



AI-Driven Multi-Dimensional Course Assessment and SHS Strand Recommendation System

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ABSTRACT

Senior High School (SHS) students often face challenges in selecting the most appropriate academic strand due to limited assessment tools and the continued reliance on traditional guidance practices. These methods frequently lack objectivity and comprehensive evaluation, resulting in mismatches between students' competencies, interests, and their chosen academic pathways. Such misalignment may affect students' academic performance, educational direction, and future career readiness.

This study aimed to develop an AI-Driven Multi-Dimensional Course Assessment and SHS Strand Recommendation System designed to objectively evaluate student competencies and generate strand recommendations that align with learners' abilities, interests, and career potential. The system intends to support students, teachers, and guidance personnel by providing data-driven insights that can assist in making informed academic decisions. The research employed a quantitative-descriptive design integrated with Explainable Artificial Intelligence (XAI). The system was developed using an Input-Process-Output (IPO) conceptual framework combined with Agile Software Development Methodology, enabling iterative system improvement and structured data processing. The platform utilizes a 30-dimension assessment model measuring cognitive skills, literacy and communication abilities, technical aptitude, and personality-interest indicators. Student responses are processed through a structured scoring model and analyzed using an AI-powered evaluation module to generate strand recommendations, competency profiles, and career-related insights, which are presented in a downloadable evaluation report.

The results are presented in a comprehensive evaluation report that users can download and use for academic guidance and decision-making. Evaluation results showed strong system performance and user acceptance. Based on the ISO/IEC 25010 software quality model, IT experts gave the system an overall mean score of 3.95, indicating a high level of software quality and functionality. System users rated the platform with an overall mean score of 4.00, interpreted as Highly Acceptable, reflecting positive user experience and effectiveness. This finding clearly demonstrates that the system can provide data-driven guidance in SHS strand selection, reduce academic-career mismatches, and support better educational alignment and long-term career readiness among students.

Keywords: *Artificial Intelligence (AI), Multi-Dimensional Assessment, Explainable AI, Senior High School Strand Recommendation, Career Guidance System.*

CHAPTER ONE

THE PROBLEM AND ITS BACKGROUND

This chapter clearly articulates the problem or question the research aims to address and its theoretical foundation. It also presents the research problem, scope and delimitation, significance of the study, and definitions of terms.

➤ *Rationale*

The selection of an appropriate Senior High School (SHS) strand remains a critical concern in the Philippine basic education system. Many learners enter SHS without a clear understanding of how their abilities, learning tendencies, and personal strengths relate to specific academic tracks. As a result, strand selection is often influenced by external factors such as peer choice, limited access to career guidance, or misconceptions regarding academic difficulty rather than by an objective evaluation of student readiness. This misalignment frequently leads to academic dissatisfaction, strand shifting, changes in college programs, and delayed career progression.

Traditional guidance mechanisms used in schools rely heavily on self-reported interest surveys, aptitude examinations, and counselor interviews. While these tools provide useful baseline information, they often examine learner characteristics in isolation and lack the capacity to synthesize cognitive, behavioral, and socio-emotional factors simultaneously. Consequently, the guidance process may fail to capture the complex profile of students whose strengths do not align neatly with single-dimensional assessment tools.

An AI-driven assessment system offers a structured alternative by systematically analyzing student data across multiple dimensions. In this study, the proposed system evaluates learners using a 30-dimensional framework, which was designed and crafted by the NEUST Graduate School, that includes cognitive skills, personality indicators, academic preparedness, technological competence, and socio-emotional attributes. Through a combination of rule-based logic, weighted scoring computation, Likert-scale response analysis, and OpenAI-powered narrative analytics, the system identifies relationships among these dimensions and compares student profiles with established competency patterns associated with specific SHS strands. This approach enables recommendations that are grounded in measurable performance indicators rather than subjective judgment alone.

Beyond strand identification, the system extends its analytical function by suggesting aligned college programs and potential career pathways. By examining patterns across academic readiness and skill clusters, the system supports continuity between SHS, higher education, and professional trajectories. This continuity is intended to reduce premature program changes, improve course retention, and assist students in making informed academic decisions earlier in their educational journey.

The adaptive capability of the AI-driven framework further strengthens its relevance. As educational requirements and labor-market demands evolve, the system can be updated to reflect emerging competencies and industry expectations. This responsiveness allows the assessment tool to remain contextually relevant within the Philippine educational landscape.

