are common challenges. The manual process for tracking dietary and dental health is slow, which can delay necessary health interventions. Students often struggle to report their food and dental records accurately without user-friendly digital tools. Moreover, each new school year requires dental exams for all students, which adds to the clinic’s workload.

This study aims to develop a Decision Support System for food intake monitoring and dental health profiling. The system is designed to help users make informed decisions about their food intake habits and dental health. The goal is to provide users with the necessary information to make health-conscious choices about their diet and oral care.

Objectives of the Study

This study generally aimed to develop a Decision Support System for Food Intake Monitoring and Dental Health Profiling

Specifically, it aimed to:

1. Develop an oral health assessment module based on the Australian Institute of Health and Welfare;
2. Develop a food intake monitoring tool to help users track their food intake and know the results about it;
3. Create a comprehensive dental health profiling tool that allows users to track and monitor oral health;
4. Validate the correctness of the assessment tools with healthcare experts; and
5. Validate the system based on ISO 25010.

Significance of the Study

The findings of this study is beneficial to the following:

Students. This study may serve as ideal participants for testing effectiveness of the proposed system, as they represent a diverse demographic that frequently faces dietary and dental health challenges. Their involvement allows for real-world data collection and feedback, ensuring the practicality and relevance of the decision support system. Their input and insights can enhance the overall quality and applicability of the study, making it more valuable for both academic and practical purposes.

WVSU Community. The involvement of the WVSU community holds paramount importance in this study as they constitute the primary audience for the decision support system (DSS). Actively engaging with and receiving feedback from this community plays a crucial role in refining and validating the system, ensuring its practicality and efficiency. Collaborating with the WVSU

community is instrumental in gaining insights into their distinct challenges and preferences, thereby facilitating the development of a DSS that is more pertinent and effective in meeting their specific needs. This participatory approach cultivates a sense of community involvement and belonging, elevating the significance of the research and its potential to enhance the overall well-being of community members.

Dentists. Their expertise in the field of dental health enables them to accurately examine and interpret the DSS data. Dentists can provide professional perspectives and advice in building dental-specific algorithms and risk assessment models. Their participation guarantees that the DSS adheres to established dental health standards and practices. Based on the DSS findings, dentists can also make recommendations for preventive measures, treatments, and interventions. Finally, their collaboration is critical for bridging the gap between research and practical

dental healthcare applications, ensuring the system's effectiveness and real-world influence.

Public Health. The study carries broader implications for public health, extending beyond its immediate context. The utilization of a decision support system for monitoring food intake and profiling dental health is transferable to diverse populations, encompassing both children and adults within communities. By advocating for healthy eating practices and effective dental hygiene, these interventions have the potential to positively influence the overall well-being of the population.

Other Researchers. This study holds a potential contribution within the realm of health promotion. Through an assessment of the decision support system's efficacy in monitoring food intake and dental health profiling, the research offers valuable insights into optimal approaches for fostering healthy habits among students. The outcomes have the capacity to guide future

interventions and shape policies aimed at promoting healthy lifestyles among young individuals.

Definition of Terms

For better understanding, the following terms were defined conceptually and operationally:

Decision Rule-Based Algorithm - A decision rule is a simple IF-THEN statement consisting of a condition (also called antecedent) and a prediction (Molnar, 2023).

In this study, the researchers used the "Decision Rule-Based Algorithm". This algorithm analyzes food intake data and oral health information. It uses predefined rules to assess risk factors and suggest actions. In the context of food monitoring, it categorized risk as High, Moderate, or Low and provides recommendations, especially for students. For dental health, it evaluates oral health factors and suggests actions ranging from Immediate Action Required to Excellent Oral Hygiene. This systematic approach personalized advice, improves efficiency, and makes the system user-friendly. By providing valuable insights, it

encourages healthier food choices and better dental care practices.

Decision Support System (DSS) – is a computer program application used to improve a company's decision-making capabilities. It analyzes large amounts of data and presents an organization with the best possible options available (www.techtarget.com, 2023).

In this study, the "Decision Support System" was a digital tool designed to help students and dental professionals make informed decisions about diet and oral health. The DSS allowed students to track their food habits, get dental check-ups, receive recommendations from the system, and schedule dental appointments. Dental professionals use the system to manage student data. The main aim of the DSS is to facilitate the monitoring of diet and oral health, leading to better mouth hygiene and overall nutritional health.

Dental - is used to describe things that relate to teeth or to the care and treatment of teeth (Collins English Dictionary, 2023).

In this study, "dental" referred to the process where our system aids dental professionals in assessing the students' oral health. This includes checking their dental condition, diagnosing issues, and giving advice on oral care. The goal is to maintain students' oral health and address any problems. This process is carried out by dental professionals.

Profiling – the act or process of extrapolating information about a person based on known traits or tendencies (Merriam Webster, 2023).

In this study, "profiling" was the process of collecting and analyzing students' food intake and oral health data regarding their risk levels, considering factors like age, gender, and department. It helps categorize students into different risk levels for food intake - high risk, moderate risk, and low risk. Similarly, it classifies students' dental health status,

identifying those immediate action required, those with moderate oral health issues, those to watch for changes, and those with good or excellent oral hygiene.

Food Intake – is sum of food consumed by a person (IGI-Global, 2013).

In this study, "Food Intake" was a key part of the system's food assessment module. It involved tracking a person's diet, how many food servings were consumed, and evaluating food choices. The goal was to understand food preferences and behaviors. This process helps monitor and enhance a student's overall nutrition and dental health.

Monitoring – watching and checking a situation carefully for a period of time in order to discover something about it (Cambridge Dictionary, 2023)

In this study, "monitoring" referred the continuous process of observing and evaluating students' diet and oral health. It involves regular collection of data on students' food habits and dental conditions during their dental visits. This routine check-up and data collection

helps keep track of changes in their nutrition and dental health. Monitoring is crucial for personalized advice, early detection of issues, and proactive health management.

Delimitation of the Study

This system is entitled "Decision Support System for Food Intake Monitoring and Dental Health Profiling," developed in the context of Information Systems.

The effectiveness of the system is dependent on the accuracy and completeness of the data provided by the students and dental professionals. Any inaccuracies or incomplete data could affect the quality of the recommendations.

The system is designed to support decision-making, not to replace professional medical advice. Users are always encouraged to consult with healthcare professionals for any health-related concerns. The system's recommendations are based on general dietary and dental health guidelines, and individual variations such as specific dietary restrictions or unique dental conditions may not be fully accounted for.

The system does not consider external factors that may influence food intake and dental health, such as socioeconomic status, cultural practices, or access to

healthcare services. It is designed for use within the West Visayas State University community and may not be applicable or effective in other settings or populations.

The system does not track changes in dietary habits or dental health over time, which limits its ability to provide dynamic recommendations based on evolving user needs. These delimitations should be considered when interpreting the results of the study and the recommendations provided by the system. Despite these limitations, the system aims to provide valuable insights and support for students in managing their dietary habits and dental health.

CHAPTER 2 REVIEW OF RELATED STUDIES

Review of Existing and Related Studies

Impact of Diet on Oral Health

The importance of a nutritious diet for optimal oral health is emphasized. It highlights the benefits of consuming foods high in calcium and phosphorus, such as dairy, greens, and nuts, to strengthen teeth and bones. It also suggests eating fiber-rich fruits, vegetables, and grains to promote healthy gums. On the other hand, it warns against sugary and acidic items that can lead to cavities and enamel wear. It also notes that poor nutrition can weaken the immune system and increase the risk of gum disease. This research is crucial for the system as it lays the groundwork for comprehending the complex link between diet and oral health. By reviewing literature on oral health, the decision support system acquires important insights into how diet affects dental problems like cavities, gum disease, and enamel wear. This information is key to formulating effective recommendations within the system. The literature review

provides vital context and background for the system to offer recommendations and insights that match a student's needs. Thus, incorporating oral health research findings improves the system’s capacity to aid in better preventive care and overall health regarding dietary monitoring and oral health assessment.

The study by Bestle et al. (2022) entitled “Comparison of Discretionary Food and Drink Intake Based on a Short Web-Based Sugar-Rich Food Screener and a Validated Web-Based 7-Day Dietary Record”, aimed to evaluate the effectiveness of a concise online questionnaire for sugar-heavy foods against a detailed 7-day dietary log in measuring discretionary food and beverage intake. The study included 135 Danish participants between 18 and 70 years old, who completed both tools within two weeks. The findings highlight the importance of using validated dietary assessment methods in research and healthcare to accurately gauge food intake. The study suggests that while the brief sugar-focused screener is helpful for quickly spotting high-risk dietary patterns, it shouldn’t replace thorough

dietary evaluations like the 7-day record. This study is pertinent to the system as it introduces an effective method for detecting potential dental caries risks through diet. The insights from this review are instrumental in refining the decision support system's assessment tools, deepening the understanding of diet's impact on oral health. Utilizing this research, the system can improve its recommendations, encourage healthy eating behaviors among students, and contribute to improved dental health.

Relationship between Food Intake and Oral Health

Lopez et al. (2020) stated that the connection between eating habits and oral well-being stresses the importance of a balanced diet rich in essential nutrients while highlighting the negative consequences of consuming too much sugar, acid, and certain beverages. It also highlights the beneficial effects of certain foods, such as dairy products, which are rich in calcium and phosphorus, and fresh produce, abundant in vitamins and antioxidants. Furthermore, this research is significant

for the system as it offers fundamental insights into the ways eating habits can impact dental health, providing a base of knowledge for the decision support system. The literature review educates the students about the good and bad effects of certain foods on oral health and allows the system to give recommendations based on assessment input provided by the students and dentist. Understanding the interplay between dietary choices and oral health, as detailed in the research, improves the system's guidance for making decisions that support ideal dental health.

Decision Support System on Healthcare

The study by Syntellis on Decision Support Systems (DSS) in healthcare underscores the critical role of data utilization in informed decision-making within medical settings. It points out that DSS is key for healthcare entities to measure the effects of their decisions across various sectors by examining diverse data sets. This process is vital for enhancing operational efficiency, financial stewardship, and patient care outcomes.

In the context of monitoring dietary habits, DSS proves to be a valuable asset in gathering and interpreting data regarding patients' eating patterns. Through the integration of information from wearable tech, digital health records, and self-reported data by patients, DSS aids medical professionals in detecting dietary trends, identifying potential nutritional shortfalls, and customizing diet plans to meet the unique requirements of each patient. Regarding oral health profiling, DSS compiles and analyzes information from dental charts, diagnostic imaging, and feedback from patients to support the diagnosis of oral conditions, the formulation of treatment plans, and the forecasting of treatment results. Additionally, DSS contributes to public health management by evaluating dental health patterns within communities and pinpointing specific areas for focused public health actions. In both scenarios, DSS acts as an instrumental mechanism in converting intricate data sets into practical knowledge, thereby empowering healthcare practitioners to make more informed decisions that enhance patient care and health management strategies.

Technological Innovations in Health Monitoring

Another literature reveals that in modern healthcare, patient monitoring technology is essential for the continuous tracking and assessment of individuals' health. Offering real-time data and valuable insights, these monitors enable healthcare professionals to make informed decisions and deliver personalized care. This pillar post delves into the newest innovations and future directions in patient monitoring technology, emphasizing its significant role in enhancing healthcare outcomes. In addition to the significance of advancements in patient monitoring technology, providing real-time data and critical insights essential for accurately tracking food consumption and dental health. These insights can be integrated into decision support systems to enhance accuracy and reliability. The study illustrates how modern monitoring technologies automate data collection and analysis, reducing manual entry burdens and minimizing errors, which is crucial for effective food intake monitoring and dental health profiling, enabling precise and timely interventions. By

emphasizing the trend towards pe9rsonalized care through continuous monitoring, the study supports tailoring decision support systems to individual patients' needs, improving dietary and dental health recommendations and outcomes. Furthermore, the research points to the potential of innovative solutions to transform traditional healthcare practices by adopting cutting-edge technologies that enhance the efficiency and effectiveness of monitoring and profiling systems. Ultimately, incorporating these innovations into decision support systems allows healthcare providers to make more informed decisions, significantly improving the quality of care for patients regarding their nutritional and dental health.

Oral Health Methods

Oral Health Surveys (2023) indicated that this research study guides how to conduct oral health surveys using standardized methods and protocols while the decision support system is a digital tool that allows students to monitor their oral health and receive

personalized recommendations based on their data. Additionally, the decision support system focuses specifically on food intake monitoring and dental health profiling, whereas the research study can be applied more broadly to different populations and settings. The research is related since it provides foundational insights into the standardized methods used in oral health surveys, offering a framework for the system to structure its data collection processes. The established techniques in oral health assessment outlined in the literature informs the decision support system's methodology, ensuring robust and reliable data for monitoring food intake and profiling dental health. Lastly, the literature contributes to the system's evidence-based approach, facilitating informed decision-making and recommendations for individuals based on comprehensive oral health survey methodologies.

CHAPTER 3 RESEARCH DESIGN AND METHODOLOGY

Description of the Study

The "Decision Support System for Food Intake Monitoring and Dental Health Profiling" aimed to improve the overall well-being of students of West Visayas State University. This system comprises an oral health assessment module aligned with AIHW guidelines, a food intake monitoring tool, and a comprehensive dental health profiling tool. Currently, the WVSU Dental Clinic relies on manual processes involving paper records and scheduling appointments manually.

Assumptions and Preconditions

The proposed Decision Support System for Food Intake Monitoring and Dental Health Profiling aimed to transform healthcare by digitizing essential components such as an oral health assessment module aligned with AIHW guidelines, a food intake monitoring tool, and a comprehensive dental health profiling tool.

1. Development of Oral Health Assessment: The system will create an oral health assessment module based on AIHW guidelines. The module will gather data on dental hygiene practices and prevalent dental conditions through standardized tools like questionnaires. The goal is to provide a comprehensive overview of users' oral health status, enabling healthcare providers to monitor, detect issues early, and offer recommendations.
2. Development of Food Intake Monitoring Tool: The system will create a food intake monitoring tool to track users' dietary habits. Students can log their daily food intake through the food intake assessment. The aim is to empower users to make informed decisions about their diet, leading to improved nutritional outcomes and overall health.
3. Creation of Dental Health Profiling Tool: The system will analyze the student’s data and demographics based on age, gender, and department. It will include visual representations. The tool aims to

empower students and dentist to monitor the oral health status and track progress.

4. Validation with Healthcare Experts: This objective entails collaborating with healthcare experts, including dentists and nutritionists, to validate the correctness and relevance of the assessment tools. Experts will review the tools' functionality, accuracy, and alignment with healthcare standards. Their feedback and suggestions will ensure that the tools meet the needs of healthcare professionals and users, enhancing their accuracy, reliability, and effectiveness in supporting healthcare decision-making and providing healthcare recommendations.
5. Digitization: The system will transition appointment and dental records into a digital format, enabling dental providers to electronically manage records of students who have made appointments and undergone dental examinations. This shift aims to eliminate the necessity for manual record-keeping, minimizing the risk of errors or data loss in the process.

Methods and Proposed Enhancements

The gathering of relevant information from many sources such as the internet, literature, and WVSU-University Dentist data of students and their dental processes. Furthermore, the researchers sought guidance and suggestions from experts in the field.

The researchers' decision support system (DSS) for food intake monitoring and dental health profiling incorporated several innovative features to enhance its functionality and effectiveness. One of the key innovations is the integration of advanced machine learning algorithms specifically decision rule-based algorithm for food intake and dental recommendations.

Firstly, the system utilizes a data collection mechanism that gathers information about students' food intake habits, including food choices and its portion sizes. This data are then processed using advanced data analytics techniques to create a recommendation tailored to individual users' nutritional needs and health goals.

The application of our algorithm extends beyond individual users to include healthcare professionals and nutritionists. For instance, dentists can use the system to track patients' dietary habits and dental health over time, enabling early intervention and treatment plans.

By integrating these cutting-edge technologies, the researchers aimed to empower users and healthcare professionals with actionable insights to improve overall well-being and promote better oral health outcomes.

Components and Design

Software Architecture

As shown in Figure 2, the system for monitoring food intake and dental health has its own parts. First, the User Interface Layer where users can easily interact with the software. Individuals can monitor and check the risk level to know where it is based on the scoring and also the recommendation where users can give tips on how they can maintain their status. Below that, the Decision Rule-based layer where we can set rules and algorithms to analyze data from the Food Intake and Dental Health Modules, offering recommendations. The Business Logic Layer where we process the data, applying rules to provide useful insights by connecting nutritional and dental health information. The Device Interface Layer ensures smooth communication with external devices collecting data. Data Access securely stores and retrieves information in the database, while monitoring keeps track of user data. The Risk Level component assesses health risks linked to user data. The Recommendation component uses rules to suggest actions for

better health. XAMPP, a tech stack, is used to set up the server side, manage databases, and handle requests. The system is accessible through a Web Application, making it easy for users to log in, input data, view suggestions, and monitor their food intake and dental health.

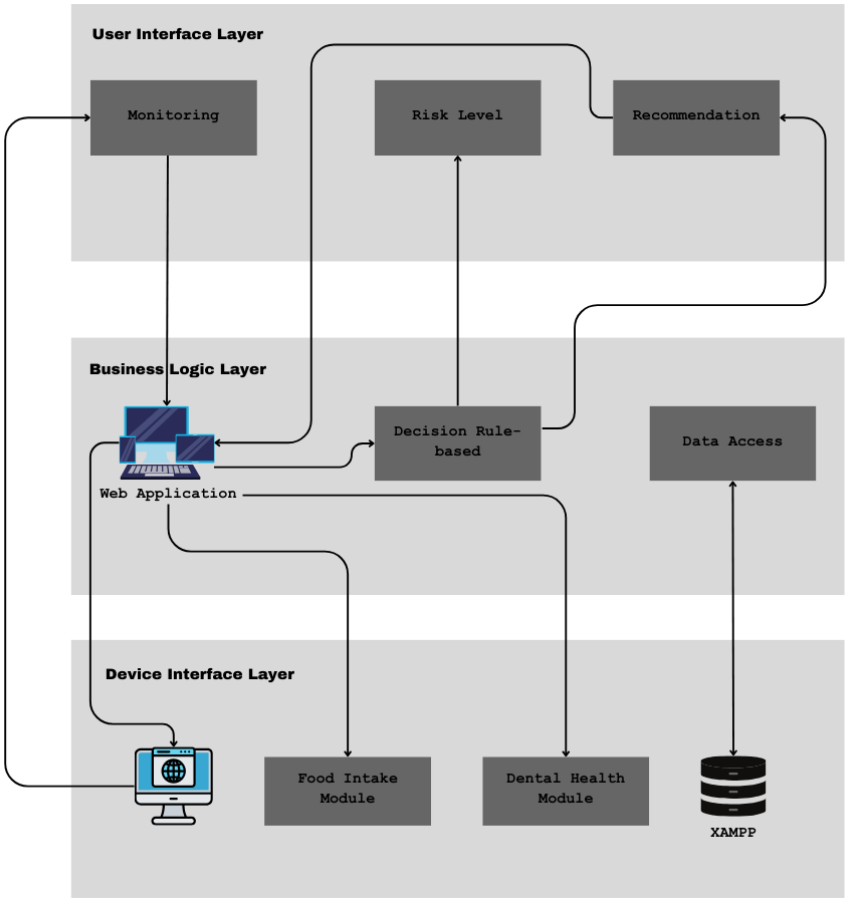


Figure 2. Software Architecture of the System

System Architecture

Figure 3 shows that the system starts with a user registration where students and dentists register through a desktop or laptop that can be used, and it collects essential information for user profiles. After this, the students can assess and track their dietary habits through food intake monitoring including food choices and servings. Next, admin or dentists can conduct oral health assessments where they can evaluate the oral status and dental history of the student. Then, the system processes data to determine individual risk levels based on food choices and oral health. There are different scoring types which we generated using the decision rule-based algorithm to easily identify the risk levels of the student. Lastly, generating recommendations for students' dietary improvements and oral health interventions which they can know where they must maintain their daily nutritional diet and oral hygiene habits. User profiles store updated information from these processes, ensuring a smooth data flow for valuable insights catering the needs of students and dentists.