In practice, the system also serves as a decision-support mechanism for guidance counselors. Given the increasing student population and limited counseling resources in many schools, automated assessment reports and visual summaries provide counselors with objective insights that can enhance individualized guidance sessions. Rather than replacing human judgment, the system supplements existing counseling practices by offering data-backed evaluations that support informed academic advising.

Overall, the development of an AI-driven multi-dimensional assessment system addresses the underlying causes of SHS strand–course mismatch by aligning student capabilities with appropriate academic pathways. Through structured data analysis, adaptive modeling, and objective reporting, the system promotes informed decision-making and contributes to improved educational alignment and workforce readiness.

A. *Literature Review*

This literature review synthesizes empirical studies, traditional evaluation, and how strand mismatch affects the students their career path and its economic impact, structured around core issues that are fundamental to the research questions.

➤ *SHS to College and Career Mismatch*

Early career assessment systems largely depended on paper-based aptitude tests, interest inventories, and counselor-led interviews. International models such as Holland's interest-based classification tools focused primarily on aligning student preferences with occupational categories. Although useful for identifying general interests, these systems offered limited insight into students' cognitive performance, learning behaviors, and multidimensional competencies. Rule-based computerized guidance systems that followed were similarly constrained, producing static recommendations that lacked adaptability to individual differences.

Recent digital assessment platforms have attempted to integrate psychological profiling with online delivery mechanisms.

However, many of these systems continue to rely on fixed questionnaires and predefined scoring rules, limiting their ability to interpret complex student profiles. In addition, contextual variables such as local curriculum structures and labor-market demands are often excluded, reducing the relevance of recommendations within specific educational environments.

Within the Philippine setting, commonly used tools such as the National Career Assessment Examination (NCAE), school-developed entrance tests, and general interest surveys provide only partial insights into student readiness. These instruments primarily emphasize cognitive ability and are frequently interpreted manually, introducing variability and inefficiency into the guidance process. Furthermore, the absence of predictive analytics and labor-market alignment reduces their effectiveness in anticipating future academic and career outcomes.

Empirical studies highlight the consequences of this mismatch. Bin Sidek et al. (2023) reported strand–course mismatch rates of 39% and 31% among former SHS STEM students in Laguna across two academic years, attributing these trends to perceived academic difficulty, changing interests, and limited career guidance. Similarly, Ho et al. (2022) demonstrated that structured Career Development Learning (CDL) programs positively influence students' perceived employability, suggesting that early and integrated guidance interventions can mitigate mismatch risks. The OECD (2022) further emphasized that career misalignment often begins before senior high school, underscoring the need for earlier and more comprehensive guidance mechanisms.

➤ *Senior High School, Course Mismatch*

In the Philippine context, the tools for assessing SHS that are currently in use in schools consist of the National Career Assessment Examination (NCAE), entrance exams developed by the schools, and generic interest surveys given by guidance counselors. Although these tools can provide a basic outline of an individual's skills, they do not give a complete picture and usually focus only on the cognitive aspects. Besides, a lot of schools depend on manual score interpretation which may vary and is a lengthy process. Moreover, the current assessment methods hardly ever use real-time labor-market data, which results in the recommendations being not entirely in sync with the fast-changing industry trends, just one of the main reasons for the Country's job mismatch. These conventional systems do not have the predictive modeling feature that can unveil the hidden talents or future performance paths based on students' diverse profiles.

In 2023, Bin Sidek et al. looked at former SHS STEM students in Laguna and found a significant strand–course mismatch. They reported, "*The rate of mismatch is 39% for the school year 2017-2018 and 31% for the school year 2018-2019*". The reasons included perceived STEM program difficulty, evolving personal interests, and lack of focused career guidance (Bin Sidek et al., 2023).

On the intervention side, Ho et al. shared longitudinal evidence from Vietnam that Career Development Learning (CDL) "*positively affects students' perceived employability over time*" (Ho et al., 2022). Their structural modeling suggested that CDL partly works by increasing students' scholastic and cultural capital. This implies that integrated guidance programs might prevent mismatches from occurring.

In 2022, the OECD's Dream Jobs? report indicated that career misalignment can begin much earlier than senior high school. It stated, "*many 15-year-olds dream of jobs that do not align with their educational aspirations*" (OECD, 2022). This highlights the importance of providing career guidance well before students finish compulsory education.