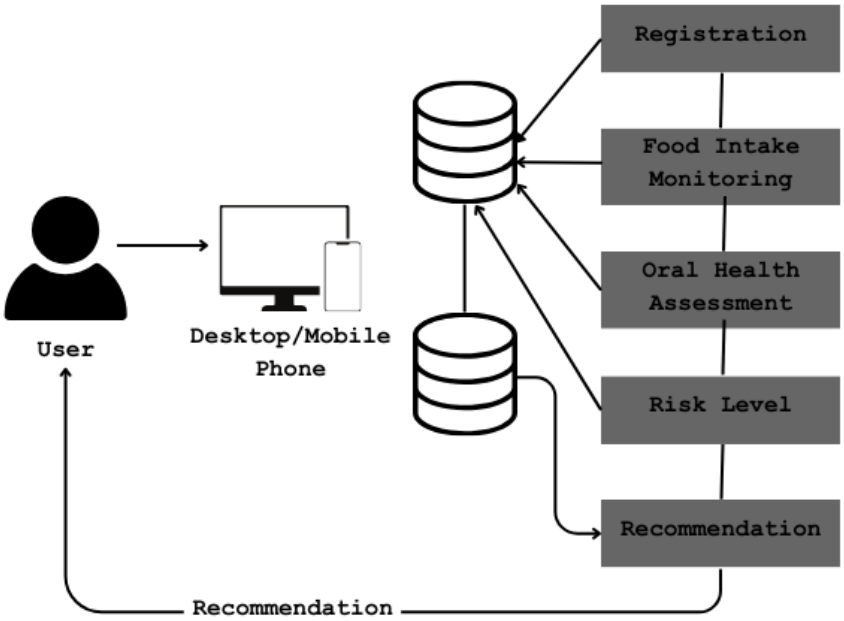


Figure 3. System Architecture of the System

Database Design

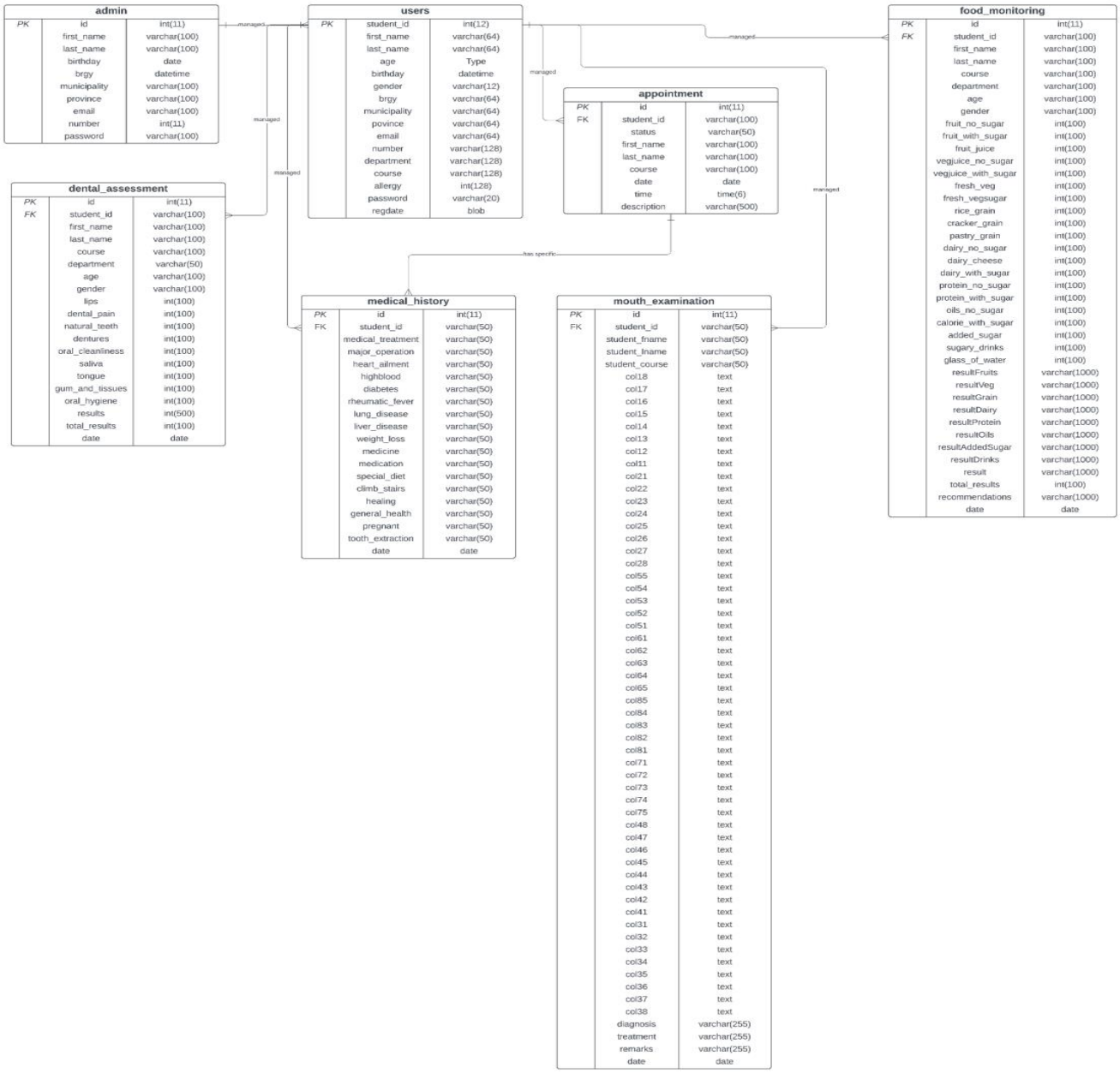


Figure 4. Entity Relationship Diagram

Figure 4 illustrates the Entity Relationship Diagram for the Decision Support System designed for Food Intake Monitoring and Dental Health Profiling. Within this framework, the database comprises seven principal tables: “admin” (managing system access and privileges), “users” (storing patient profiles and login credentials), “food monitoring” (tracking dietary habits and nutritional intake), “dental assessment” (recording dental check-up results and treatment plans), “appointment” (scheduling and managing patient appointments), “medical history” (documenting past medical conditions and treatments), and “mouth examination” (detailing oral examinations and findings). This ERD is pivotal in ensuring that the DSS efficiently captures, organizes, and correlates data across different aspects of patient health, thereby facilitating informed decision-making for both patients and healthcare providers.

Procedural and Object-Oriented Design

The system's structured flowchart, as illustrated in Figure 5, outlines the login process for both dentists and students. Users initiate the process by logging into the system, where their information is thoroughly verified. If the user’s information is successfully verified, they are directed to the dashboard; otherwise, the verification fails, the system concludes. Following successful verification, students have the capability to schedule dental health appointments and fill out the food they consume every day.

Dentists have the responsibility of either approving or rescheduling these appointments. Once an appointment is approved, a dentist performs examinations about the oral health assessments and the mouth examination of the students and the system will provide recommendations based on their oral health assessment result while the dentist

will provide diagnosis, treatment and remarks for the mouth examination results.

For students, the system enables them to record their food intake and assess their food intake records. The system, in turn, scrutinizes these food records to generate dietary recommendations. The flowchart ultimately concludes, marking the end of the process.