To conclude, the AI-driven assessment system is a remarkable deviation from the present-day tools because it has brought together high-tech data-based profiling, multiple-dimensional evaluation, and machine learning–driven suggestion algorithms. The system does not just recognize students according to their interests or IQ scores but rather assesses 30 areas of competency, applies the results through standard scoring models, uses domain analytics to group strengths and at the same time, creates recommendations for strand, course, and school that are supported by labor-market relevance. What's more, AI provides that the model is continuously updated as more student data is fed through the system thereby ensuring accuracy gets better over time—a point of comparison to traditional tools which is their incapacity to do such. The proposed system which utilizes localized data from Philippine educational trends, school offerings, and employment projections, takes over the role of static and outdated assessment techniques. This not only characterizes the AI-based model as being more individualized but also as being better attuned to the needs of students, guidance counselors, and the whole Philippine education-employment landscape.

➤ *AI-Based Recommendation Systems*

Artificial intelligence–based recommendation systems are intelligent software mechanisms designed to analyze large volumes of user data and generate personalized suggestions that support decision-making. These systems function by identifying patterns in user behavior, preferences, and characteristics, then applying computational algorithms to recommend relevant options. Recommendation systems have been widely applied in various digital platforms, including e-commerce, entertainment streaming services, and educational technologies. In the educational context, AI recommendation systems help learners identify suitable academic programs, courses, and learning pathways based on their abilities, interests, and performance indicators. According to Francesco Ricci, Lior Rokach, and Bracha Shapira (2015), recommender systems operate by collecting and analyzing user-related data through algorithmic models that generate personalized suggestions to improve user satisfaction and decision accuracy.

Several techniques are commonly used in recommendation systems. Content-based filtering recommends items based on similarities between user profiles and item attributes, while collaborative filtering generates suggestions based on the preferences of users with similar patterns of behavior. Hybrid recommendation models combine these techniques to improve reliability and predictive performance. In educational environments, AI recommendation systems can analyze academic records, assessment results, and learner preferences to guide students toward suitable academic tracks or learning opportunities. Moreover, the integration of explainable artificial intelligence (XAI) enhances these systems by providing transparent explanations of how recommendations are generated. This transparency is particularly important in educational settings, where students, teachers, and administrators must understand the reasoning behind automated recommendations in order to trust and effectively use the system.

➤ *Career Decision Support Systems*

Career Decision Support Systems (CDSS) are computerized tools designed to assist individuals in selecting educational and career paths that align with their personal abilities, interests, and long-term goals. These systems utilize structured assessment data, psychological profiling, and computational algorithms to match users with relevant academic programs or occupational opportunities. In educational institutions, CDSS are often integrated into guidance and counseling programs to support students in making informed decisions regarding their academic tracks and future professions. Traditional career guidance methods typically rely on manual assessments and counselor interpretation, which may sometimes lead to subjective decisions or inconsistencies in recommendations. The use of automated decision-support systems helps address this limitation by providing data-driven insights that improve the accuracy and objectivity of career guidance.

Modern career decision support systems often incorporate artificial intelligence and data analytics to process multidimensional learner data, including cognitive abilities, interests, personality traits, and skill competencies. These systems analyze the collected information to generate recommendations that align students' capabilities with potential academic or professional pathways. According to Wayne Holmes, Maya Bialik, and Charles Fadel (2019), AI technologies in education can enhance decision-making processes by identifying meaningful patterns in learner data and translating them into actionable insights for educational planning. By integrating AI-driven analytics with career guidance frameworks, CDSS can provide students with personalized recommendations that help them make realistic and well-informed decisions about their academic and professional futures. Furthermore, these systems can serve as valuable tools for educators and guidance counselors by supporting the development of individualized academic pathways and reducing the likelihood of mismatches between students' abilities and chosen career tracks.

➤ *Agile-IPO Integration*

The integration of the Input–Process–Output (IPO) model with Agile methodology offers a flexible yet structured framework. Agile supports continuous improvement, iteration, and stakeholder involvement, which are essential for developing systems that require ongoing data validation and model refinement, such as AI-driven assessments (Dingsøyr et al., 2020). Meanwhile, the IPO model clarifies how input data (e.g., student responses), processes (e.g., AI computation, dimensional analysis), and outputs (e.g., strand and course recommendations) interact within the system.

Recent studies highlight the effectiveness of hybrid Agile-IPO frameworks in educational software development because they combine clarity of system flow with the adaptability of iterative enhancement (Serrano & Fajardo, 2022). Agile allows developers to refine AI models based on real-world user interactions, while IPO ensures structured documentation of data flow and system functions. This integration is particularly beneficial for AI-powered assessments that require repeated model retraining, continuous updating of datasets, and frequent evaluation of output accuracy (Kakar, 2023).

Thus, for AI-enabled guidance systems, Agile-IPO integration provides a methodological foundation that supports real-time evaluation, rapid enhancement cycles, and transparent data processing pathways—critical components in developing a robust, research-based SHS assessment tool.

Collectively, these studies show that AI in student assessment can enhance feedback quality, scalability, and personalization in which will greatly help students and teachers as well to the advancement of modern education and learning. It is not only beneficial, but it is also essential for a quick and thorough assessment of our students, especially those getting ready for college. By putting this initiative into action, we can match each student with the best course for their individual reasoning skills, intellect, and personal traits. This careful matching will improve their educational experience and greatly help their future success, making sure they are ready to excel in their chosen fields.

➤ *Synthesis*

The research team established an artificial intelligence-based system that evaluates multiple aspects of educational programs while providing secondary school students with recommendations for their preferred academic tracks. National reports and employability studies highlight those students face academic challenges when their academic pathways do not match their actual competencies. Career Development Learning research further emphasizes that structured, data-informed guidance enables secondary students to make better career choices which leads to improved chances of employment success (Ho et al., 2022). The traditional assessment and counseling methods depend on personal judgment together with standardized assessment methods which fail to meet current labor market requirements.

The system combines Input–Process–Output (IPO) model with Agile development methods to create Explainable Artificial Intelligence (XAI) which enables users to comprehend and interpret recommendation results. Grade 10 students complete a validated 30-dimension assessment which measures their cognitive abilities together with their literacy and communication skills and technical aptitude and personality–interest indicators. The evaluation process for student assessment follows the principles of purposive assessment design (Lavrakas, 2011) which utilizes secure student response transmission together with API-based AI model analysis of weighted raw scores. The model analyzes multiple dimensions to create strand recommendations and competency profiles together with strengths and developmental areas and career-aligned insights which follow SHS pathway standards.

The ISO/IEC 25010 software quality framework was used to assess system quality which IT experts rated highly for functional suitability performance efficiency compatibility usability reliability security maintainability and portability. The research demonstrates that AI-supported decision-making systems can improve guidance services together with their capacity to assist students in making objective strand selections while building better connections between student skills and educational options and professional development (CHED 2022 Ho et al. 2022).

➤ *Conceptual Framework*

The system implemented a hybrid Explainable Artificial Intelligence (XAI) model that combines rule-based logic, weighted scoring computation, Likert-scale response analysis, and OpenAI-powered narrative analytics to generate transparent and evidence-based Senior High School strand recommendations. This integrated approach ensures that student responses are systematically quantified, objectively processed, and clearly explained through human-readable outputs. Rather than functioning as a black-box AI model, the system allows users to understand how each recommendation was derived from the student's own assessment responses, competency scores, and overall profile.

The assessment process begins with the student answering the 30-dimension questionnaire, where each item uses a Likert scale to measure the degree of agreement, preference, confidence, or competency. Responses are typically scored from 1 to 5, where higher values indicate stronger presence of a specific skill, behavior, or interest. These dimensions cover four major competency clusters: Cognitive Skills, Literacy and Communication Skills, Technical and Practical Aptitude, and Personality and Interest Indicators. The Likert-scale design enables the system to convert subjective perceptions and self-assessments into structured numerical data that can be analyzed consistently across all respondents.

After the responses are submitted, the system applies a weighted scoring computation model. Each item response is assigned a numeric equivalent, then processed using a formula such as $(0.7 \times Q1) + (0.3 \times Q1a)$, where the primary question receives greater weight than the supporting indicator. This produces a final score for each assessment dimension. The resulting dimension scores are then normalized and grouped into their corresponding competency clusters to determine the student's strengths and developmental areas. By using weighted calculations, the system ensures that more significant indicators contribute proportionally to the final result.