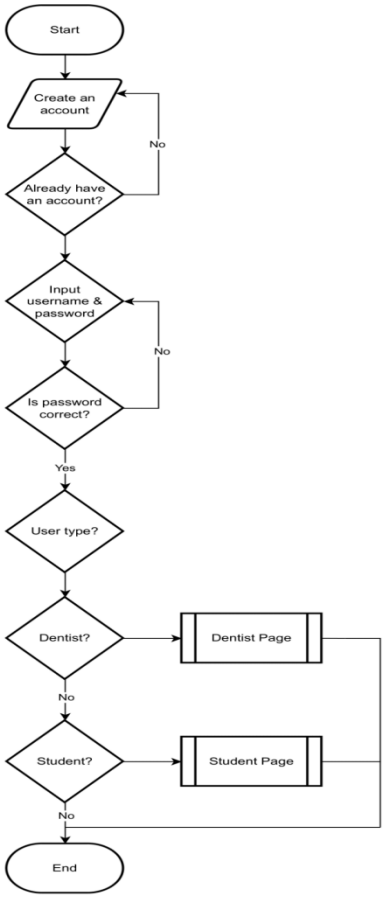


Figure 5. Structured Flowchart of the System

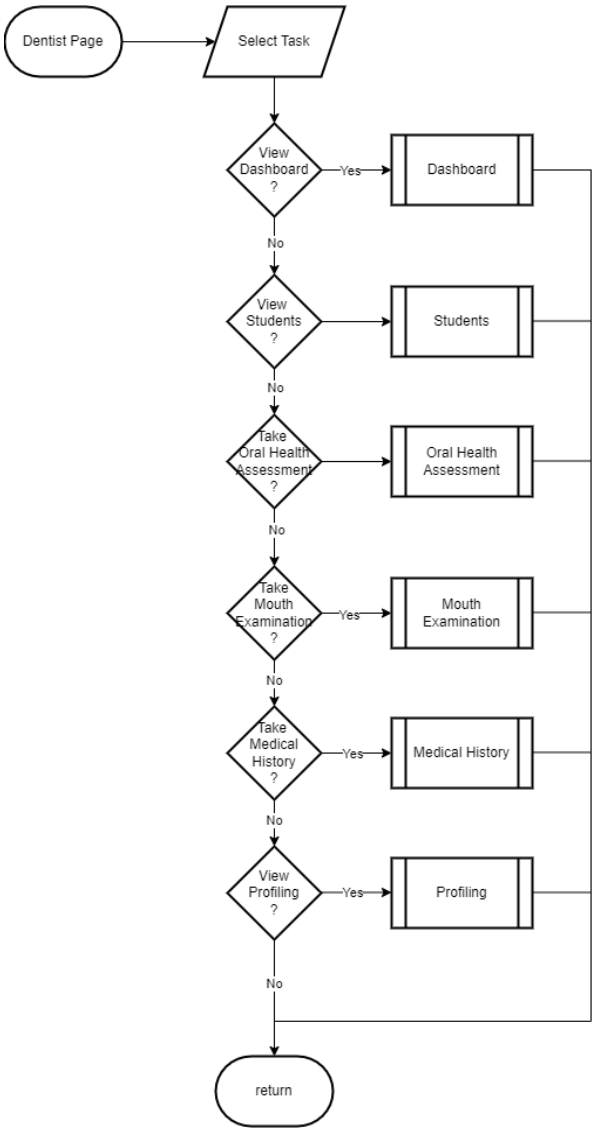


Figure 6. Dentist Page Flowchart

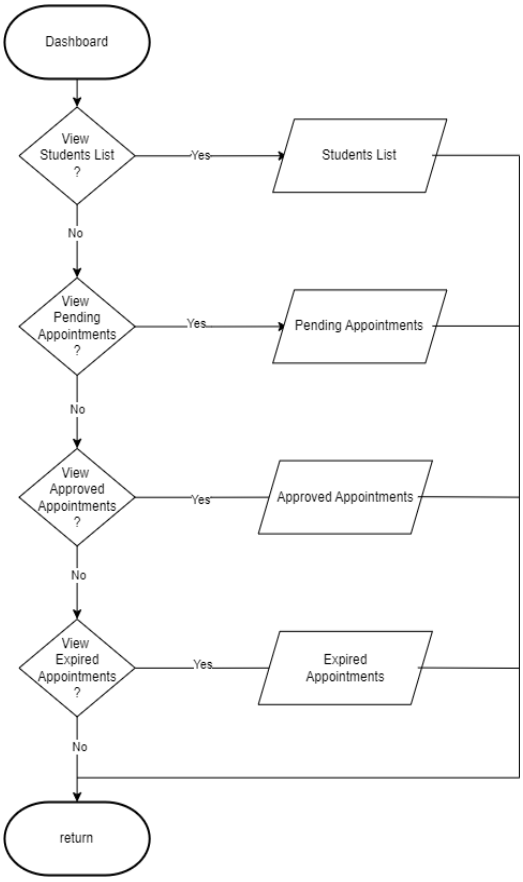


Figure 7. Dashboard Page Flowchart

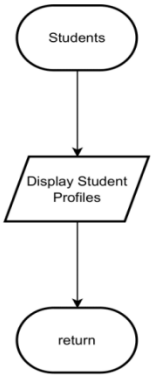


Figure 8. Students Page Flowchart

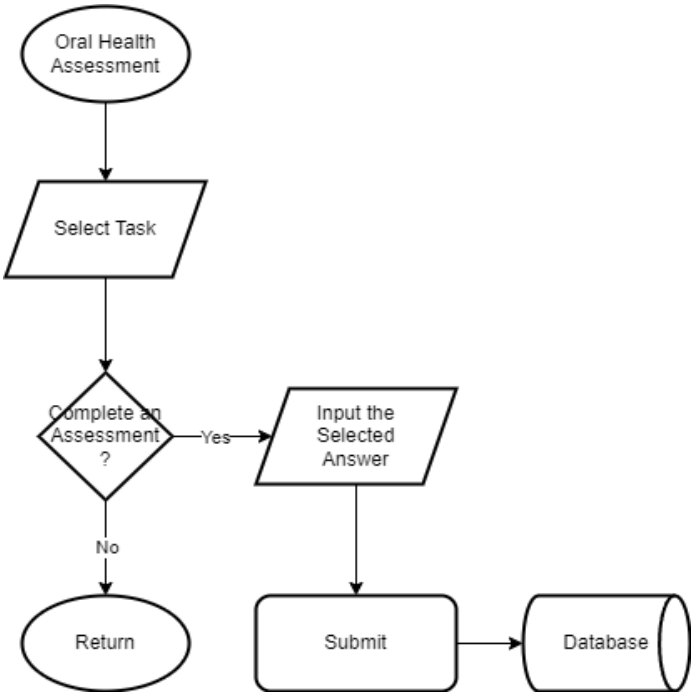


Figure 9. Oral Health Assessment Page Flowchart

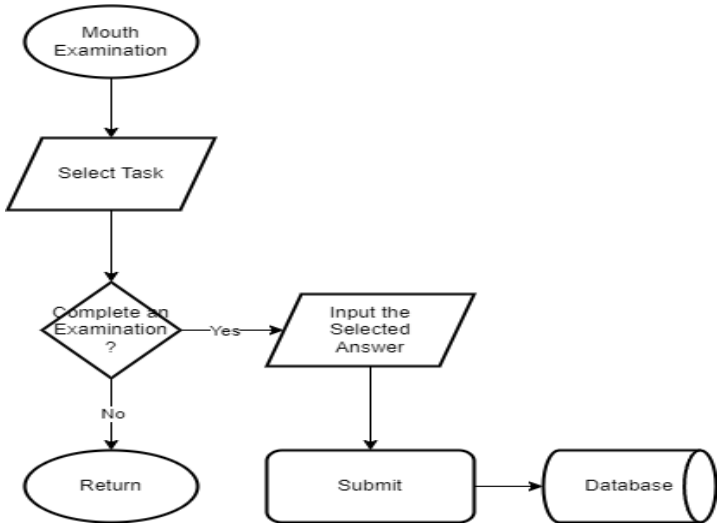


Figure 10. Mouth Examination Page Flowchart

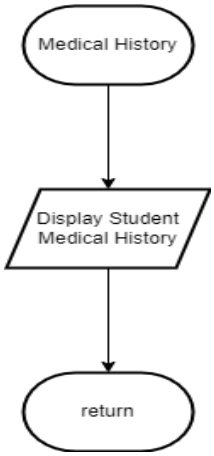


Figure 11. Medical History Page Flowchart

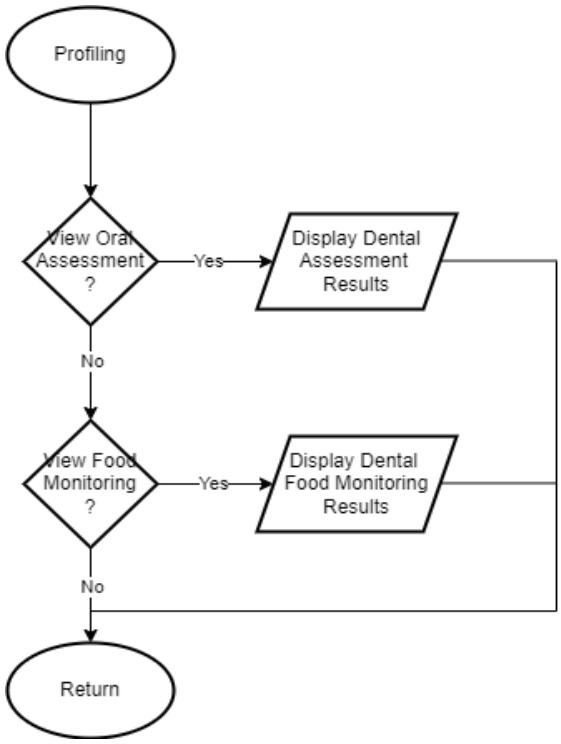


Figure 12. Profiling Page Flowchart

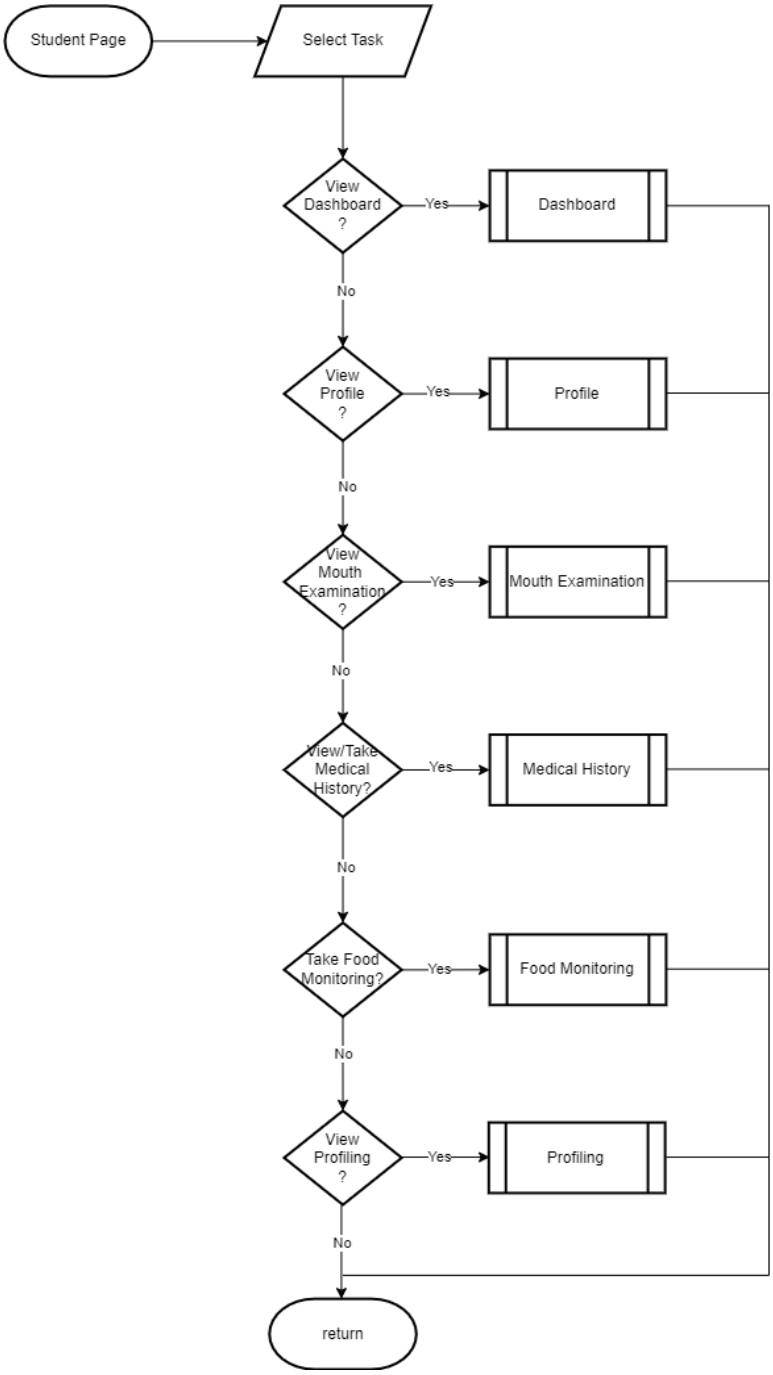


Figure 13. Student Page Flowchart

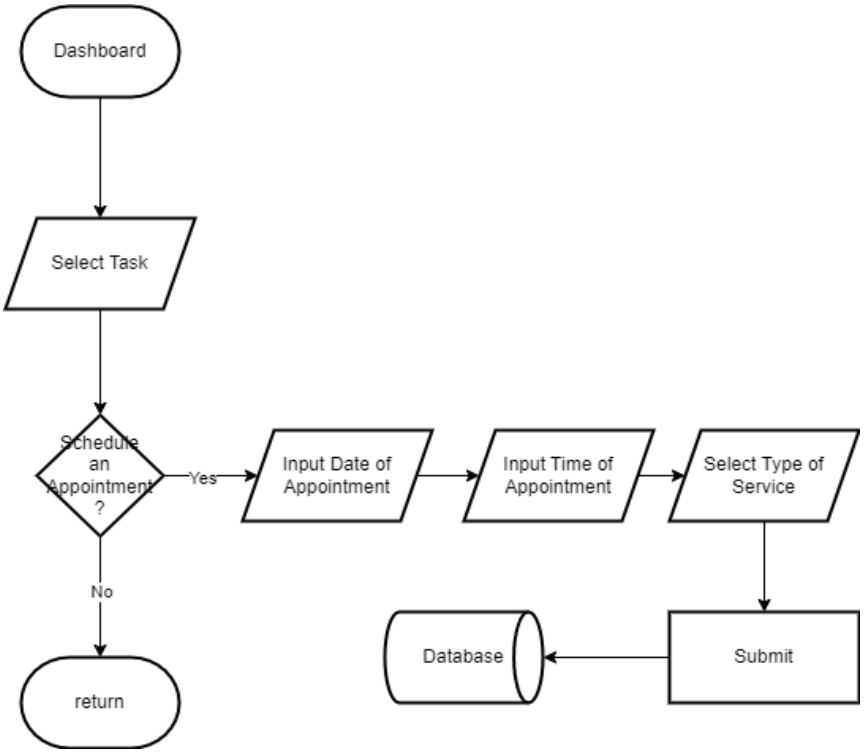


Figure 14. Dashboard Page Flowchart

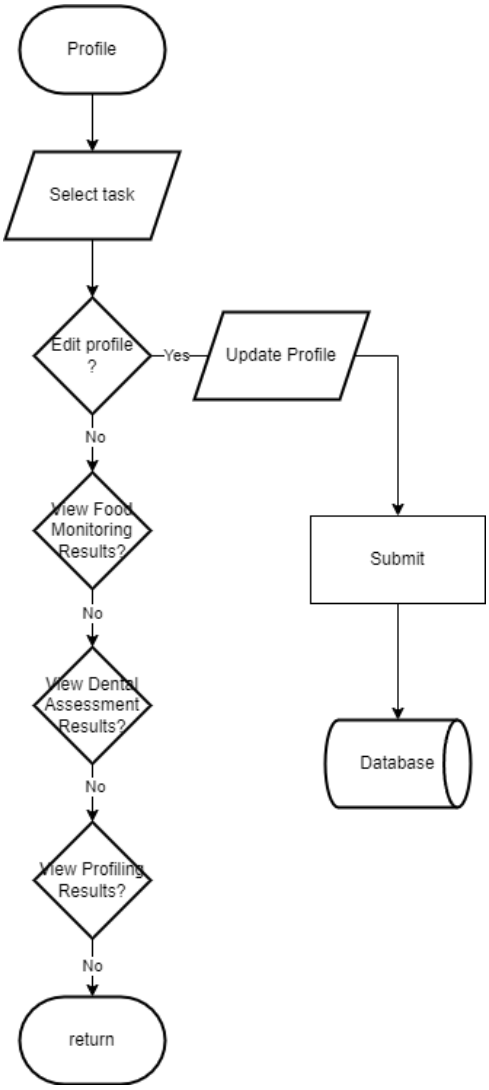


Figure 15. Profile Page Flowchart

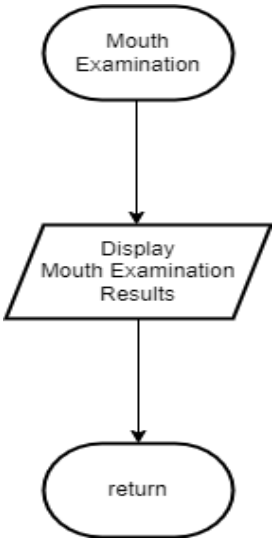


Figure 16. Mouth Examination Page Flowchart

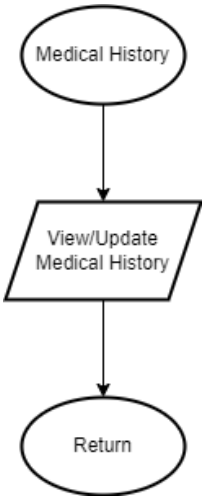


Figure 17. Medical History Page Flowchart

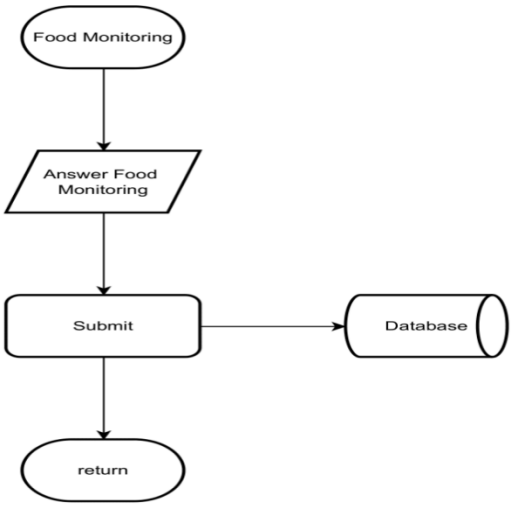


Figure 18. Food Monitoring Page Flowchart

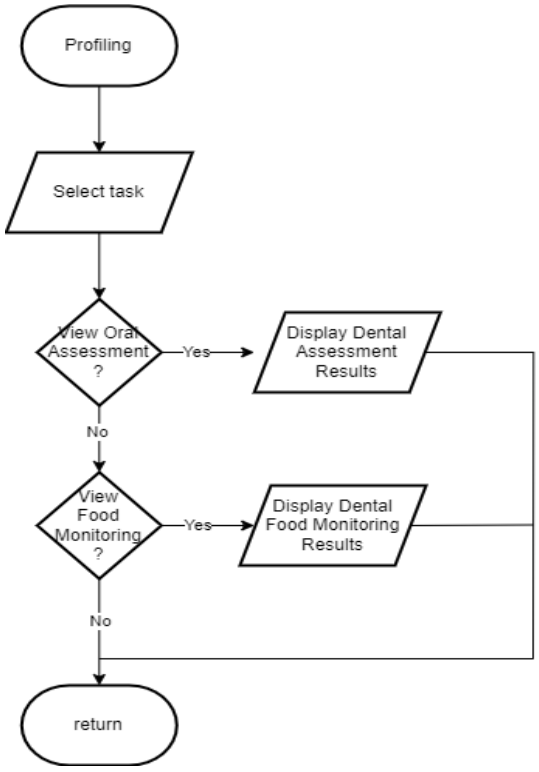


Figure 19. Profiling Page Flowchart

In Figure 20, represent the activity diagram of the system for Decision Support System for Food Intake Monitoring and Dental Health Profiling. A student and a dentist (admin) can log into the system, each with their respective credentials. After a successful login, the student is presented with a main menu offering different options.

The student can choose from three modules: dental assessment, food assessment, and appointment. The admin, who is the dentist, has access to administrative functions and can manage student profiles and data.

In the dental assessment module, the dentist examines the student's mouth, while in the food assessment module, the student records their food intake. The system processes the food and dental data to assess and analyze the both results.

After gathering information from both assessments, the system generates results and provides recommendations based on the student's input and health profiles. If needed, the student can request a dental appointment by specifying

their preferred date and time. The dentist checks for available appointments and schedules one if possible.

Additionally, the dentist (admin) has access to various administrative functions, including managing student profiles, reviewing and updating data, and generating reports.

The entire process comes to a conclusion, with the student having received dental and food intake recommendations and, if necessary, an appointment scheduled by the dentist.

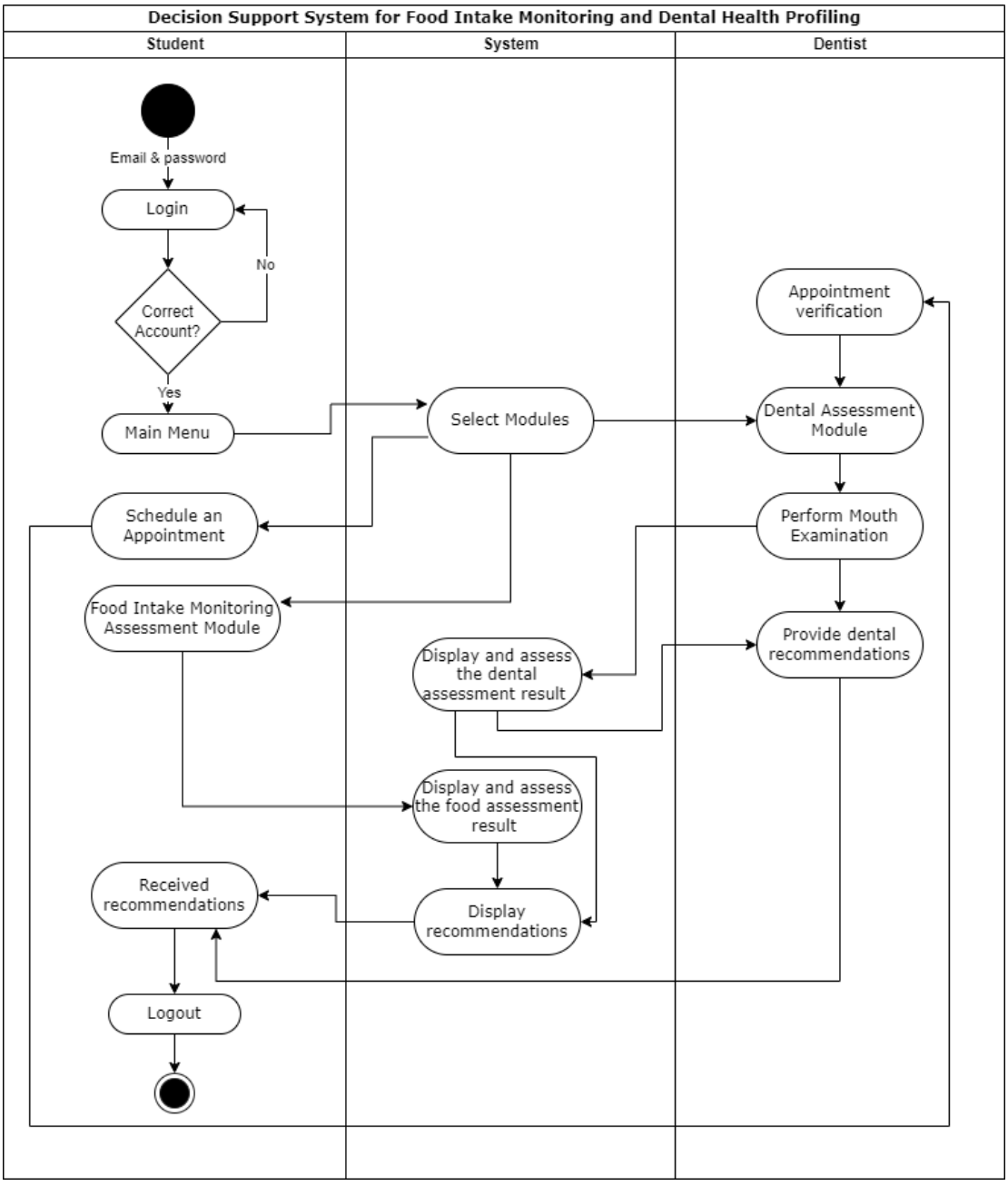


Figure 20. Activity Diagram of the System

Use Case Diagram

In Figure 21, the Use Case Diagram of the system for Decision Support System for Food Intake Monitoring and Dental Health Profiling, the system was designed for two primary user groups: students and dentists. Students and dentists are individuals who engage with the system. Both students and dentists can access the system by logging in with their credentials. This use case diagram outlines the primary interactions between users and the system, highlighting the distinct processes for students and dentists within the Decision Support System for Food Intake Monitoring and Dental Health Profiling.

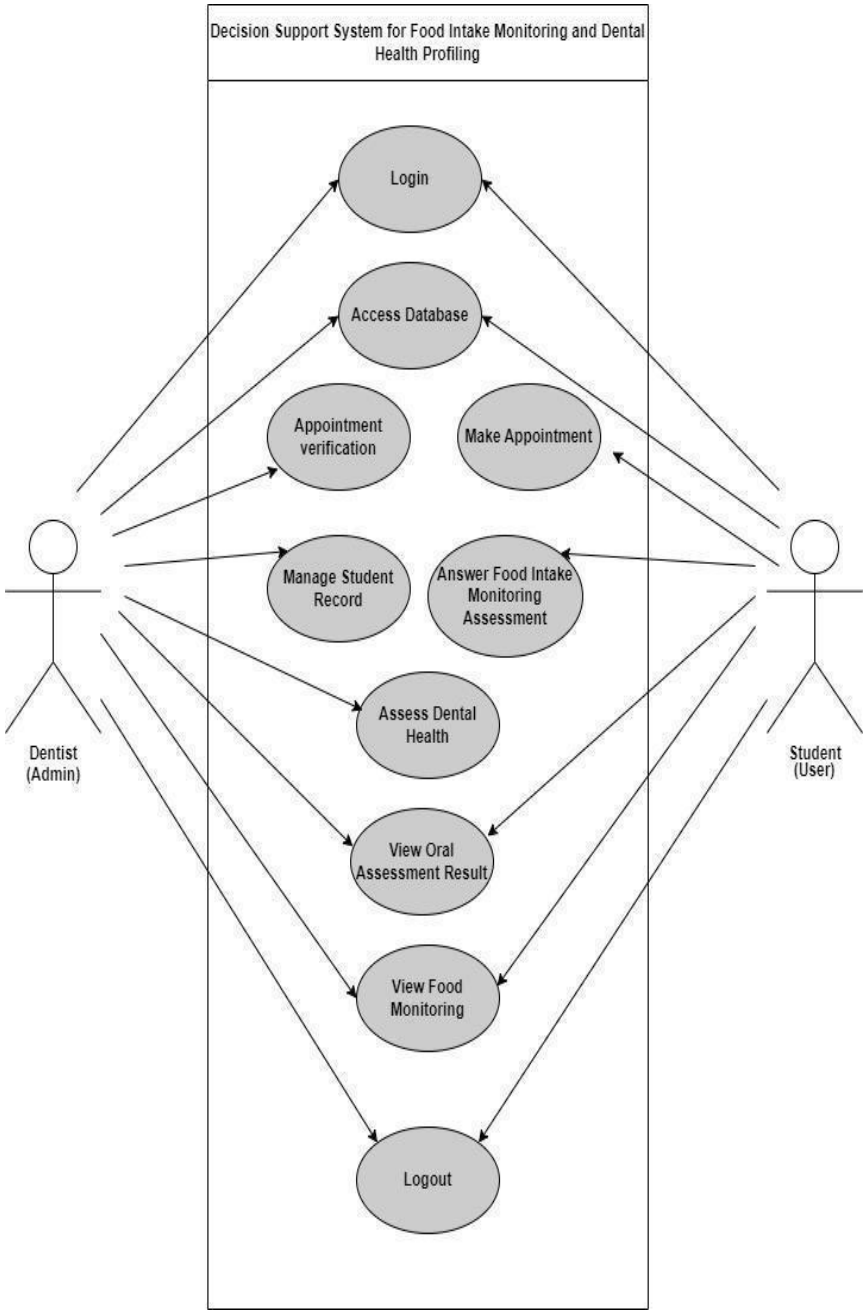


Figure 21. Use Case Diagram of the System

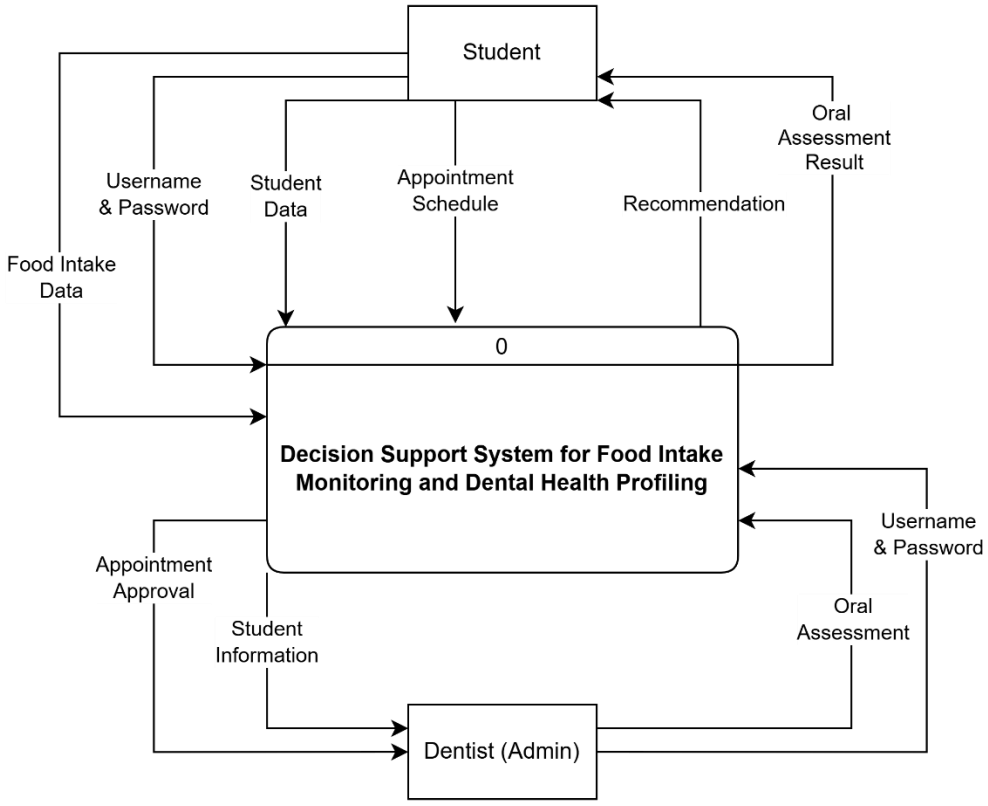


Figure 22. Context Diagram

The "Decision Support System for Food Intake Monitoring and Dental Health Profiling" is designed to streamline interactions between dentists and students. This system will enhance communication and coordination by providing a centralized platform. Dentists and students will use this platform to schedule appointments efficiently, track food intake, conduct oral health assessments, and monitor progress over time. By integrating these functionalities, the system aims to improve dental

health outcomes and support healthy eating habits. Additionally, it will generate comprehensive reports and actionable insights, facilitating better decision-making for both students and dentists. The centralized platform will also ensure data accuracy and accessibility, making it easier to maintain continuous care and follow-ups.

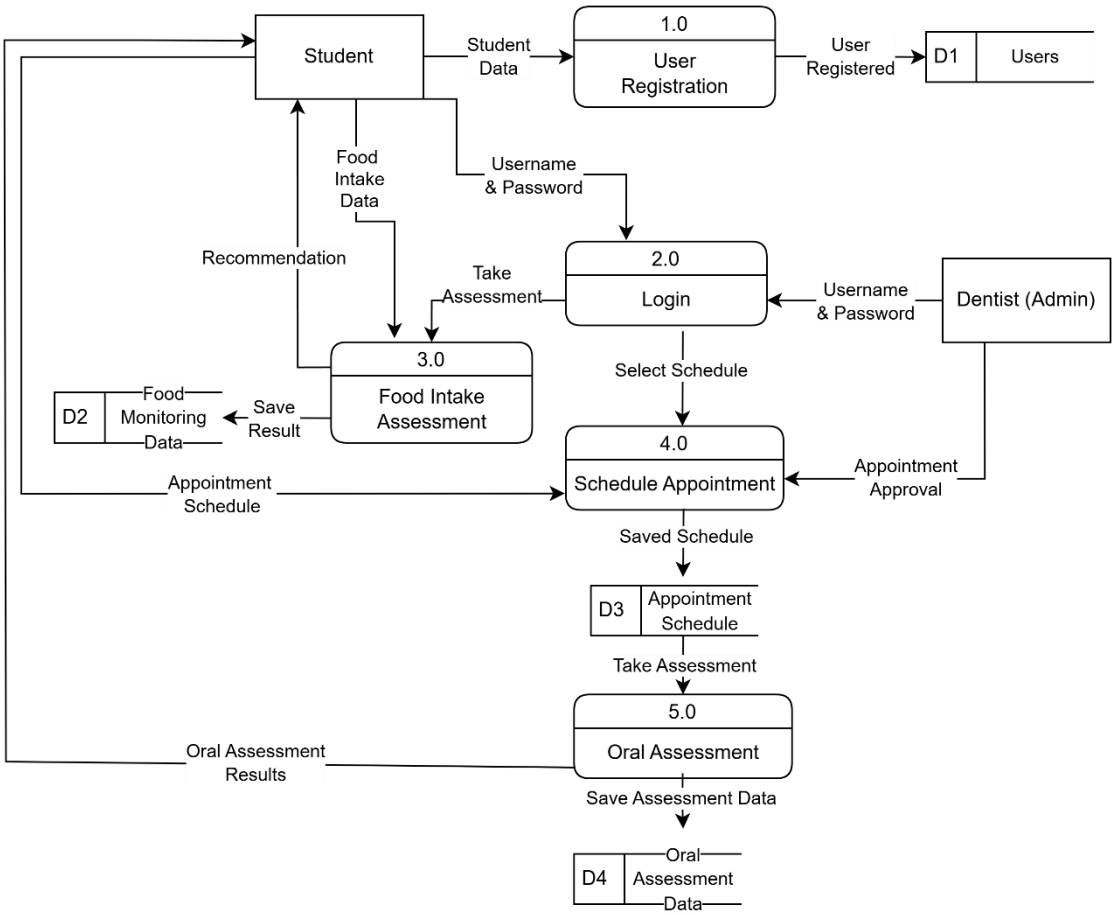


Figure 23. Level 1 Diagram

Students input their username and password to login and conduct daily food intake assessment and schedule appointments, while dentists input oral health assessments of student and manage appointments. These inputs to monitor progress and provide recommendations to students. This system enhances communication and coordination by centralizing appointment scheduling and data tracking.

System Development Life Cycle

The study was developed according to the phases of the System Development Life Cycle using the agile method: plan, design, develop, test, release, and feedback.

In the planning phase, the researchers need to identify potential risks and strategies for implementing the system. This could include performing user research to better understand the student's needs and goals, as well as reviewing current data sources linked to food intake and oral health. The researchers may employ approaches such as persona development and stakeholder mapping to identify the primary user groups and stakeholders who will be involved in the system.

In the design phase, the researchers studied the styles, components, flows, and other elements needed during the development of the system.

In the development phase, researchers start to code which includes the system structure, functions and interface design.

In the test phase, researchers test the system to see if the system functions correctly or if there are any issues or problems in the program codes and make changes on some interfaces.

Following testing, the system will be released or implemented when the system is fully functional and performs completely.

Finally, after using the system, gather feedback from users.

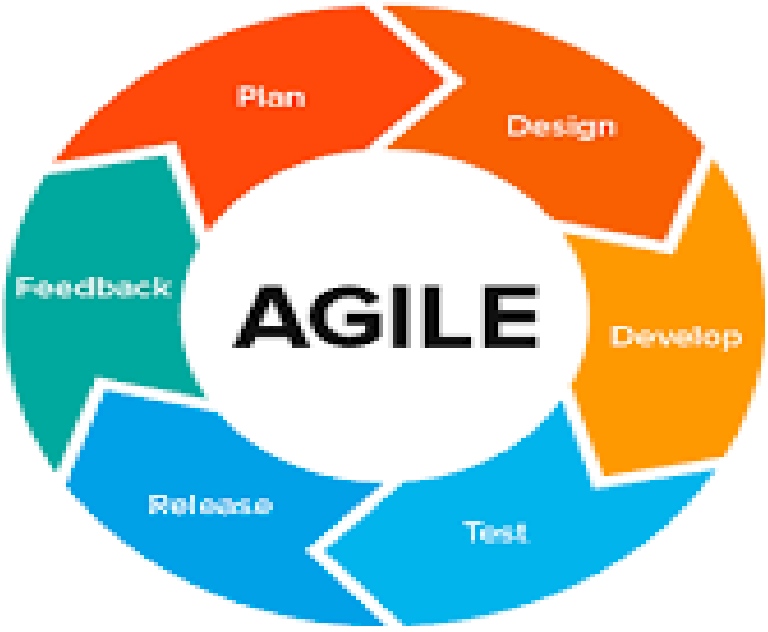


Figure 24. Agile Methodology

CHAPTER 4 RESULTS AND DISCUSSION

Implementation

The system is implemented on the web as a web-based application through web hosting. The system entails the creation of a user-friendly frontend interface using technologies like HTML and CSS, coupled with the formulation of backend logic using an appropriate programming language and framework such as JavaScript and PHP. This comprehensive approach enables users to input dietary data securely and gain insights into their oral health profiles after establishing secure user authentication and data storage measures. Decision-rule-based algorithms analyze user input, generating oral health recommendations based on dentist examination to the oral health assessment of students, and dietary suggestions, which are then presented on the front end. Rigorous testing and debugging are conducted during this phase to identify and rectify any potential errors.

Students benefit from ongoing monitoring of their food intake patterns and oral health condition using a web

application and an online portal. The collected data undergoes processes within the system to identify individual risk levels linked to food intake habits and oral health conditions. Based on this information, the assigned dentist can offer recommendations and interventions. The system itself may also suggest enhancements to oral hygiene practices, propose scheduling dental examinations, and advise on making healthier food choices to mitigate the risk of dental health issues.

Additionally, comprehensive user guidance will be provided to ensure proper utilization of the web-based system, granting users the opportunity to explore its functionalities effectively.

Hardware and Software Specifications or Environment

The system had certain specifications that were met before it was implemented. The requirements were software, hardware, and user specifications. The following requirements were met to make sure for the system to function successfully and efficiently. The

proposed system has certain software requirements that cause the system accounts processing. The creation of the system employs Visual Studio Code version 4.0 and Bootstrap Studio version 5. For backend operations, XAMPP v3.3.0 is utilized. The system utilized HTML and CSS for the frontend interface, with backend functionality managed by JavaScript and PHP. Accessible through various web browsers such as Google Chrome, Microsoft Edge, Mozilla Firefox, among others, the system ensures compatibility for user accessibility.

The system required specific hardware components in order for the software to function. These are the following hardware components used: (1) Operating System with at least Windows 10 and 8 GB RAM. The system is designed to be accessed via the web and mobile responsiveness through the utilization of desktop, laptop, or mobile device ensuring an enhanced view and seamless access to the full spectrum of the system's features.

The user specifications of this system are individuals seeking a comprehensive approach to managing their food

intake habits and oral well-being. These users could range from health-conscious individuals aiming to optimize their nutrition and dental health. Individuals with varying levels of technological expertise. The system was developed to be used by the students of West Visayas State University - Main Campus and dentists within the campus.

System Implementation

The system underwent five phases of implementation: The physical set-up phase, implementation phase, the system testing phase, system continuation phase, and the maintenance phase.

In the physical set-up phase, hardware involved in the study was set up. It required (1) Target device: desktops, laptops or mobile device (2) Target OS: Windows 10 64-bit.

In the implementation phase, the system was applied. The system is designed to monitor food intake and dental health. It involved programming, database creation, and user interface development.

In the system testing phase, the system was analyzed with a series of examinations to test functionality and would be improved if there would be a problem.

In the system continuation phase, the system was again be put to final use. Ongoing support mechanisms were established to address any user inquiries or technical issues that may arise.

In the maintenance phase, the system was maintained such as fixing bugs and the system remains up-to-date and functional.

Screenshots of the System

The following figures are the screenshot of the system.

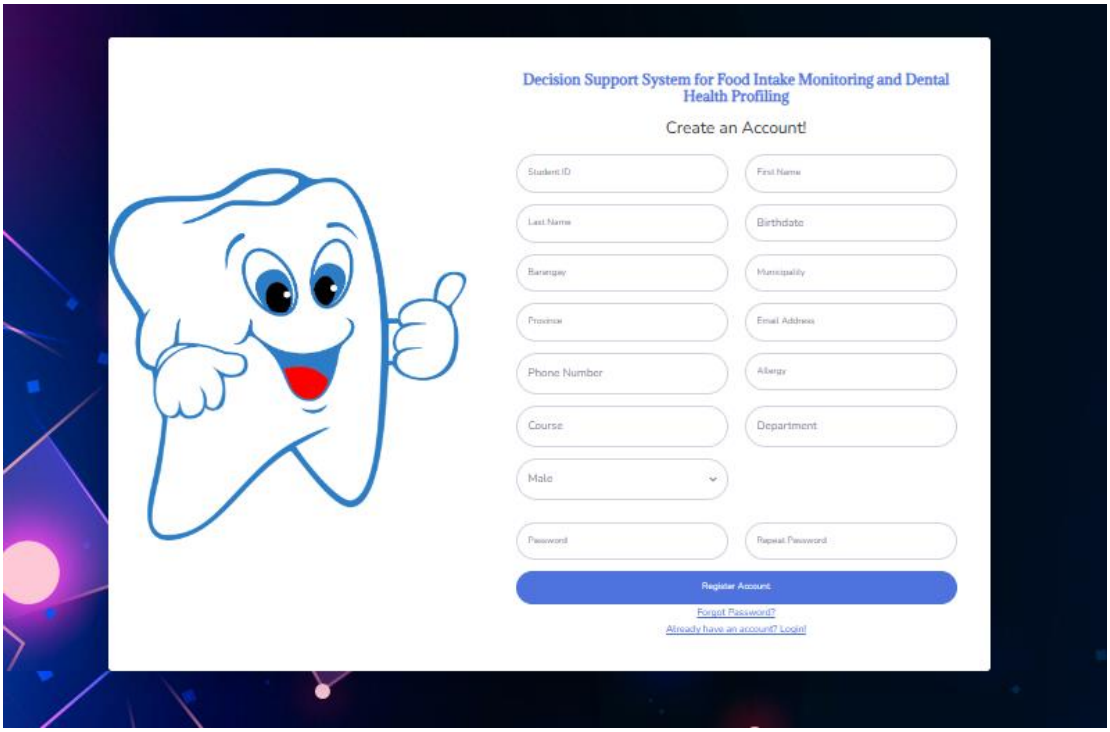


Figure 25. Register a Student Feature

On the student's view, first registration is a fundamental step in ensuring the security and integrity of user accounts. When a user registers, they provide their unique identification and authentication information, such as a username and password. This data is crucial for verifying the user's identity and preventing unauthorized access to

their account. Without registration, anyone could potentially access sensitive information or misuse the system.

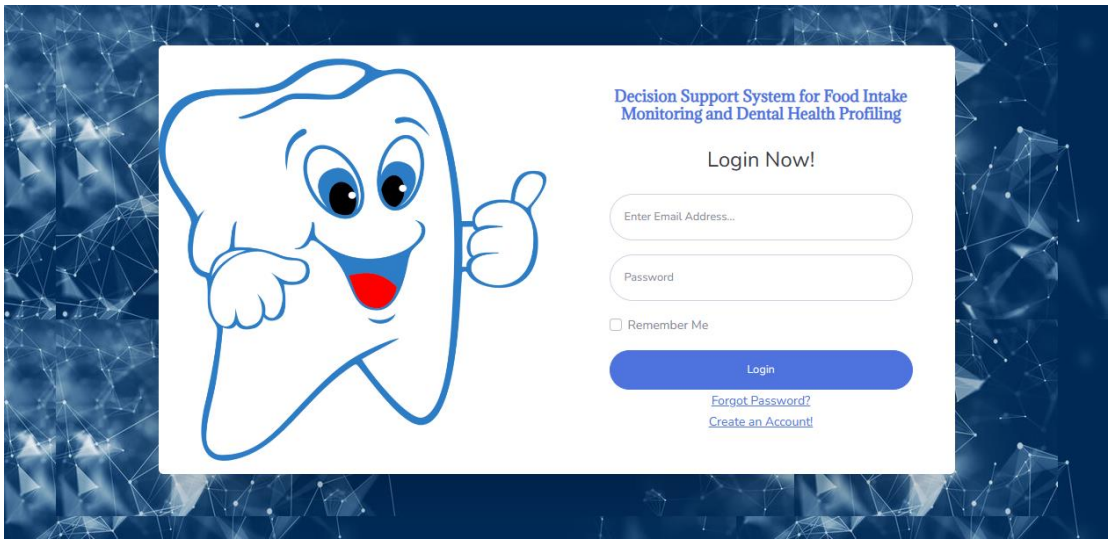
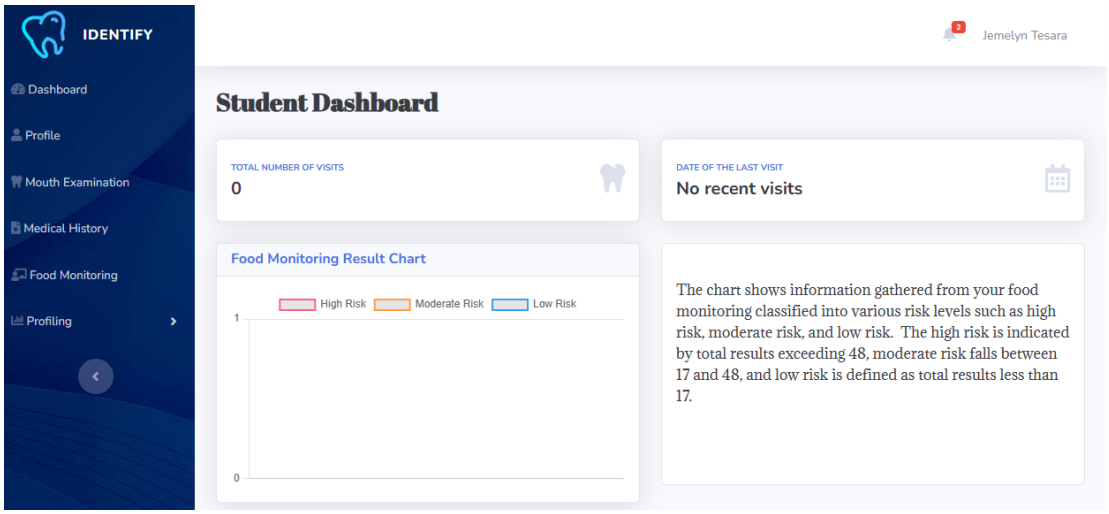
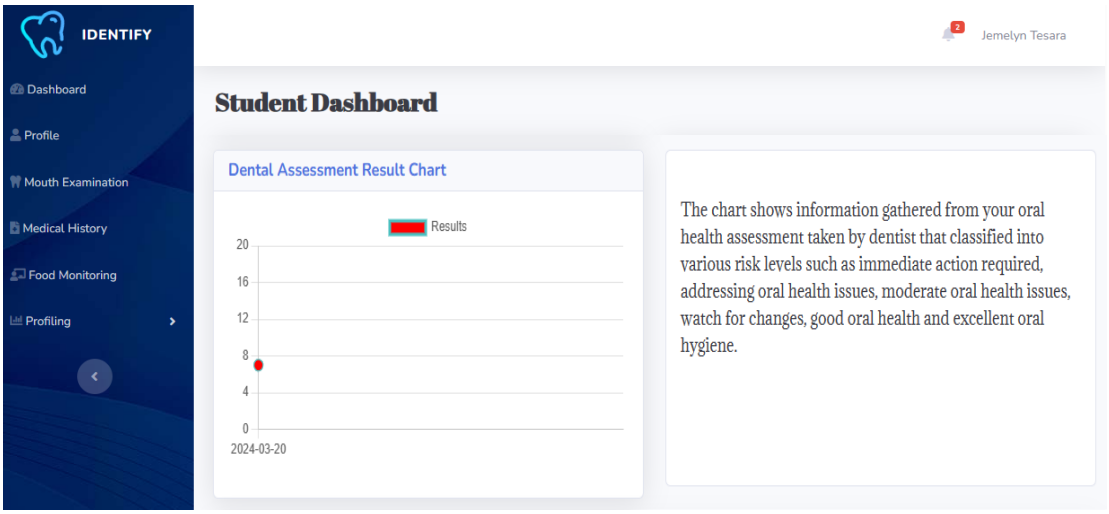


Figure 26. Login an Account

Upon completing the registration process, the subsequent step is to log in to the account. Logging in is a crucial security measure. During this process, users input their predetermined credentials, such as a username and password. This authentication step is essential for verifying the user's identity and ensuring that only authorized individuals can access the account. It plays a pivotal role in protecting user data and maintaining the system's overall integrity,

which is especially critical when handling sensitive information or services.





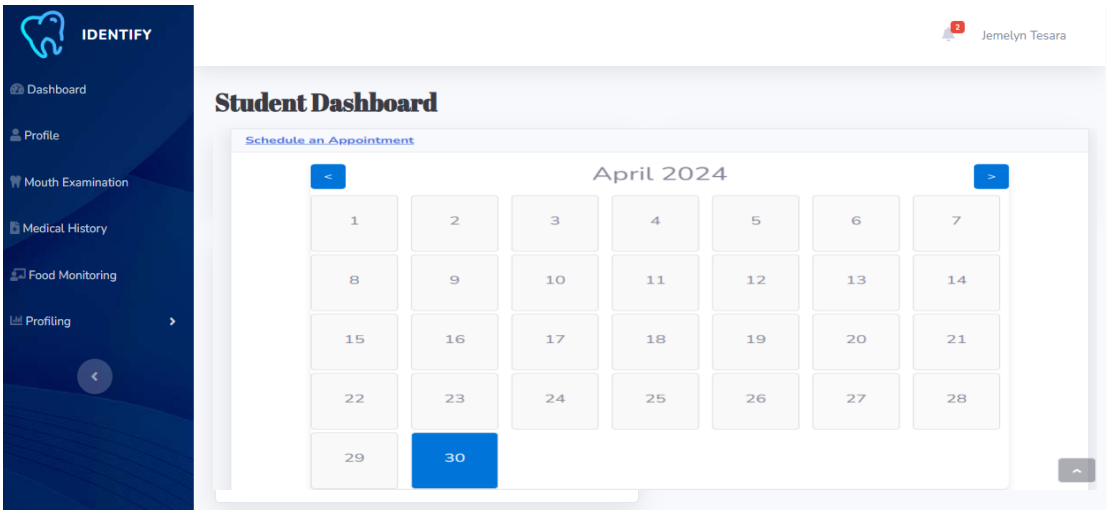


Figure 27. Student Dashboard Feature

Figure 27 represents the Dashboard Feature serving as the primary interface of the system. After the user completes the first step, they will be directed to the dashboard of the system. The user's profile is positioned at the upper-right corner of the dashboard. The dashboard prominently displays the following output: (1) Total number of visits, (2) Date of the last visit. On the left side of the dashboard is the sidebar containing the additional features of the system which are: (1) Dashboard, (2) Profile, (3) Mouth Examination, (4) Medical History, (5) Food Monitoring, and (6) Profiling.

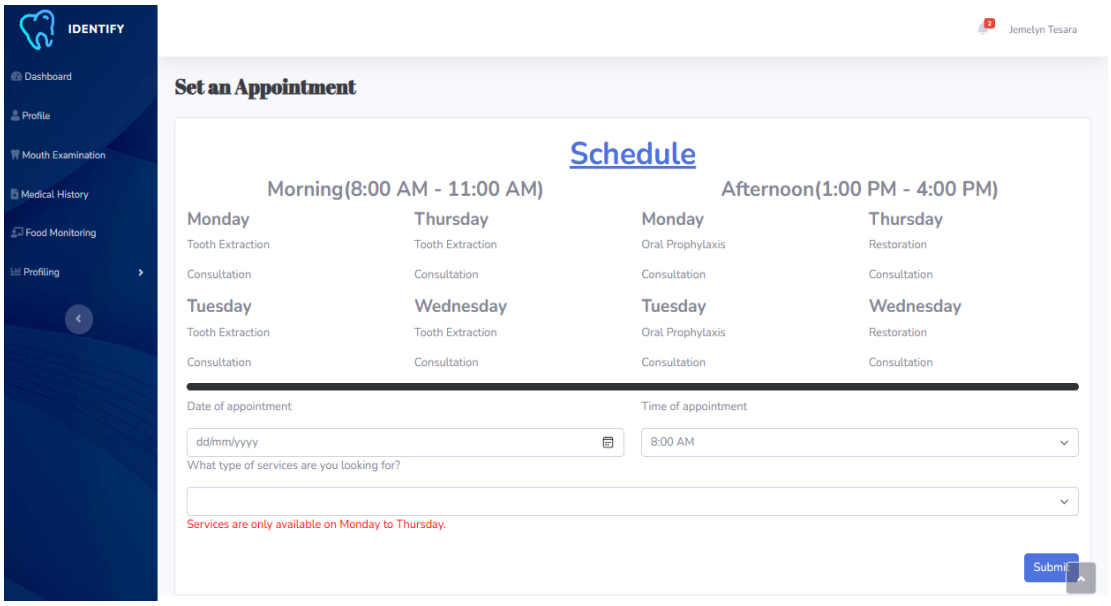


Figure 28. Student Appointment Feature

This feature enables students to schedule appointments for consultations regarding their dental health status.

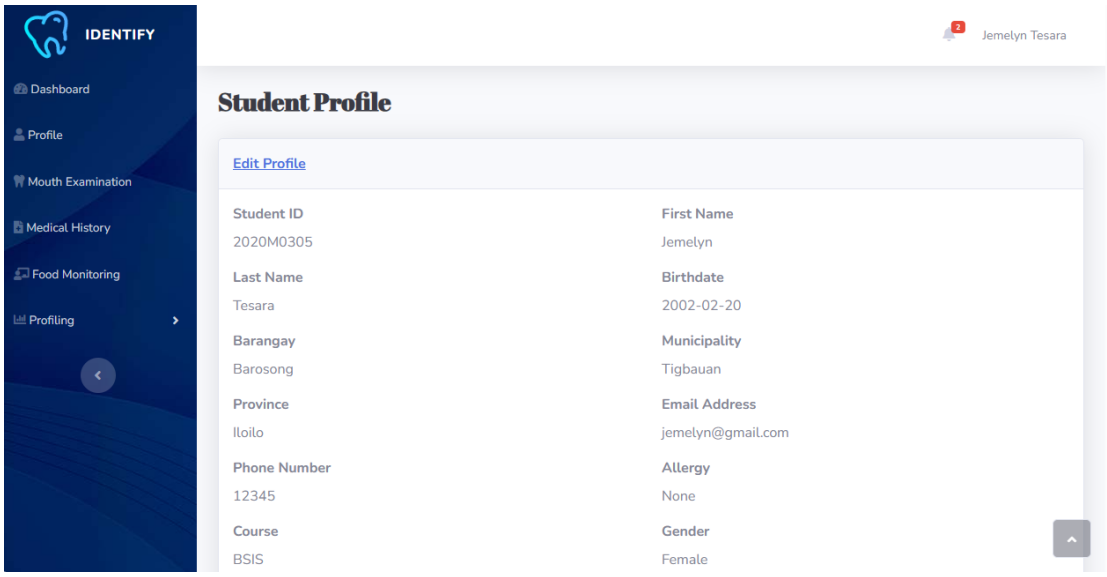


Figure 29. Student Profile Feature

Figure 29 illustrates the student profile feature showing the data comes from students subsequent to their registration within the system.

Figure 30. Student Mouth Examination Feature

Figure 30 illustrates the mouth examination feature showing results of how many teeth has not affected and affected. This examination is conducted by the dentist.

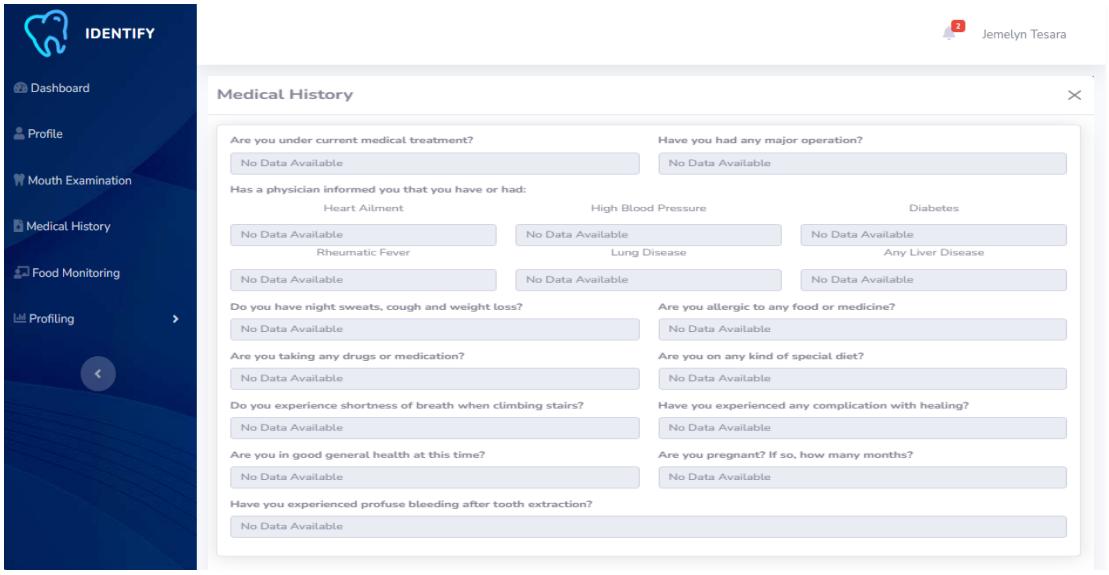


Figure 31. Student Medical History Feature

Figure 31 illustrates the medical history feature showing the previous and recent data available from medical health assessment.