The subsequent phase employs a rule-based logic engine which converts calculated dimension scores into respective Senior High School strands which include STEM, HUMSS, ABM, and TVL. The compatibility weights for each dimension have established values which educational standards and career-alignment frameworks and academic competencies determine. The STEM field shows increased compatibility through high scores in logical reasoning and mathematics and scientific thinking while HUMSS shows increased alignment through strong communication skills and social awareness abilities and writing capabilities. The system combines all weighted inputs to calculate an overall compatibility score which it uses to assess every available educational track. The primary recommendation identifies the strand with the highest score while the secondary options include strands that show close similarity to the primary recommendation.

The Explainable AI framework necessitates the transmission of structured scores and rankings to the OpenAI-powered narrative analytics layer in order to achieve completion effectively. In this advanced system, the language model interprets the numerical outputs and subsequently converts them into a clear and personalized evaluation report that articulates students' strengths and areas for growth. This comprehensive report utilizes competency cluster descriptions as its foundation, which outline the specific abilities demonstrated by students while also integrating evaluation patterns drawn from Likert scales and observable behavioral signs.

Furthermore, the report may incorporate statements reflecting strong analytical ability, effective communication skills, practical aptitude, or leadership potential, depending on the individual results obtained by each student. These insights are crucial as they provide a nuanced understanding of a student's unique capabilities. Additionally, the document not only highlights areas where the student may need to improve but also makes thoughtful recommendations for academic paths and career options that align with the suggested educational strand. This alignment ensures that students can make informed decisions about their futures, ultimately empowering them to pursue opportunities that resonate with their strengths and aspirations. The overall approach enhances the educational experience by combining data-driven insights with personalized guidance tailored to individual needs.