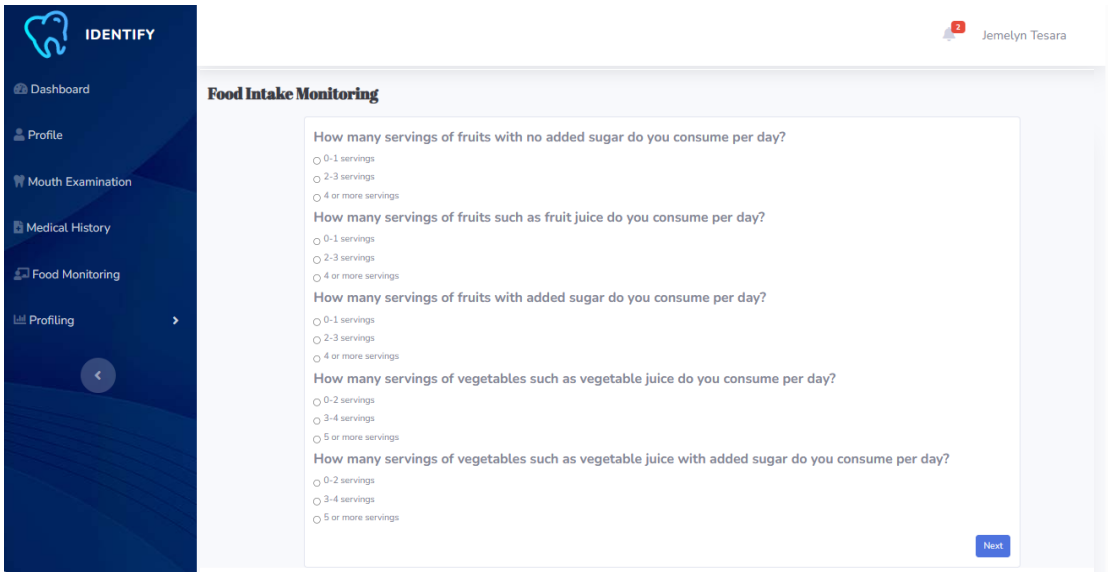


Figure 32. Student Food Monitoring Feature

Figure 32 illustrates the food intake monitoring feature on the student's view presenting the different food groups, their types and how many servings per day are consumed.

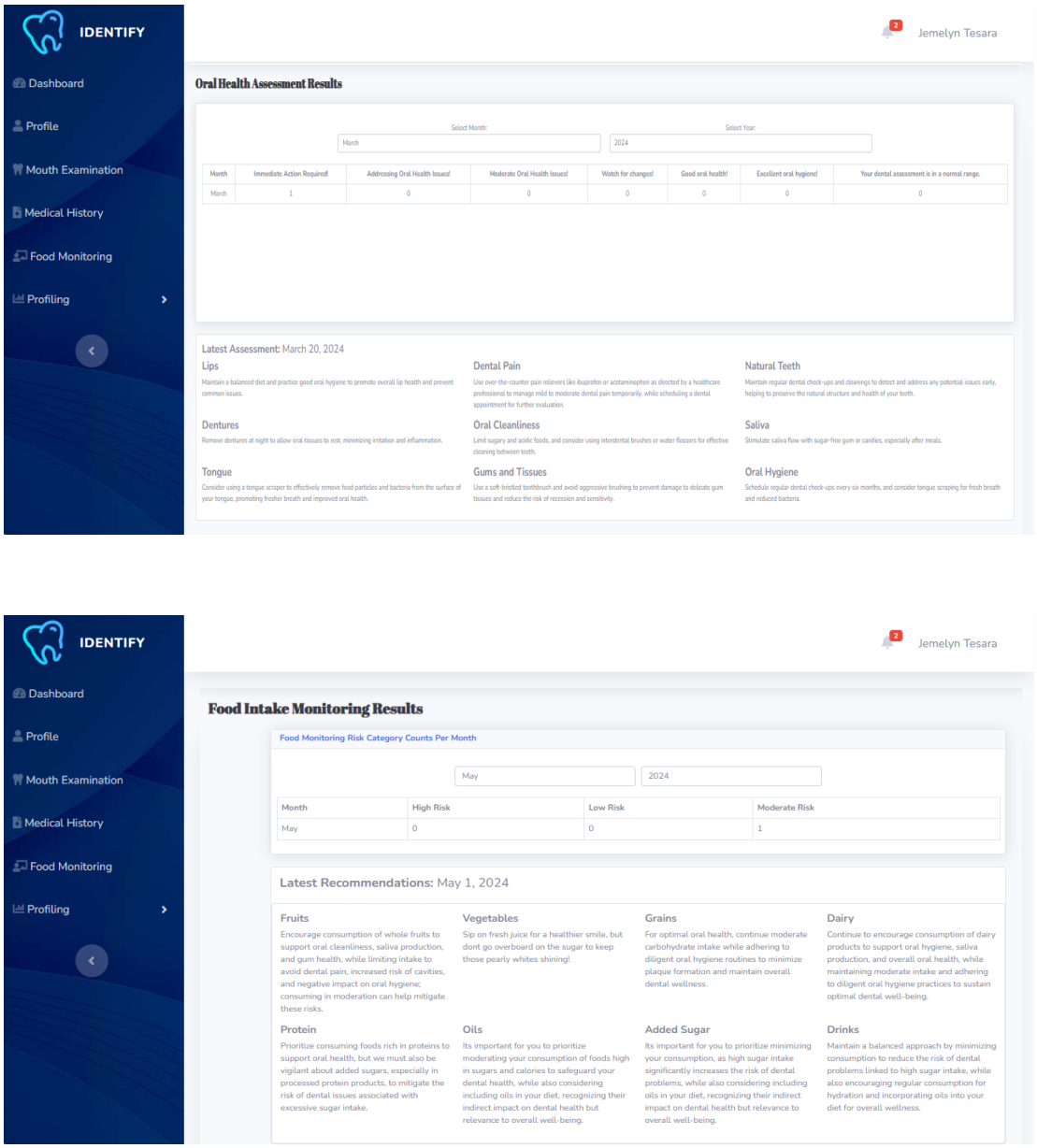


Figure 33. Student Profiling Feature

Figure 33 illustrates the profiling feature, which includes two tabs: one for oral assessment that displays

the results, and another for food intake monitoring that also displays the results.

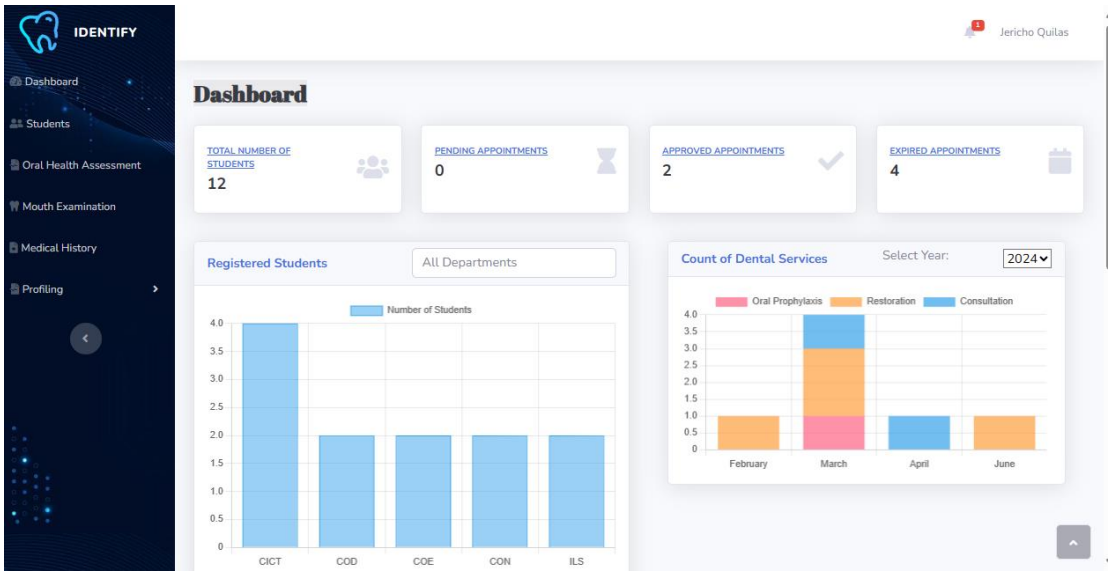


Figure 34. Dentist Dashboard Feature

Figure 34 represents the Dashboard Feature serving as the primary interface of the system. This dashboard includes the bar chart of registered students and stacked bar chart of dental services. Furthermore, the calendar of appointments allows visibility into individuals who have scheduled appointments on a specific date. The user's profile is positioned at the upper-right corner of the dashboard. The dashboard prominently displays the following

output: (1) Total number of students, (2) Pending appointments, (3) Approved appointments, and (4) Expired appointments. On the left side of the dashboard is the sidebar containing the additional features of the system which are: (1) Dashboard, (2) Students, (3) Oral Health Assessment, (4) Mouth Examination, (5) Medical History, (6) Profiling.

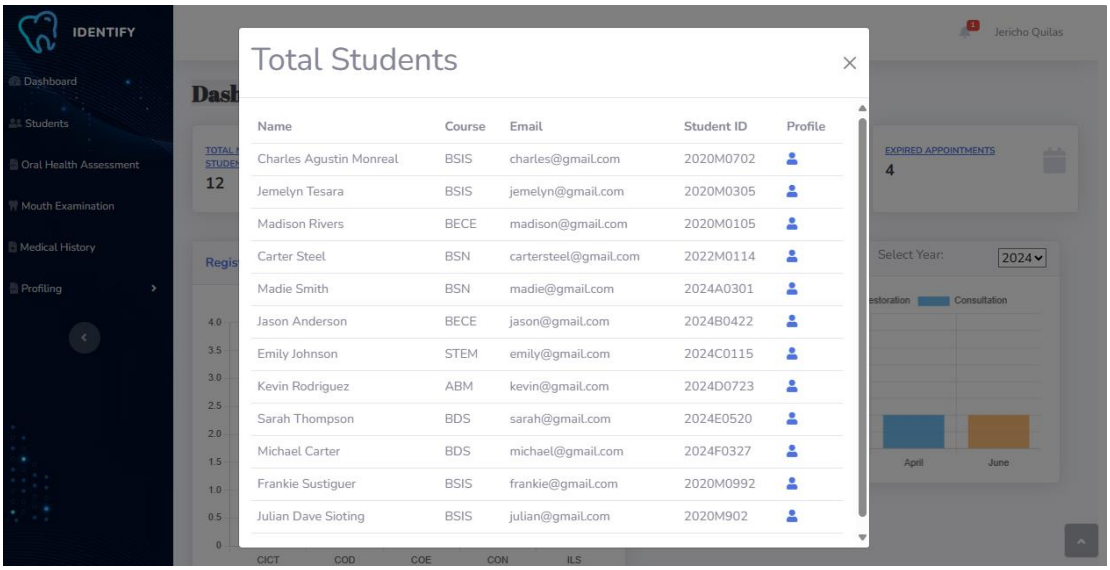


Figure 35. Dentist Dashboard Feature (Total Number of Students)

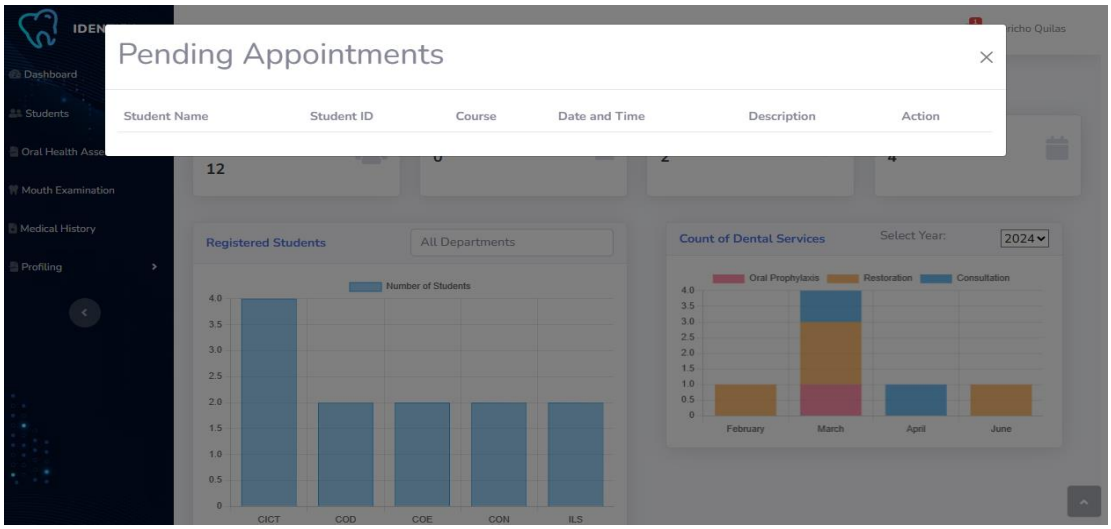


Figure 36. Dentist Dashboard Feature (Pending Appointments)

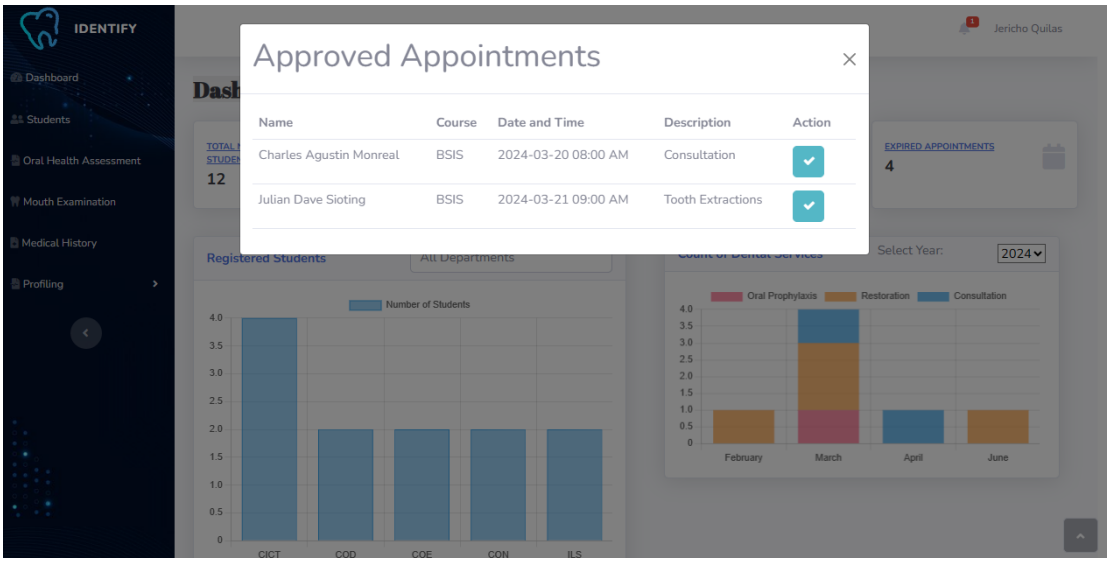


Figure 37. Dentist Dashboard Feature (Approved Appointments)

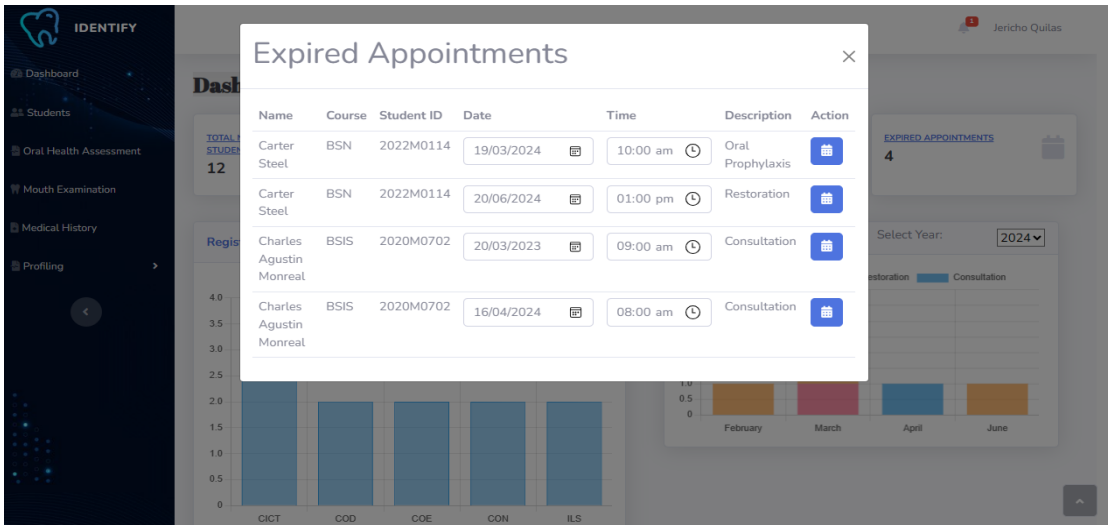
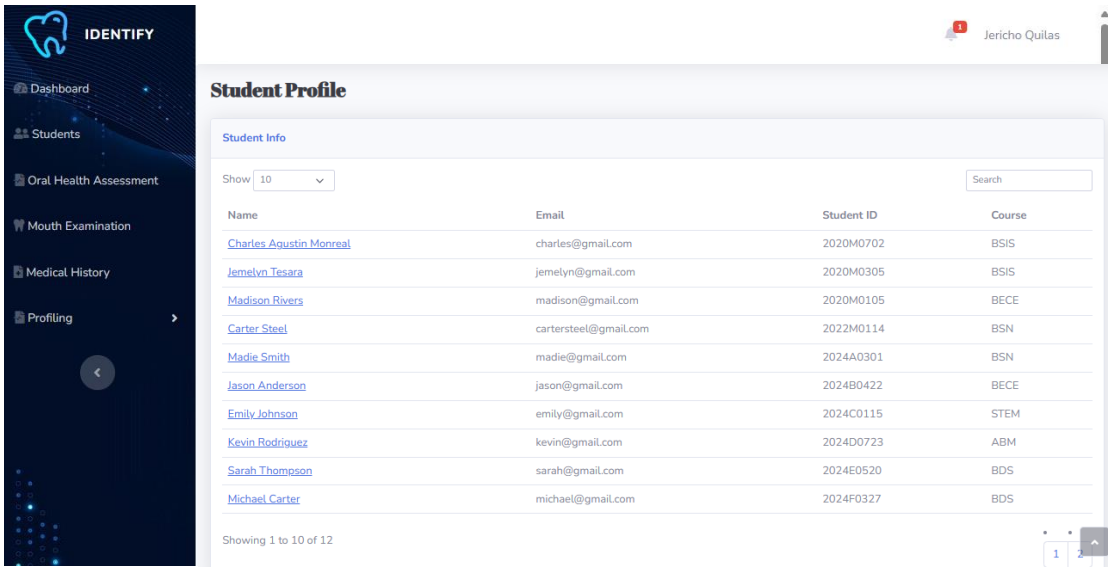


Figure 38. Dentist Dashboard Feature (Expired Appointments)



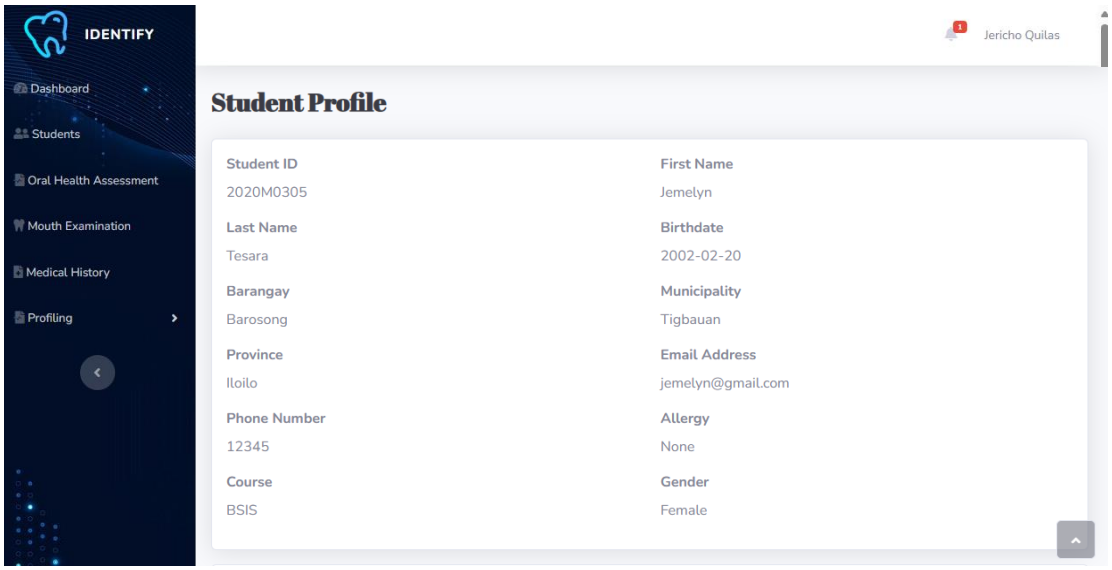


Figure 39. Dentist Students Feature

Figure 39 represents the students page provides a list of students showcasing their profiles. Each student profile includes essential personal information.

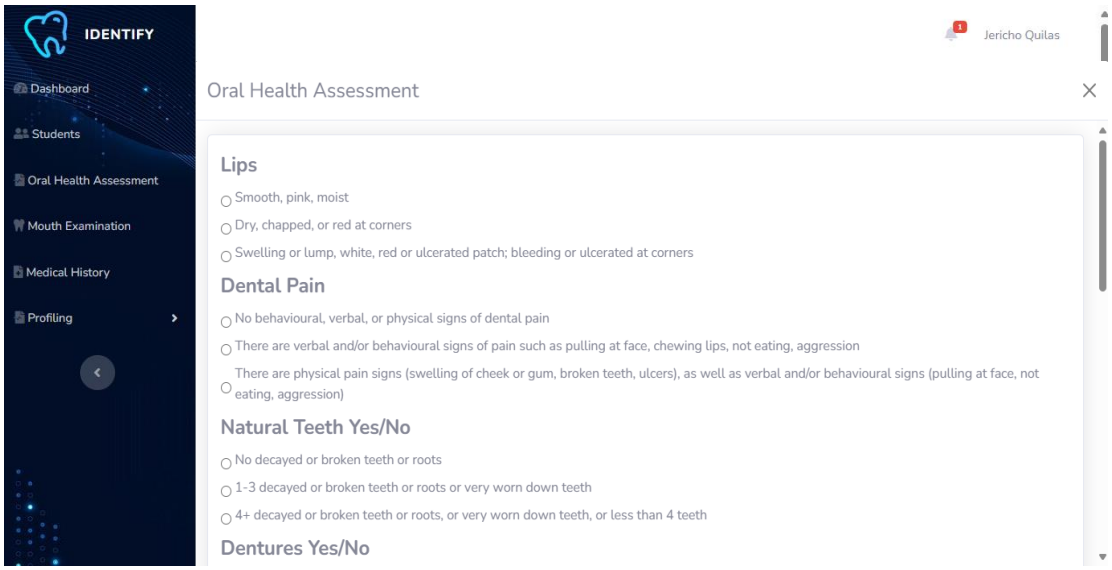


Figure 40. Dentist Oral Health Assessment Feature

Figure 40 represents the oral health assessment page, which serves as the platform for dentists to conduct thorough assessments of students' oral health. This interface is designed specifically for dentists to efficiently perform evaluations and record findings related to students' oral hygiene and dental conditions.

Figure 41. Dentist Mouth Examination Feature

Figure 41 depicts the mouth examination page; the dentist conducts to assess and document the oral health and dental status of students. This platform facilitates a systematic approach for dentists to evaluate and note observations concerning the students' dental hygiene and overall oral condition.

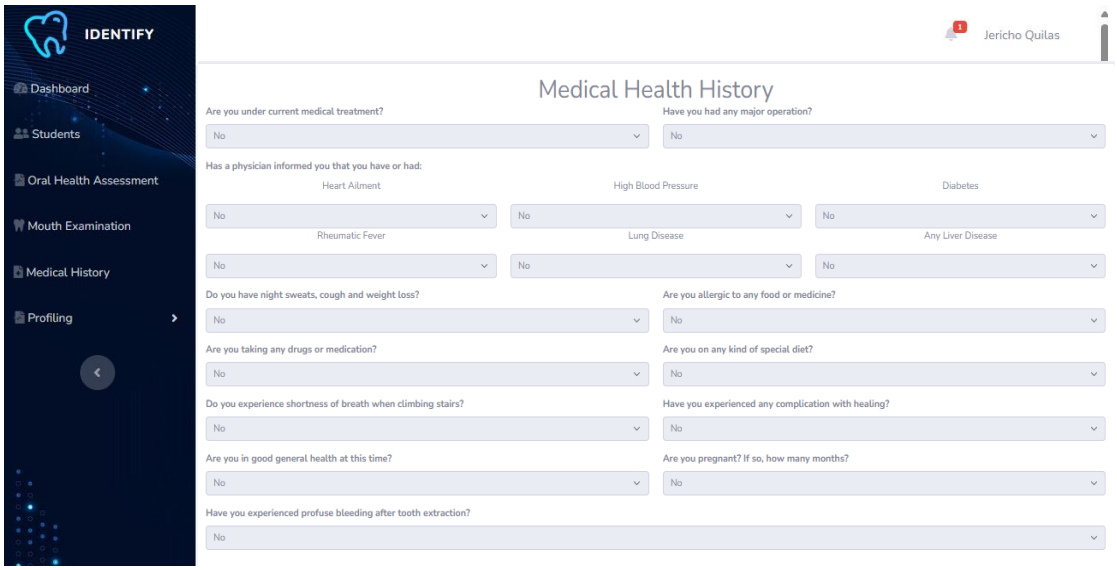
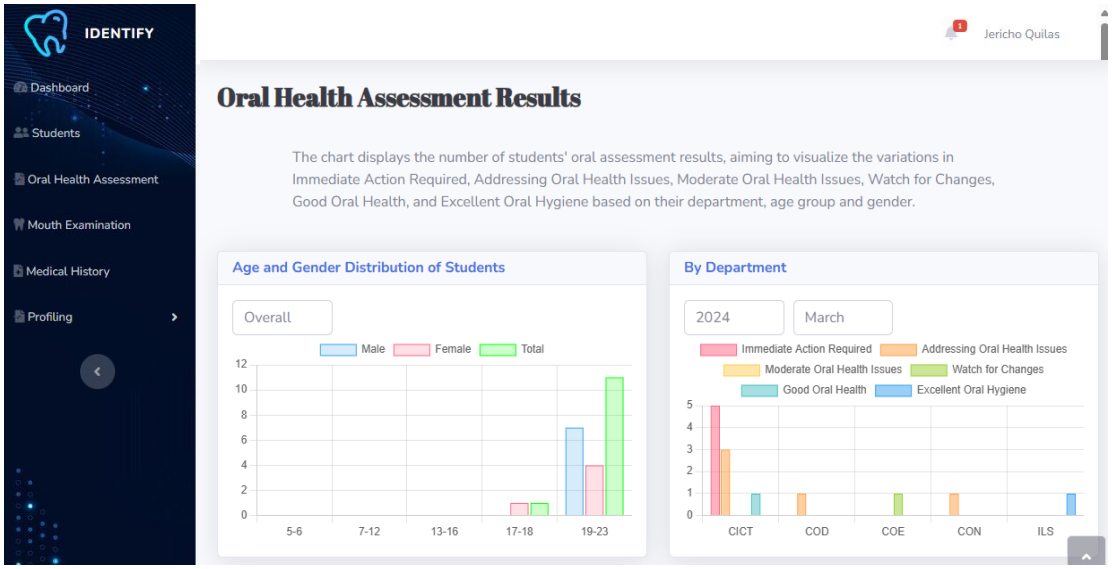
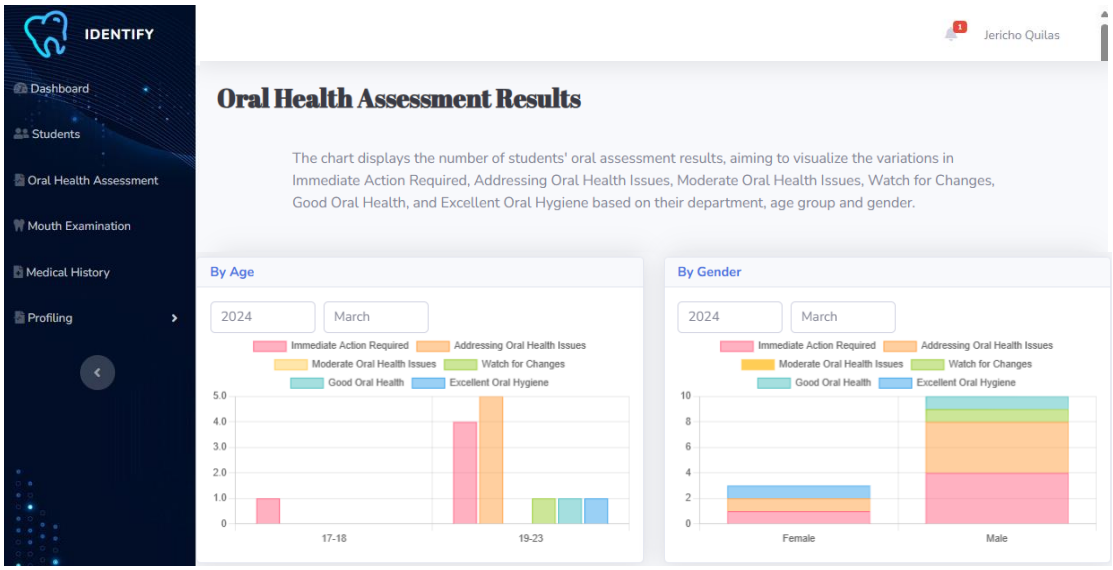
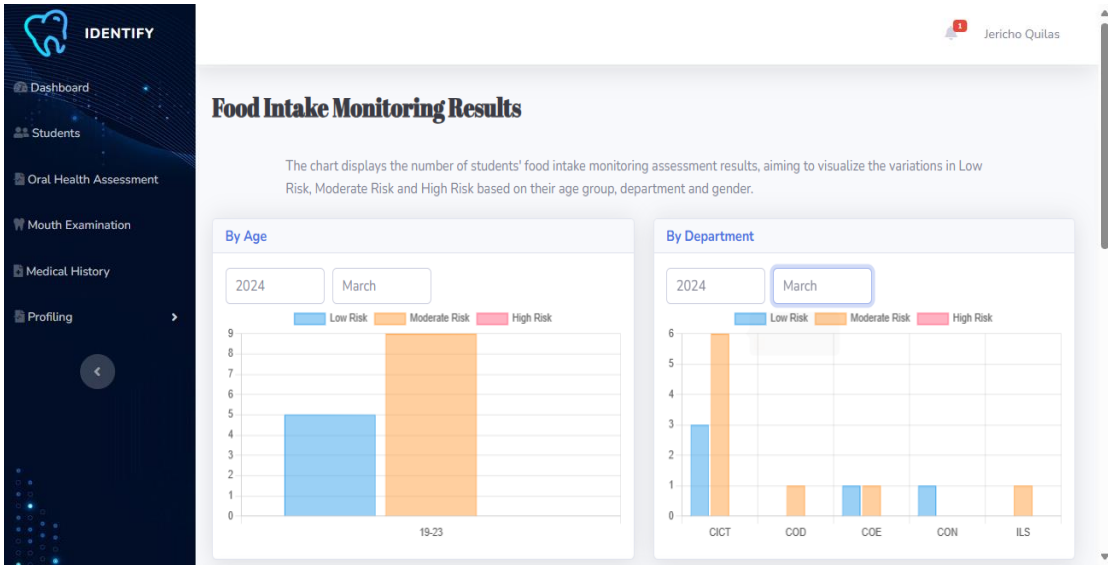


Figure 42. Dentist Medical History Feature

Figure 42 depicts the medical history page, displays the medical records of one specific student.




IDENTIFY
Dashboard
Students
Oral Health Assessment
Mouth Examination
Medical History
Profiling
Jericho Quilas
Oral Health Assessment Results
The chart displays the number of students' oral assessment results, aiming to visualize the variations in Immediate Action Required, Addressing Oral Health Issues, Moderate Oral Health Issues, Watch for Changes, Good Oral Health, and Excellent Oral Hygiene based on their department, age group and gender.
By Age
2024
March
Immediate Action Required
Addressing Oral Health Issues
Moderate Oral Health Issues
Watch for Changes
Good Oral Health
Excellent Oral Hygiene
5.0
4.0
3.0
2.0
1.0
0
17-18
19-23
By Gender
2024
March
Immediate Action Required
Addressing Oral Health Issues
Moderate Oral Health Issues
Watch for Changes
Good Oral Health
Excellent Oral Hygiene
10
8
6
4
2
0
Female
Male


IDENTIFY
Dashboard
Students
Oral Health Assessment
Mouth Examination
Medical History
Profiling
Jericho Quilas
Food Intake Monitoring Results
The chart displays the number of students' food intake monitoring assessment results, aiming to visualize the variations in Low Risk, Moderate Risk and High Risk based on their age group, department and gender.
By Age
2024
March
Low Risk
Moderate Risk
High Risk
9
8
7
6
5
4
3
2
1
0
19-23
By Department
2024
March
Low Risk
Moderate Risk
High Risk
6
5
4
3
2
1
0
CICT
COD
COE
CON
ILS

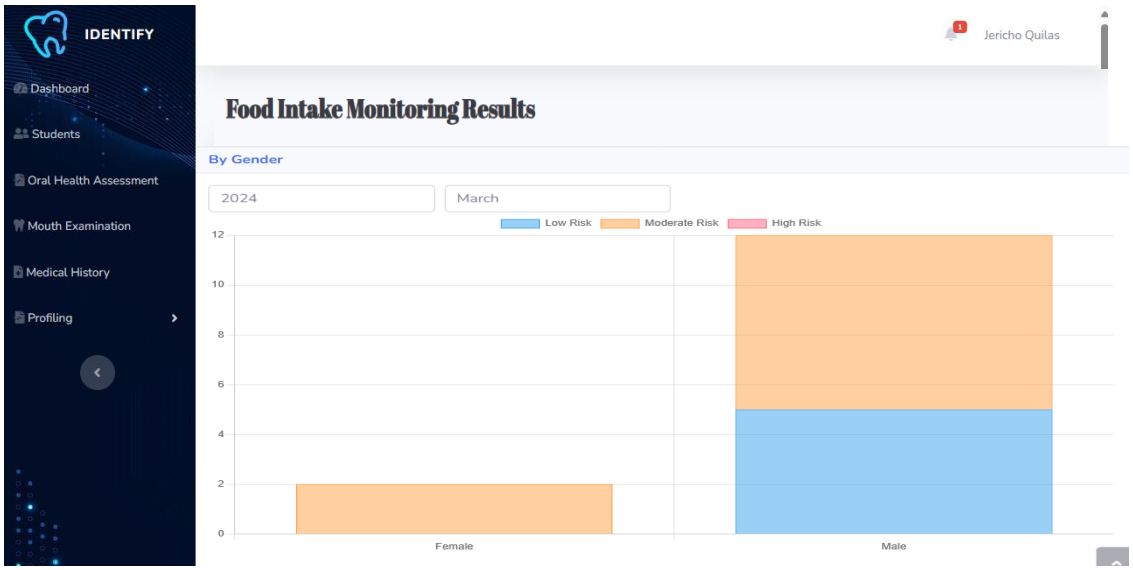


Figure 43. Dentist Profiling Feature

Figure 43 presents the profiling page, which consists of two tabs: one for oral assessment and the other for food monitoring. These tabs display results categorized by the department, age, and gender of the students.

Simulation Environment and Scenarios

The use of a simulated environment and various scenarios holds significant importance in our study. This simulated space provides a controlled and virtual setting where we can assess and observe how the system functions in a systematic manner. For students, it offers a safe and educational platform where they can interact with the system by inputting their dietary and dental care choices within simulated scenarios. This hands-on experience allows them to see how making healthier food choices and improving dental hygiene practices can positively affect their daily lives.

Simultaneously, for dentists, this simulation environment serves as a platform for evaluating and analyzing virtual dental health profiles across different scenarios. Dentists can simulate various patient cases, adjusting variables to test the system's ability to identify oral health issues and aid in early detection.

Thus, the outcomes of these simulations, as discussed in this section, provide valuable insights into the practicality and potential of the decision support system,

ensuring that it meets the needs and expectations of both students and dentists in promoting improved dietary habits and dental health. In essence, the simulation environment serves as a crucial testing ground for understanding how the system can be applied in the real world and its effectiveness in enhancing overall well-being.

Results, Interpretation, and Analysis

The system is beneficial for both dentists and students, who are the primary users. Currently, at the WVSU clinic, they still use paper and pen to gather information from all students. Therefore, the researchers developed a system that makes this process easier and more organized in terms of gathering information. The system is connected to food consumption, which significantly impacts oral health, increasing the risk of tooth decay and cavities. It monitors food intake and helps users become aware of potential outcomes. Implementing this system assists dentists in profiling each department by their risk levels, allowing them to identify departments that need more attention and conduct regular checks. Limiting sugary intake can help improve oral health. Based on feedback from respondents, they strongly agree that having a food monitoring system that can track and check its impact on oral health is beneficial. It raises awareness and encourages users to reduce the consumption of foods that may harm their oral health.

System Evaluation Results

The system was presented to five jurors to test the system's quality. The ISO/IEC 25010 is utilized in order to evaluate the system. The criteria are divided into eight parts:

1. Functional Suitability - to determine whether the system's functions fulfill their intended purposes.
2. Reliability - to verify the system's stability and dependability.
3. Usability - to evaluate the system's user interface and overall user experience.
4. Performance Efficiency - to evaluate the system's performance under different workloads and stress conditions.
5. Compatibility - to verify the system's interoperability and adaptability.
6. Security - to identify potential weaknesses and vulnerabilities that could be exploited by attackers or unauthorized individuals.
7. Maintainability - to evaluate the system's manageability and supportability.

8. Portability - to evaluate the system's adaptability and compatibility across different platforms, operating systems, and configurations.

Evaluation

According to Table 1, the evaluators provided an average rating of 4.84, which corresponds to the classification of "Very Good." In terms of functional suitability, the system received a rating of 4.92. Reliability, with a rating of 4.71, also received a very good evaluation. Usability received a rating of 4.88 and performance efficiency received a rating of 4.90, indicating a very good level. On the other hand, the compatibility, with a rating of 5.13. Security as it received a rating of 4.70. Maintainability received a rating of 4.82 and portability received a rating of 4.64.

Table 1

Evaluation Results for the Proposed System

Criteria	Mean	Description	Rank
Functional Suitability	4.92	Very Good	2
Reliability	4.71	Very Good	6
Usability	4.88	Very Good	4
Performance Efficiency	4.90	Very Good	3
Compatibility	5.13	Very Good	1
Security	4.70	Very Good	7
Maintainability	4.82	Very Good	5
Portability	4.64	Very Good	8
Overall Evaluation	4.84	Very Good	

Scale	Description
5.20 – 6.00	Excellent
4.30 – 5.19	Very Good
3.50 – 4.29	Good
2.70 – 3.49	Fair
1.80 - 2.69	Poor
1.00 - 1.79	Very Poor

CHAPTER 5 SUMMARY OF FINDINGS, CONCLUSION, AND RECOMMENDATIONS

Summary of the Proposed Study Design and Implementation

The primary objective of the proposed study is to create a decision support system for monitoring food intake and dental health profiling, utilizing technology and data integration. The researchers anticipate that the implementation of this system will significantly streamline the process of monitoring dietary habits and oral health for end users, particularly individuals seeking to manage their well-being efficiently.

By incorporating a decision rule-based algorithm and data analytics, the system aims to provide recommendations based on food intake monitoring assessment and oral health assessment, ultimately assisting users in making informed decisions about their dietary choices and oral care.

The study focused on enhancing user experience and leveraging technological advancements to promote healthier lifestyles, addressing the growing need for innovative solutions in the realm of health monitoring.

Through the utilization of this system, the researchers aimed to contribute to the overall improvement of public health by empowering individuals to proactively manage their food intake and dental well-being in an informed and effective manner.

Summary of Findings

The study used information from students' food records and oral health assessments to create a helpful decision support system. By finding connections between food habits and dental health, the system pinpointed potential risks and suggested specific recommendations for both eating choices and dental care practices.

The system was designed for the students of West Visayas State University (WVSU). To guarantee its dependability, experts validated the dental questionnaire's purpose and content on June 13, 2023, and the food questionnaire on November 17, 2023, marking a pivotal move forward in the system's development. Currently, the WVSU Dental Clinic operates without a technological system, necessitating an upgrade for improved efficiency. The current manual system poses challenges in managing files and retrieving information, making it difficult for users to schedule appointments and access the necessary information.

The researchers created a system known as the "Decision Support System for Food Intake Monitoring and Dental Health Profiling." The system aimed to evaluate students' dental conditions and dietary preferences through assessments. Based on these evaluations, students receive recommendations. Additionally, the system features in the dentist’s section, enabling them to track students' dental health and dietary profiles using the obtained results. This user-friendly system is easily accessible through both phones and laptops, offering convenience for users to access and manage their information.

The main goal of this study was to create a decision support system for monitoring food intake and profiling dental health specifically for West Visayas State University. By making information easily accessible, the system aimed to encourage better oral health practices and promote appropriate food portioning among WVSU students. Furthermore, the potential benefits of this system extend beyond WVSU, suggesting possibilities for implementation in similar educational institutions and other settings.

Conclusion

1. The system has effectively transitioned the WVSU clinic from a manual paper-based system to an automated digital platform for collecting student data. This shift has streamlined the data collection process, making it more efficient and less prone to errors. The automated system ensures that data is recorded accurately and consistently. As a result, the clinic can handle a larger volume of data with greater

ease. This modernization significantly enhances the overall operational efficiency of the clinic.

2. The system has improved communication and coordination between dentists and students by providing a centralized platform for appointment scheduling, food intake monitoring, and oral health assessments. This centralization ensures that all relevant information is accessible in one place, facilitating seamless interactions. Dentists can easily track appointments, monitor patients progress, and communicate recommendations effectively. Students benefit from a more organized system that keeps them informed and engaged in their healthcare.