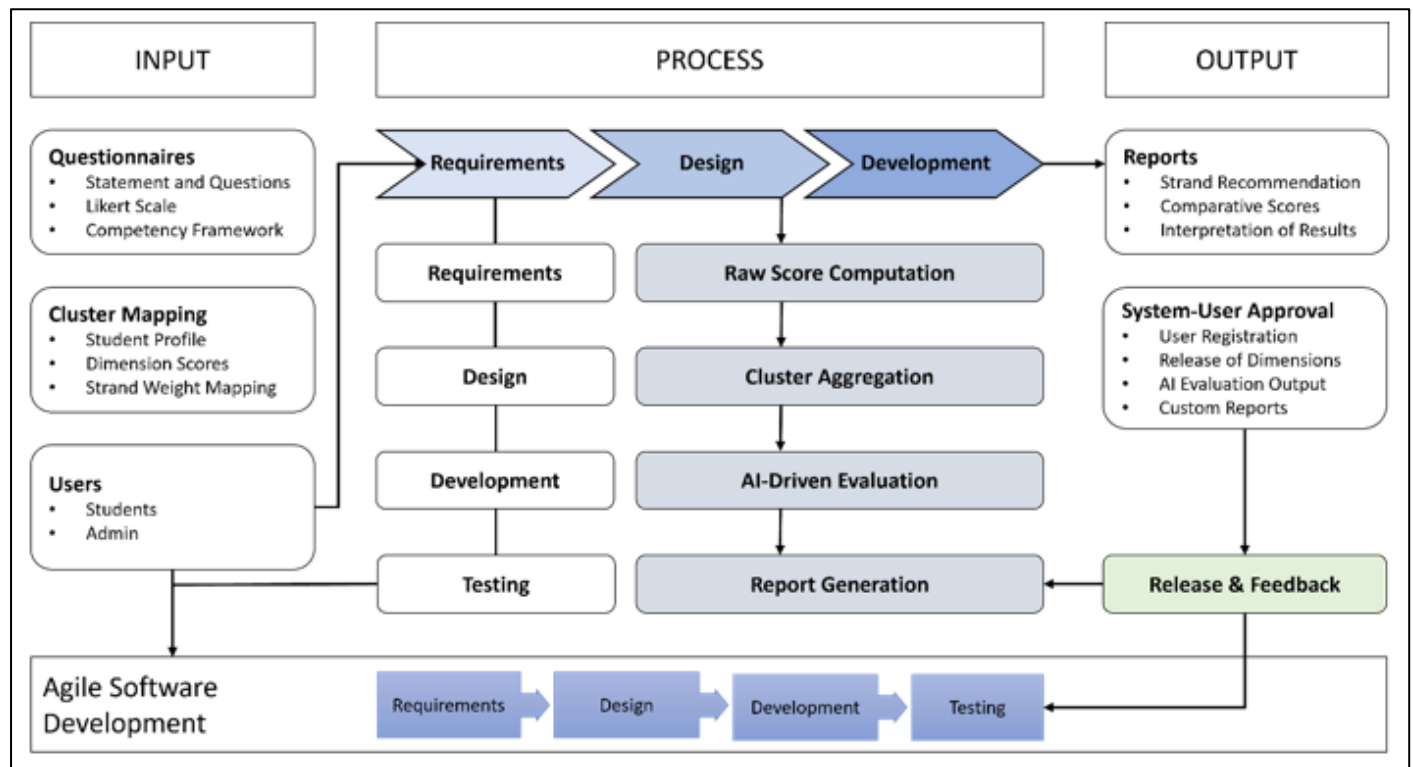


Fig1 Conceptual Framework

B. Research Problem

This study aimed to develop and evaluate an AI-driven assessment system that analyzes Grade 10 students' cognitive, behavioral, and skill-based responses. The study specifically investigated how an AI-supported diagnostic tool generated data-driven recommendations that align students' competencies with appropriate SHS strands and potential career pathways.

Specifically, the Study Sought to Answer to the Following:

- How may the Development of an AI-Driven Multi-Dimensional Course Assessment and SHS Strand Recommendation System be developed using Agile Software Development Methodology according to:

- ✓ Project initialization phase, and
- ✓ Work package development stages in terms of;

- Requirements;
- Design;
- Development;
- Testing; and
- Deployment?
- Release

- How may the Development of an AI-Driven Multi-Dimensional Course Assessment and SHS Strand Recommendation System be evaluated by the IT experts based on the following ISO/IEC 25010 criteria:

- ✓ Functional suitability;
- ✓ Performance efficiency;
- ✓ Compatibility;
- ✓ Usability;
- ✓ Reliability;
- ✓ Security;
- ✓ Maintainability; and
- ✓ Portability?

- How may the Development of an AI-Driven Multi-Dimensional Course Assessment and SHS Strand Recommendation System be evaluated by the end-users based on the selected ISO/IEC 25010 criteria such as:

- ✓ Functional suitability;
- ✓ Performance efficiency; and
- ✓ Usability?

- How may the acceptability of the Development of an AI-Driven Multi-Dimensional Course Assessment and SHS Strand Recommendation System Framework be evaluated by the end-users in terms of:

- ✓ User Registration;
- ✓ Assessment Dimensions (Questionnaires and clusters); and
- ✓ Raw score computation and AI- Driven Evaluation
- ✓ Reports?

➤ *Scope and Delimitations*

This study focused solely on the development and evaluation of an AI-Driven Multi-Dimensional Course Assessment and SHS Strand Recommendation System Framework that utilizes a 30-Dimensional Student Profiling Framework to recommend Senior High School strands, possible college programs, and potential career pathways. The scope was limited to the analysis and interpretation of students' examination results generated by the system's AI model. These results included cognitive, behavioral, technological, and socio-emotional dimensions that are transformed into strand and course recommendations through machine learning-based pattern identification and weighted scoring algorithms (Alonso & Romero, 2020).

The study did not include other significant factors that commonly influence students' decisions regarding strand or course selection. Personal interests beyond those indirectly reflected in the assessment responses are not measured. Likewise, socioeconomic background, family expectations, financial capacity, geographic accessibility of schools, and long-term career goals were excluded from the system's analytical model. Research shows that these factors play an important role in actual course selection and career decision-making among Filipino learners (CHED, 2022; Bernardo, 2019), but they fall outside the operational boundaries of this system.

The study was also limited to the technical and functional evaluation of the AI-driven assessment tool. It did not measure the long-term academic performance or employability outcomes of students who receive recommendations from the system, nor does it track strand retention or course satisfaction beyond the immediate assessment period. Additionally, the study only covered respondents within the Senior High School level and does not extend its application to college, vocational, or adult learners.

Despite these delimitations, the study aimed to provide a structured, data-driven tool that enhances guidance processes by offering standardized and unbiased recommendations derived strictly from students' assessment results. The findings contribute to ongoing efforts to modernize educational guidance in the Philippines by integrating AI into career exploration frameworks (UNESCO, 2021).