3. The system successfully monitors students' food intake and raises awareness about the connection between diet and oral health, providing feedback and recommendations. By tracking dietary habits, the DSS helps students understand how their food choices impact their dental health. The feedback mechanism

educates students on healthier eating practices and their benefits. This ongoing monitoring creates a continuous learning process, encouraging students to make better dietary decisions. As a result, the system plays a crucial role in promoting long-term oral health awareness.

4. The DSS enables dentists to profile each department based on their risk levels, allowing for targeted monitoring and interventions for high-risk groups. This targeted approach ensures that those who need the most help receive it promptly. Consequently, the system helps in optimizing healthcare delivery and outcomes.

5. The system facilitates the ongoing tracking of students' progress in both dietary habits and oral health, providing insights into the effectiveness of interventions. Continuous data collection allows for the assessment of long-term trends and changes in health behaviors. Dentists can evaluate the success of

dietary recommendations and dental treatments over time. This longitudinal tracking supports the refinement of healthcare strategies based on real-world outcomes. Students benefit from seeing their progress, which can motivate them to maintain healthy habits.

Recommendations

The following recommendations are offered for related research in the field of dental health and food intake. The researchers highly recommend:

1. The dental experts may catch up with today's generation of technology that is being adapted by the students and give them a very convenient way

to communicate with them considering their schedule.

2. The system may continuously gather data on food intake and dental health to further enhance its algorithms and insights over time. Regular data updates may guarantee that the recommendations remain accurate and relevant as students' food habits and oral health needs change.

3. The decision support system may be implemented in educational institutions such as WVSU to allow for continuous monitoring and guidance of students' dental health and food habits. The students will have regular access to personalized recommendations and promote a health-conscious culture on campus.

4. It is also recommended to ensure that the Decision Support System is accessible across several platforms, including mobile devices, tablets, and desktops to accommodate different user preferences and lifestyles.

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Appendices

Appendix A

Letter of Request to the Adviser

Attachment 3

	INVITATION LETTER FOR ADVISER	Document No.	WVSU-ICT-SOI-03-F03
		Issue No.	1
		Revision No.	0
	WEST VISAYAS STATE UNIVERSITY	Date of Effectivity:	April 27, 2018
		Issued by:	CICT
		Page No.	Page 1 of 1

February 3, 2023

DR. MA. BETH S. CONCEPCION
College Dean
College of Information and Communications Technology - West Visayas State University
Luna Street, La Paz, Iloilo City

Dear Dr. Ma. Beth S. Concepcion,

The undersigned are BS Information Systems Research 1/Thesis 1 students of CICT, this university. Our thesis/capstone project title is "Decision Support System for Food Intake Monitoring and Dental Health Profiling for WVSU-CICT Students".

Knowing of your expertise in research and on the subject matter, we would like to request you to be our **ADVISER.**

We are positively hoping for your acceptance. Kindly check the corresponding box and affix your signature in the space provided. Thank you very much.

Respectfully yours,

1. Edrian Aperocho
2. Caesy Ladores
3. Jonela Marie Magbanua
4. Jericho Cleo Quiles
5. Julian Dave Sioting
6. Jemelyn Tesara

PS:

Advisers, are task to work with the students in providing direction and assistance as needed in their thesis/capstone project. They shall meet with the students weekly or as needed to provide direction, check on progress and assist in resolving problems until such a time that the students passed their defenses and submit their final requirements, as well as, preparing their evaluations and grades.

Action Taken:
☑ I Accept.
○ Sorry. I don't accept.

Signature over printed name of the Adviser

CC:

CICT Dean
Research Coordinator
Group
*To be accomplished in 4 copies

Appendix B

Letter for Interview

West Visayas State University
COLLEGE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY
Luna St., La Paz, Iloilo City 5000
Iloilo, Philippines
* Trunkline: (063) (033) 320-0870 to 78 loc. 1403 * Telefax No.: (033) 320-0879
* Website: www.wvsu.edu.ph * Email Address: cict@wvsu.edu.ph

June 13, 2023

DR. GEORGE N. SIBONGA
University Dentist
West Visayas State University
La Paz, Iloilo City

Dear Dr. Sibonga,

Good day!

We are the undersigned Bachelor of Science in Information Systems students of College of Information and Communications Technology. We are currently working our thesis entitled "Decision Support System for Food Intake Monitoring and Dental Health Profiling."

The purpose of our questionnaire is to evaluate an individual's risk of developing dental health profiling tool based on dental conditions. We have carefully designed the questionnaire to gather relevant information.

We are respectfully requesting your expert evaluation of the questionnaire to ensure its accuracy, comprehensiveness, and alignment with current best practices in caries risk assessment. We would greatly appreciate your expert insights, feedback, and recommendations to ensure the validity and reliability of the questionnaire. Your input will be instrumental in ensuring the accuracy of our caries risk assessment process and ultimately improving the oral health outcomes of the individuals we serve.

Your kind and favorable response of this request will greatly help us in the completion of the study. Thank you very much for considering our request, and we genuinely appreciate your valuable contribution to this important endeavor. Please do not hesitate to contact us at caesy.ladores@wvsu.edu.h or 09127632709.

Sincerely,

EDRIAN D. APEROCHO
Researcher

JERICHO CLEO D. QUILAS
Researcher

CAESY L. LADORES
Researcher

JULIAN DAVE G. SIOTING
Researcher

JONELA MARIE P. MAGBANUA
Researcher

JEMELYN D. TESARA
Researcher

Noted by:

MA. BETH S. CONCEPCION, DIT
Research Adviser
Dean, CICT

Approved by:

DR. GEORGE N. SIBONGA
University Dentist

Appendix C

Letter to the Technical Editor

	ADVISER'S ENDORSEMENT FORM (For Thesis Manuscript)	Document No.	WVSU-ICT-SOI-03-F10
		Issue No.	1
		Revision No.	0
	WEST VISAYAS STATE UNIVERSITY	Date of Effectivity:	April 27, 2018
		Issued by:	CICT
		Page No.	Page 1 of 1

Respectfully endorsed to the **Technical Editor**, the attached manuscript of the thesis entitled:

DECISION SUPPORT SYSTEM FOR FOOD INTAKE MONITORING AND DENTAL HEALTH PROFILING

Said manuscript has been presented to me for preliminary evaluation and guidance, and after a series of corrections/directions given which was implemented by the proponents whose names are listed hereunder and their thorough research, we have come to its completion.

Now therefore, I hereby **ENDORSE** the said thesis manuscript to the Technical Editor for **TECHNICAL EDITING**.

DR. MA. BETH S. CONCEPCION
Adviser's Name & Signature

Date: May 31, 2024

Group Members:
1. CAESY L. LADORES
2. JONELA MARIE P. MAGBANUA
3. JERICHO CLEO D. QUILAS
4. JULIAN DAVE G. SIOTING
5. JEMELYN D. TESARA

Note: *This form should be accomplished and signed if the corrections and changes made by the adviser have been implemented and a new copy of the document have been printed for checking and submission to the next editor*

Appendix D

Letter to the English Editor

	TECHNICAL EDITOR'S ENDORSEMENT FORM (For Thesis Manuscript)	Document No.	WVSU-ICT-SOI-03-F11
		Issue No.	1
		Revision No.	0
	WEST VISAYAS STATE UNIVERSITY	Date of Effectivity:	April 27, 2018
		Issued by:	CICT
		Page No.	Page 1 of 1

Respectfully endorsed to the **English Editor**, the attached manuscript of the thesis entitled:

DECISION SUPPORT SYSTEM FOR FOOD INTAKE MONITORING AND DENTAL HEALTH PROFLING

Said manuscript was presented to me and was reviewed and edited in terms of technical specifications, correctness of diagrams and other technical matters. The corrections and suggestions was carried and implemented by the proponents whose names are listed hereunder.

Now therefore, I hereby **ENDORSE** the said thesis manuscript to the English Editor/Grammarian for **English Grammar Editing.**

DR. MA. BETH S. CONCEPCION
Technical Editor's Name & Signature

Date: May 31, 2024

Group Members:
1. CAESY L. LADORES
2. JONELA MARIE P. MAGBANUA
3. JERICHO CLEO D. QUILAS
4. JULIAN DAVE G. SIOTING
5. JEMELYN D. TESARA

Note: *This form should be accomplished and signed if the corrections and changes made by the Technical Editor have been implemented and a new copy of the document have been printed for checking and submission to the next editor.*

Appendix E

Letter to the Format Editor

	ENGLISH EDITOR/GRAMMARIAN'S ENDORSEMENT FORM (For Thesis Manuscript)	Document No.	WVSU-ICT-SOI-03-F12
		Issue No.	1
		Revision No.	0
	WEST VISAYAS STATE UNIVERSITY	Date of Effectivity:	April 27, 2018
		Issued by:	CICT
		Page No.	Page 1 of 1

Respectfully endorsed to the **Thesis Format Editor**, the attached manuscript of the thesis entitled:

DECISION SUPPORT SYSTEM FOR FOOD INTAKE MONITORING AND DENTAL HEALTH PROFILING

Said manuscript was presented to me for English grammar editing, corrections have been made and the proponents whose names are listed hereunder implemented said corrections and changes in the revised manuscript.

Now therefore, I hereby **ENDORSE** the said thesis manuscript for **Thesis Format Editing**.

PROF. ESPERVAL CEZHAR H. CADIAO
English Editor/Grammarian's Name and Signature

Date: June 3, 2024

Group Members:
1. CAESY L. LADORES
2. JONELA MARIE P. MAGBANUA
3. JERICHO CLEO D. QUILAS
4. JULIAN DAVE G. SIOTING
5. JEMELYN D. TESARA

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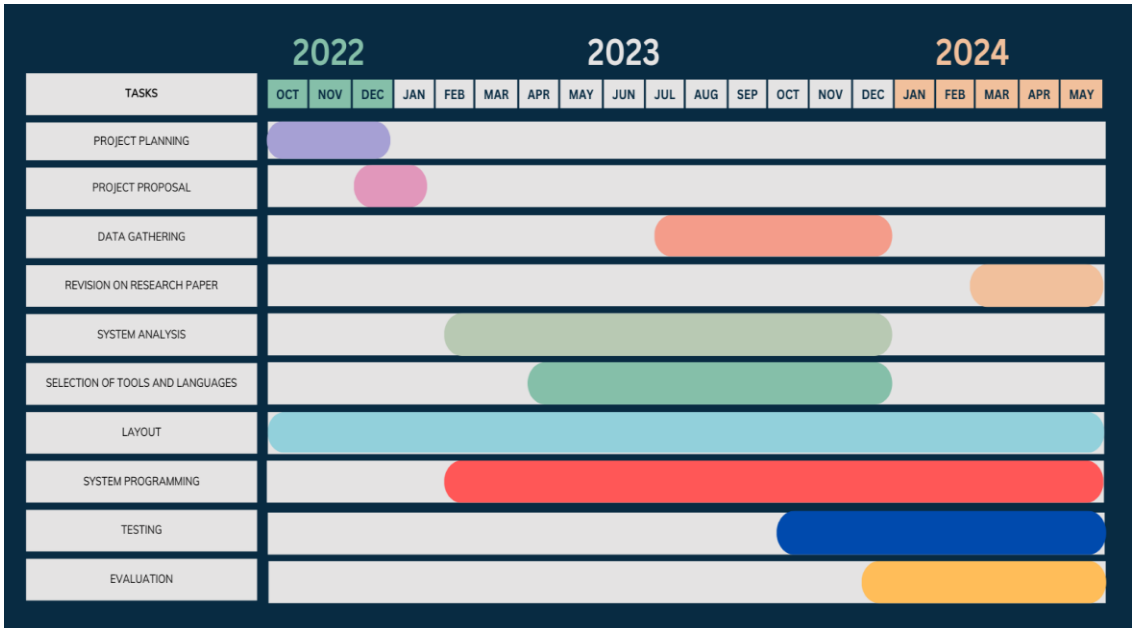
Appendix F

Gantt Chart



Appendix G

Data Dictionary

Admin	:	id + first_name + last_name + birthday + brgy + municipality + province + email + number + password +
Users	:	id + student_id + first_name + last_name + birthday + brgy + municipality + province + email + number + course + department + allergy + password + gender + civstats +
Appointment	:	id + student_id + status [pending | …] + first_name + last_name + course + date + time + description +
Dental Assessment	:	id +

```
                                    student_id +
                                    first_name +
                                    last_name +
                                    course +
                                    lips +
                                    dental_pain +
                                    natural_teeth +
                                    dentures +
                                    oral_cleanliness +
                                    saliva +
                                    tongue +
                                    gum_and_tissues +
                                    dental_hygiene +
                                    results +
                                    total_results +
                                    recommendations
                                    date

Food Monitoring                 :   id +
                                    student_id +
                                    first_name +
                                    last_name +
                                    course +
                                    fruit_no_sugar +
                                    fruit_with_sugar +
                                    fruit_juice +
                                    vegjuice_no_sugar +
                                    vegjuice_with_sugar +
                                    fresh_veg +
                                    rice_grain +
                                    cracker_grain +
                                    pastry_grain +
                                    dairy_no_sugar +
                                    dairy_cheese +
                                    dairy_with_sugar +

                                    protein_no_sugar +
                                    protein_with_sugar +
                                    oils_no_sugar +
                                    calorie_with_sugar +
                                    sugary_drinks +
                                    glass_of_water +
```

```
                                    result +
                                    total_results +
                                    recommendations +
                                    date +

Mouth Examination           :       id +
                                    col18 +
                                    col17 +
                                    col16 +
                                    col15 +
                                    col14 +
                                    col13 +
                                    col12 +
                                    col11 +
                                    col21 +
                                    col22 +
                                    col23 +
                                    col24 +
                                    col25 +
                                    col26 +
                                    col27 +
                                    col28 +
                                    col55 +
                                    col54 +
                                    col53 +
                                    col52 +
                                    col51 +
                                    col61 +
                                    col62 +
                                    col63 +
                                    col64 +
                                    col65 +
                                    col85 +
                                    col84 +
                                    col83 +
                                    col82 +
                                    col81 +
                                    col71 +
                                    col72 +
                                    col73 +
                                    col74 +
                                    col75 +
```

```
                                col48 +
                                col47 +
                                col46 +
                                col45 +
                                col44 +
                                col43 +
                                col42 +
                                col41 +
                                col31 +
                                col32 +
                                col33 +
                                col34 +
                                col35 +
                                col36 +
                                col37 +
                                col38 +
                                date +
                                users_id +

Medical History             :   id +
                                medical_treatment +
                                major_operation +
                                heart_ailment +
                                highblood +
                                diabetes +
                                rheumatic_fever +
                                lung_disease +
                                weight_loss +
                                medicine +
                                medication +
                                special_diet +
                                climb_stairs +
                                healing +
                                general_health +
                                pregnant +
                                tooth_extraction +
                                date +
                                users_id
```

Appendix H

Data Elements

Admin (Dentist)

Name: id
Type: int
Length:
Description: The field identifies the id of the admin.

Name: first_name
Type: varchar
Length: 100
Description: The field identifies the first name of the admin.

Name: last_name
Type: varchar
Length: 100
Description: The field identifies the first name of the admin.

Name: birthday
Type: date
Length:
Description: The field identifies the birthday of the admin.

Name: brgy
Type: varchar
Length: 100

Description: The field identifies the barangay of the admin.

Name: municipality

Type: varchar

Length: 100

Description: The field identifies the municipality of the admin.

Name: province

Type: varchar

Length: 100

Description: The field identifies the province of the admin.

Name: email

Type: varchar

Length: 100

Description: The field identifies the email of the admin.

Name: number

Type: int

Length: 100

Description: The field identifies the phone number of the admin.

Name: password

Type: varchar

Length: 100

Description: The field identifies the password of the admin.

Users (Student)

Name: id

Type: int

Length: 11

Description: The field identifies the id of the student.

Name: student_id

Type: varchar

Length: 100

Description: The field identifies the student id of the student.

Name: first_name

Type: varchar

Length: 100

Description: The field identifies the first name of the student.

Name: last_name

Type: varchar

Length: 100

Description: The field identifies the last name of the student.

Name: birthday

Type: date

Length:

Description: The field identifies the birthday of the student.

Name: brgy

Type: varchar

Length: 100

Description: The field identifies the barangay of the student.

Name: municipality

Type: varchar

Length: 100

Description: The field identifies the municipality of the student.

Name: province

Type: varchar

Length: 100

Description: The field identifies the province of the student.

Name: email

Type: varchar

Length: 100

Description: The field identifies the email of the student.

Name: number

Type: int

Length: 100

Description: The field identifies the phone number of the student.

Name: course

Type: varchar

Length: 100

Description: The field identifies the course of the student.

Name: department

Type: varchar

Length: 250

Description: The field identifies the department of the student.

Name: allergy

Type: varchar

Length: 100

Description: The field identifies the allergy of the student.

Name: password

Type: varchar

Length: 100

Description: The field identifies the password of the student.

Name: gender

Type: varchar

Length: 50

Description: The field identifies the gender of the student.

Name: civstats

Type: varchar

Length: 50

Description: The field identifies the civil status of the student.

Appointment

Name: id

Type: int

Length: 11

Description: The field identifies the id of the appointment.

Name: student_id

Type: varchar

Length: 255

Description: The field identifies the student id status of the appointment.

Name: status

Type: varchar

Length: 50

Description: The field identifies the status of the appointment.

Name: first_name

Type: varchar

Length: 100

Description: The field identifies the first name of the student for their appointment.

Name: last_name

Type: varchar

Length: 100

Description: The field identifies the last name of the student for their appointment.

Name: course

Type: varchar

Length: 100

Description: The field identifies the course of the student for their appointment.

Name: date

Type: date

Length:

Description: The field identifies the date of the appointment.

Name: time

Type: time

Length: 6

Description: The field identifies the time of the appointment.

Name: description

Type: varchar

Length: 100

Description: The field identifies the description of the appointment.

Dental Assessment

Name: id

Type: int

Length: 11

Description: The field identifies the id of the dental assessment.

Name: student_id

Type: varchar

Length: 100

Description: The field identifies the student id of the student for their dental assessment.

Name: first_name

Type: varchar

Length: 100

Description: The field identifies the firt name of the student for their dental assessment.

Name: last_name

Type: varchar

Length: 100

Description: The field identifies the last name of the student for their dental assessment.

Name: course

Type: varchar

Length: 100

Description: The field identifies the course of the student for their dental assessment.

Name: lips

Type: int

Length: 100

Description: The field identifies the lips of the dental assessment.

Name: dental_pain

Type: int

Length: 100

Description: The field identifies the dental pain of the dental assessment.

Name: natural_teeth

Type: int

Length: 100

Description: The field identifies the natural teeth of the dental assessment.

Name: dentures

Type: int

Length: 100

Description: The field identifies the dentures of the dental assessment.

Name: oral_cleanliness

Type: int

Length: 100

Description: The field identifies the oral cleanliness of the dental assessment.

Name: saliva

Type: int

Length: 100

Description: The field identifies the saliva of the dental assessment.

Name: tongue

Type: int

Length: 100

Description: The field identifies the tongue of the dental assessment.

Name: gum_and_tissues

Type: int

Length: 100

Description: The field identifies the gums and tissues of the dental assessment.

Name: dental_hygiene

Type: int

Length: 100

Description: The field identifies the dental hygiene of the dental assessment.

Name: results

Type: varchar

Length: 500

Description: The field identifies the results of the dental assessment.

Name: total_results

Type: int

Length: 100

Description: The field identifies the total results of the dental assessment.

Name: recommendations

Type: varchar

Length: 250

Description: The field identifies the recommendations of the dental assessment.

Name: date

Type: date

Length:

Description: The field identifies the date of the dental assessment.

Food Monitoring

Name: id

Type: int

Length: 11

Description: The field identifies the id of the food monitoring.

Name: student_id

Type: varchar

Length: 100

Description: The field identifies the student id of the student for their food monitoring.

Name: first_name

Type: varchar

Length: 100

Description: The field identifies the first name of the student for their food monitoring.

Name: last_name

Type: varchar

Length: 100

Description: The field identifies the last name of the student for their food monitoring.

Name: course

Type: varchar

Length: 100

Description: The field identifies the course of the student for their food monitoring.

Name: fruit_no_sugar

Type: int

Length: 100

Description: The field identifies type of food of the food monitoring.

Name: fruit_with_sugar

Type: int

Length: 100

Description: The field identifies type of food of the food monitoring.

Name: fruit_juice

Type: int

Length: 100

Description: The field identifies type of food of the food monitoring.

Name: vegjuice_no_sugar

Type: int

Length: 100

Description: The field identifies type of food of the food monitoring.

Name: vegjuice_with_sugar

Type: int

Length: 100

Description: The field identifies type of food of the food monitoring.

Name: fresh_veg

Type: int

Length: 100

Description: The field identifies type of food of the food monitoring.

Name: rice_grain

Type: int

Length: 100

Description: The field identifies type of food of the food monitoring.

Name: cracker_grain

Type: int

Length: 100

Description: The field identifies type of food of the food monitoring.

Name: pastry_grain

Type: int

Length: 100

Description: The field identifies type of food of the food monitoring.

Name: dairy_no_sugar

Type: int

Length: 100

Description: The field identifies type of food of the food monitoring.

Name: dairy_cheese

Type: int

Length: 100

Description: The field identifies type of food of the food monitoring.

Name: dairy_with_sugar

Type: int

Length: 100

Description: The field identifies type of food of the food monitoring.

Name: protein_no_sugar

Type: int

Length: 100

Description: The field identifies type of food of the food monitoring.

Name: protein_with_sugar

Type: int

Length: 100

Description: The field identifies type of food of the food monitoring.

Name: oils_no_sugar

Type: int

Length: 100

Description: The field identifies type of food of the food monitoring.

Name: calorie_with_sugar

Type: int

Length: 100

Description: The field identifies type of food of the food monitoring.

Name: sugary_drinks

Type: int

Length: 100

Description: The field identifies type of food of the food monitoring.

Name: glass_of_water

Type: int

Length: 100

Description: The field identifies type of food of the food monitoring.

Name: result

Type: varchar

Length: 500

Description: The field identifies result of the food monitoring.

Name: total_results

Type: int

Length: 100

Description: The field identifies total results of the food monitoring.

Name: recommendations

Type: varchar

Length: 100

Description: The field identifies the recommendations of the food monitoring.

Name: date

Type: date

Length:

Description: The field identifies date of the food monitoring.

Mouth Examination

Name: id

Type: int

Length: 11

Description: The field identifies id of the mouth examination.

Name: col18

Type: text

Length:

Description: The field identifies the tooth number of the mouth examination.

Name: col17

Type: text

Length:

Description: The field identifies the tooth number of the mouth examination.

Name: col16

Type: text

Length:

Description: The field identifies the tooth number of the mouth examination.

Name: col15

Type: text

Length:

Description: The field identifies the tooth number of the mouth examination.

Name: col14

Type: text

Length:

Description: The field identifies the tooth number of the mouth examination.

Name: col13

Type: text

Length:

Description: The field identifies the tooth number of the mouth examination.

Name: col12

Type: text

Length:

Description: The field identifies the tooth number of the mouth examination.

Name: col11

Type: text

Length:

Description: The field identifies the tooth number of the mouth examination.

Name: col21

Type: text

Length:

Description: The field identifies the tooth number of the mouth examination.

Name: col22

Type: text

Length:

Description: The field identifies the tooth number of the mouth examination.

Name: col23

Type: text

Length:

Description: The field identifies the tooth number of the mouth examination.

Name: col24

Type: text

Length:

Description: The field identifies the tooth number of the mouth examination.

Name: col25

Type: text

Length:

Description: The field identifies the tooth number of the mouth examination.

Name: col26

Type: text

Length:

Description: The field identifies the tooth number of the mouth examination.

Name: col27

Type: text

Length:

Description: The field identifies the tooth number of the mouth examination.

Name: col28

Type: text

Length:

Description: The field identifies the tooth number of the mouth examination.

Name: col55

Type: text

Length:

Description: The field identifies the tooth number of the mouth examination.

Name: col54

Type: text

Length:

Description: The field identifies the tooth number of the mouth examination.

Name: col53

Type: text

Length:

Description: The field identifies the tooth number of the mouth examination.

Name: col52

Type: text

Length:

Description: The field identifies the tooth number of the mouth examination.

Name: col51

Type: text

Length:

Description: The field identifies the tooth number of the mouth examination.

Name: col61

Type: text

Length:

Description: The field identifies the tooth number of the mouth examination.

Name: col62

Type: text

Length:

Description: The field identifies the tooth number of the mouth examination.

Name: col63

Type: text

Length:

Description: The field identifies the tooth number of the mouth examination.

Name: col64

Type: text

Length:

Description: The field identifies the tooth number of the mouth examination.

Name: col65

Type: text

Length:

Description: The field identifies the tooth number of the mouth examination.

Name: col85

Type: text

Length:

Description: The field identifies the tooth number of the mouth examination.

Name: col84

Type: text

Length:

Description: The field identifies the tooth number of the mouth examination.

Name: col83

Type: text

Length:

Description: The field identifies the tooth number of the mouth examination.

Name: col82

Type: text

Length:

Description: The field identifies the tooth number of the mouth examination.

Name: col81

Type: text

Length:

Description: The field identifies the tooth number of the mouth examination.

Name: col71

Type: text

Length:

Description: The field identifies the tooth number of the mouth examination.

Name: col72

Type: text

Length:

Description: The field identifies the tooth number of the mouth examination.

Name: col73

Type: text

Length:

Description: The field identifies the tooth number of the mouth examination.

Name: col74

Type: text

Length:

Description: The field identifies the tooth number of the mouth examination.

Name: col75

Type: text

Length:

Description: The field identifies the tooth number of the mouth examination.

Name: col48

Type: text

Length:

Description: The field identifies the tooth number of the mouth examination.

Name: col47

Type: text

Length:

Description: The field identifies the tooth number of the mouth examination.

Name: col46

Type: text

Length:

Description: The field identifies the tooth number of the mouth examination.

Name: col45

Type: text

Length:

Description: The field identifies the tooth number of the mouth examination.

Name: col44

Type: text

Length:

Description: The field identifies the tooth number of the mouth examination.

Name: col43

Type: text

Length:

Description: The field identifies the tooth number of the mouth examination.

Name: col42

Type: text

Length:

Description: The field identifies the tooth number of the mouth examination.

Name: col41

Type: text

Length:

Description: The field identifies the tooth number of the mouth examination.

Name: col31

Type: text

Length:

Description: The field identifies the tooth number of the mouth examination.

Name: col32

Type: text

Length:

Description: The field identifies the tooth number of the mouth examination.

Name: col33

Type: text

Length:

Description: The field identifies the tooth number of the mouth examination.

Name: col34

Type: text

Length:

Description: The field identifies the tooth number of the mouth examination.

Name: col35

Type: text

Length:

Description: The field identifies the tooth number of the mouth examination.

Name: col36

Type: text

Length:

Description: The field identifies the tooth number of the mouth examination.

Name: col37

Type: text

Length:

Description: The field identifies the tooth number of the mouth examination.

Name: col38

Type: text

Length:

Description: The field identifies the tooth number of the mouth examination.

Name: date

Type: date

Length:

Description: The field identifies the tooth number of the mouth examination.

Name: users_id

Type: int

Length: 10

Description: The field identifies users id of the mouth examination.

Medical History

Name: id

Type: int

Length: 11

Description: The field identifies the id of the medical history.

Name: medical_treatment

Type: varchar

Length: 50

Description: The field identifies the medical treatment of the medical history.

Name: major_operation

Type: varchar

Length: 50

Description: The field identifies the major operation of the medical history.

Name: heart_ailment

Type: varchar

Length: 50

Description: The field identifies the heart ailment of the medical history.

Name: highblood

Type: varchar

Length 50

Description: The field identifies the high blood of the medical history.

Name: diabetes

Type: varchar

Length: 50

Description: The field identifies the diabetes of the medical history.

Name: rheumatic_fever

Type: varchar

Length: 50

Description: The field identifies the rheumatic fever of the medical history.

Name: lung_disease

Type: varchar

Length: 50

Description: The field identifies the lung disease of the medical history.

Name: weight_loss

Type: varchar

Length: 50

Description: The field identifies the weight loss of the medical history.

Name: medicine

Type: varchar

Length: 50

Description: The field identifies the medicine of the medical history.

Name: medication

Type: varchar

Length: 50

Description: The field identifies the medication of the medical history.

Name: special_diet

Type: varchar

Length: 50

Description: The field identifies the special diet of the medical history.

Name: climb_stairs

Type: varchar

Length: 50

Description: The field identifies the climb stairs of the medical history.

Name: healing

Type: varchar

Length: 50

Description: The field identifies the healing of the medical history.

Name: general_health

Type: varchar

Length: 50

Description: The field identifies the general health of the medical history.

Name: pregnant

Type: varchar

Length: 50

Description: The field identifies the pregnant of the medical history.

Name: tooth_extraction

Type: varchar

Length: 50

Description: The field identifies the tooth extraction of the medical history.

Name: date

Type: date

Length:

Description: The field identifies the date of the medical history.

Name: users_id

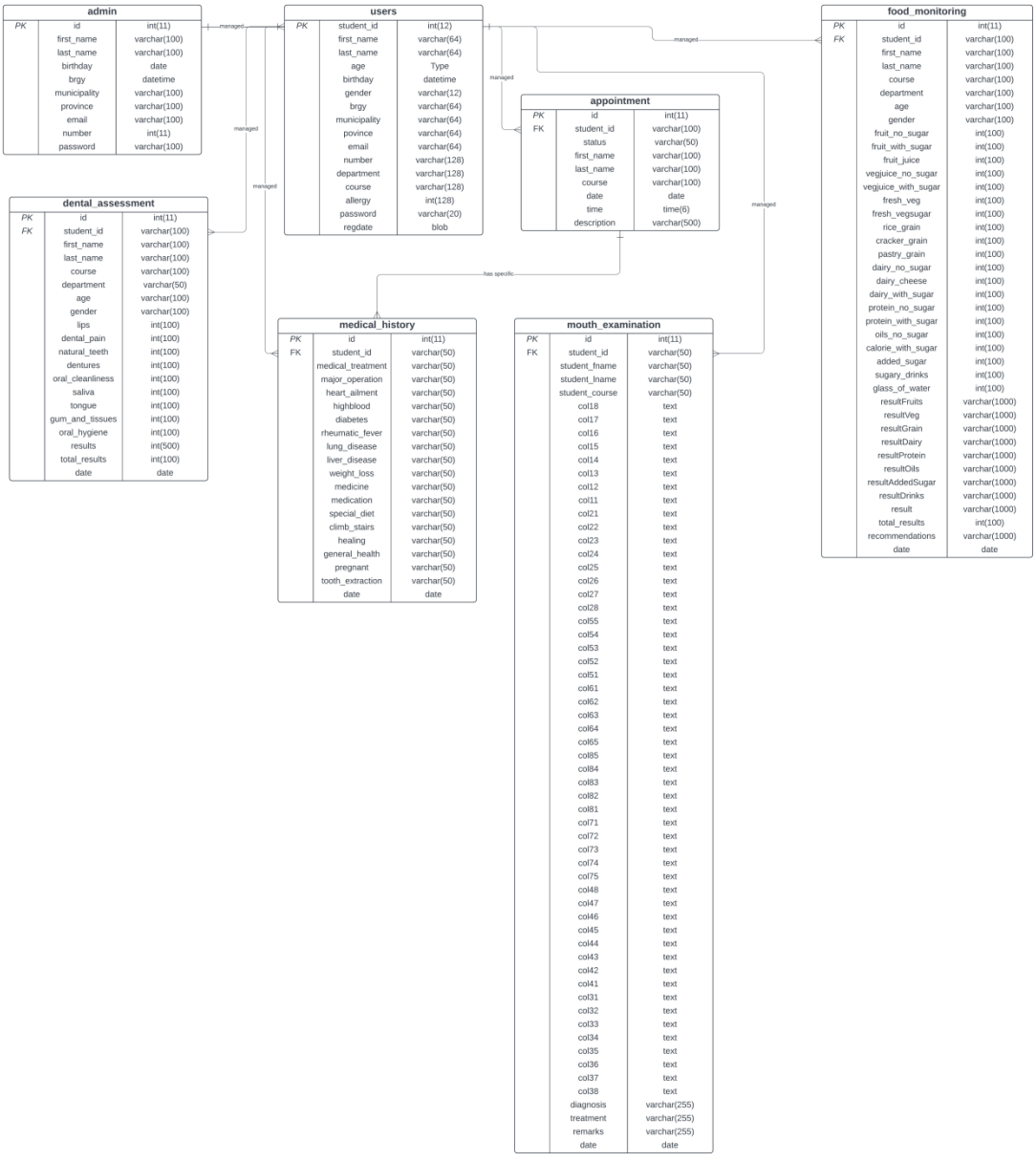
Type: int

Length: 10

Description: The field identifies the users id of the medical history.

Appendix I

Entity-Relationship Diagram



Appendix J

Sample Program Codes

```
<?php
include 'setup.php';


$sqlDept = "SELECT
            DISTINCT YEAR(date) AS year,
MONTH(date) AS month, department,
            SUM(CASE WHEN result = 'Low Risk'
THEN 1 ELSE 0 END) AS low_risk,
            SUM(CASE WHEN result = 'Moderate
Risk' THEN 1 ELSE 0 END) AS moderate_risk,
            SUM(CASE WHEN result = 'High Risk'
THEN 1 ELSE 0 END) AS high_risk,
            COUNT(*) AS total
            FROM food_monitoring
            GROUP BY department
            ORDER BY department";


$result = mysqli_query($conn, $sqlDept);


$departments = [];
```

```
$lowRisk = [];
$moderateRisk = [];
$highRisk = [];
$total = [];

while ($row = mysqli_fetch_assoc($result)) {
$departments[] = $row['department'];
$lowRisk[] = $row['low_risk'];
$moderateRisk[] = $row['moderate_risk'];
$highRisk[] = $row['high_risk'];
$total[] = $row['total']; // Add total to the
array
}

// Fetch distinct years and months
$sqlDistinctDates = "SELECT DISTINCT
YEAR(date) AS year, MONTH(date) AS month FROM
food_monitoring ORDER BY year DESC, month
DESC";
$resultDistinctDates = mysqli_query($conn,
$sqlDistinctDates);
```

```
$years = [];
$months = [];

while ($row =
mysqli_fetch_assoc($resultDistinctDates)) {
$years[] = $row['year'];
$months[] = $row['month'];
}
$years = array_unique($years);
$months = array_unique($months);
?>

<script
src="https://cdn.jsdelivr.net/npm/chart.js"></
script>
<div class="card shadow mb-4">
    <div class="card-header d-flex justify-
content-between align-items-center">
        <h6 class="text-primary fw-bold m-
0">By Department</h6>
```

```
    </div>
    <div class="card-body">
        <div class="select" style="display:
flex;">
            <select class="form-control"
id="deptSelectYear" style="width: 25%; margin-
right: 5px;">
                <?php foreach ($years as
$year) { ?>
                    <option value="<?php echo
$year; ?>"><?php echo $year; ?></option>
                <?php } ?>
            </select>

            <select class="form-control"
id="deptSelectMonth" style="width: 25%;
margin-left: 5px;">
                <?php foreach ($months as
$month) { ?>
```

```
                    <option value="<?php echo
$month; ?>"><?php echo date("F", mktime(0, 0,
0, $month, 1)); ?></option>
                <?php } ?>
            </select>
        </div>
        <canvas id="deptBarChart" width="400"
height="200"></canvas>
    </div>
</div>

<script>
    var deptSelectYear =
document.getElementById('deptSelectYear');
    var deptSelectMonth =
document.getElementById('deptSelectMonth');
    var deptBarChrt; // Define deptBarChrt
variable outside the scope of any function

    deptSelectYear.addEventListener('change',
deptChartUpdate);
```

```
    deptSelectMonth.addEventListener('change',
deptChartUpdate);


    function deptChartUpdate() {
        var deptYearSelect =
deptSelectYear.value;
        var deptMonthSelect =
deptSelectMonth.value;



fetch('fetch_department_data.php?year=' +
deptYearSelect + '&month=' + deptMonthSelect)
        .then(response => response.text())
        .then(data => {
            return JSON.parse(data);
        })
        .then(data => {
            // Check if myChart is defined
before updating it
            if (deptBarChrt) {
```

```
                deptBarChrt.data.labels =
data.departments;

deptBarChrt.data.datasets[0].data =
data.low_risk;

deptBarChrt.data.datasets[1].data =
data.moderate_risk;

deptBarChrt.data.datasets[2].data =
data.high_risk;

deptBarChrt.data.datasets[3].data =
data.total; // Update total dataset
                deptBarChrt.update();
            }
        })
    }

    // Get the latest year and month values
    var latestYear = <?php echo $years[0]; ?>;
```

```
    var latestMonth = <?php echo $months[0];
?>;

    // Set the selected values for the
dropdown menus
    deptSelectYear.value = latestYear;
    deptSelectMonth.value = latestMonth;

    // Trigger the chart update function with
the latest values
    deptChartUpdate();

    // Initial chart rendering
    var chart =
document.getElementById('deptBarChart').getCon
text('2d');
    deptBarChrt = new Chart(chart, {
        type: 'bar',
        data: {
            labels: <?php echo
json_encode($departments); ?>,
```

```
            datasets: [
                {
                    label: 'High Risk',
                    data: <?php echo
json_encode($highRisk); ?>,
                    backgroundColor:
'rgba(255, 99, 132, 0.5)', // RED
                    borderColor: 'rgba(255,
99, 132, 1)',
                    borderWidth: 1
                },
                {
                    label: 'Moderate Risk',
                    data: <?php echo
json_encode($moderateRisk); ?>,
                    backgroundColor:
'rgba(255, 159, 64, 0.5)', // ORANGE
                    borderColor: 'rgba(255,
159, 64, 1)',
                    borderWidth: 1
                },
```

```
                {
                    label: 'Low Risk',
                    data: <?php echo
json_encode($lowRisk); ?>,
                    backgroundColor: 'rgba(54,
162, 235, 0.5)', // BLUE
                    borderColor: 'rgba(54,
162, 235, 1)',
                    borderWidth: 1
                },
                {
                   label: 'Total', // Add
Total label
                    data: <?php echo
json_encode($total); ?>,
                    backgroundColor:
'rgba(153, 102, 255, 0.5)', // VIOLET
                    borderColor: 'rgba(153,
102, 255, 1)',
                    borderWidth: 1
                }
```

```
            ]
        },
        options: {
            scales: {
                x: {},
                y: {}
            }
        }
    });
</script>
```

Appendix K

ISO 25010 Software Quality Standards Form

ISO 25010 Software Quality Evaluation Instrument

System Evaluation Sheet for "Decision Support System for Food Intake Monitoring and Dental Health Profiling"

Name of Evaluator: _____

(Dentist/ Student)

Scale	Description
5.20 – 6.00	Excellent
4.30 – 5.19	Very Good
3.50 – 4.29	Good
2.70 – 3.49	Fair
1.80 - 2.69	Poor
1.00 - 1.79	Very Poor

Evaluation Proper

Characteristic	Sub-Characteristics	Description	Evaluation Rating
Functional Suitability	Functional completeness	Degree to which the set of functions covers all the specified tasks and user objectives.	
	Functional correctness	Degree to which a product or system provides the correct results with the needed degree.	
	Functional appropriateness	Degree to which the functions facilitate the accomplishment of specified tasks and objectives.	
Performance Efficiency	Time behavior	Degree to which the response and processing times and throughout rates of a product or system, when performing its functions, meet requirements.	
	Resource utilization	Degree to which the amounts and types of resources used by a product or system, when performing its functions, meet requirements.	

	Capacity	Degree to which the maximum limits of a product or system parameter meet requirements.	
Compatibility	Co-existence	Degree to which a product can perform its required functions efficiently while sharing a common environment and resources with other products, without detrimental impact on any other product.	
	Interoperability	Degree to which two or more systems, products or components can exchange information and use the information that has been exchanged.	
Usability	Appropriateness recognizability	Degree to which users can recognize whether a product or system is appropriate for their needs.	
	Learnability	Degree to which a product or system can be used by	

		specified users to achieve specific goals of learning to use the product or system with effectiveness, efficiency, freedom from risk and satisfaction in a specified context of use.	
	Operability	Degree to which a product or system has attributes that make it easy to operate and control.	
	User error protection	Degree to which a system protects users against making errors.	
	User interface aesthetics	Degree to which a user interface enables pleasing and satisfying interaction for the user.	
	Accessibility	Degree to which a product or system can be used by people with the widest range of characteristics and capabilities to achieve a specified goal	

		in a specified context of use.	
Reliability	Maturity	Degree to which a system, product or component meets needs for reliability under normal operation.	
	Availability	Degree to which a system, product or component is operational and accessible when required for use.	
	Fault tolerance	Degree to which a system, product or component operates as intended despite the presence of hardware or software faults.	
	Recoverability	Degree to which, in the event of an interruption or a failure, a product or system can recover the data directly affected and re-establish the desired state of the system.	
Security	Confidentiality	Degree to which a product or system ensures that data are accessible only to those authorized to have access.	
	Integrity	Degree to which	

		a system, product or component prevents unauthorized access to, or modification of, computer programs or data.	
	Non-repudiation	Degree to which actions or events can be proven to have taken place so that the events or actions cannot be repudiated later.	
	Accountability	Degree to which the actions of an entity can be traced uniquely to the entity.	
	Authenticity	Degree to which the identity of a subject or resource can be proved to be the one claimed.	
Maintainability	Modularity	Degree to which a system or computer program is composed of discrete components such that a change to one component has	

		minimal impact on other components.	
	Reusability	Degree to which an asset can be used in more than one system, or in building other assets.	
	Analyzability	Degree of effectiveness and efficiency with which it is possible to assess the impact on a product or system of an intended change to one or more of its parts, or to diagnose a product for deficiencies or causes of failures, or to identify parts to be modified.	
	Modifiability	Degree to which a product or system can be effectively and efficiently modified without introducing defects or degrading existing product quality.	
	Testability	Degree of effectiveness and efficiency with which test	

		criteria can be established for a system, product or component and tests can be performed to determine whether those criteria have been met.	
Portability	Adaptability	Degree to which a product or system can effectively and efficiently be adapted for different or evolving hardware, software or other operational or usage environments.	
	Installability	Degree of effectiveness and efficiency with which product or system can be successfully installed and/or uninstalled in a specified environment.	
	Replaceability	Degree to which a product can replace another specified software product for the same purpose in the environment.	

Appendix L

Disclaimer

This software project and its corresponding documentation entitled "Decision Support System for Food Intake Monitoring and Dental Health Profiling" is submitted to the College of Information and Communications Technology, West Visayas State University, in partial fulfillment of the requirements for the degree, Bachelor of Science in Information Systems. It is the product of our own work, except where indicated text.

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Caesy L. Ladores
Julian Dave G. Sioting
Jonela Marie P. Magbanua
Jemelyn D. Tesara
Jericho Cleo D. Quilas

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