➤ *Significance of the Study*

This Research Study Hopes to be Beneficial to the Following:

- *Nueva Ecija University of Science and Technology–Laboratory High School (NEUST-LHS) and Other Academic Institutions stand.* They are deemed to benefit significantly from the implementation of the AI-Driven Multi-Dimensional Course Assessment and SHS Strand Recommendation System Framework. The system provides a structured, data-based mechanism for evaluating students' cognitive, behavioral, and technological competencies. Through its comprehensive analysis, schools can obtain valuable insights into the readiness, strengths, and developmental needs of their learners. These insights support more informed academic advising, enable evidence-based curriculum enhancement, and promote institutional alignment with evolving educational standards. Furthermore, the tool equips educators with an innovative platform that enhances their capacity to deliver adaptive and future-ready instruction.
- *Students.* The students, specifically the incoming grade 11 (grade 10 students), are the primary beneficiaries of the system, as it offers a personalized, objective, and multidimensional evaluation of their capabilities. By assessing students across 30 dimensions, the system helps them gain a clearer understanding of their analytical, logical, socioemotional, and technological strengths. This data-driven guidance enables students to make well-informed decisions regarding Senior High School (SHS) strands, college programs, and future career pathways. The system reduces the likelihood of course-career mismatch by aligning academic choices with individual aptitude profiles, thereby supporting higher academic satisfaction and long-term career alignment.
- *Parents.* They will benefit from receiving transparent, evidence-based information about their child's strengths, skill levels, and potential developmental areas. This facilitates more informed parental involvement in educational decision-making, enabling them to support their child's academic and career planning realistically and responsibly. The system's results provide parents with a clearer perspective on the pathways in which their child is most likely to succeed, contributing to more rational, collaborative, and future-oriented guidance at home.

- *Future Researchers and Developers.* The study provides a foundational framework for researchers and software developers interested in educational technology, guidance systems, and AI-driven assessment tools. It can serve as a reference point for future investigations seeking to refine assessment algorithms, integrate additional psychological constructs, or expand the system through advanced AI methodologies. The documentation, methodology, and conceptual structure of this project open opportunities for replication, improvement, and innovation in related fields.
- *Researchers/Developers of the Present Study.* For the project's researchers and developers, the study offers an opportunity to deepen their knowledge of artificial intelligence, educational assessment, and system design. It contributes to their professional growth by enhancing their understanding of students' needs, the educational landscape, and the technical requirements of building an adaptive career-assessment application. Additionally, the project equips them with practical experience in developing technological solutions responsive to community needs, thereby broadening their technical and academic competencies.

➤ Definition of Terms

The terms used in this study are defined technically and operationally for better understanding of the readers:

- *Adaptive Algorithm.* An adaptive algorithm refers to a computational method that automatically adjusts its behavior or parameters based on incoming data or environmental changes in order to improve performance or accuracy over time. These algorithms are commonly used in intelligent systems to optimize decision-making processes based on patterns identified from data (Russell, S., & Norvig, P., 2021).
- *Artificial Intelligence (AI) Driven Assessment.* Refers to the use of AI technologies to evaluate learner responses, analyze performance patterns, and generate personalized feedback or recommendations. These systems use machine learning or intelligent algorithms to enhance the accuracy and objectivity of educational assessments (Luckin, R., Holmes, W., Griffiths, M., & Forcier, L. B., 2016).
- *Career.* It is operationally defined in this study as the long-term occupational pathway that a student is likely to pursue based on the results of the AI-driven assessment. It refers to the alignment between the learner's measured competencies, cognitive abilities, personality dimensions, and the corresponding academic programs or professional fields that match these characteristics. Within the context of the system, a "career" is not conceptualized as a lifetime commitment but as a data-informed trajectory that represents the most suitable educational and occupational options indicated by the student's assessment scores (Greenhaus, J. H., et al., 2019).
- *Cross-platform software.* Cross-platform software refers to applications that are designed to operate on multiple operating systems or devices without requiring significant modification, enabling consistent functionality across platforms such as Windows, macOS, Linux, and web-based environments (Sommerville, I., 2016).
- *Data Flow.* Data flow refers to the movement and transformation of data through a system, illustrating how information is input, processed, stored, and output within an information system or software application (Dennis, A., Wixom, B. H., & Roth, R. M., 2018).
- *ISO 25010.* It is a crucial software quality standard defining a product quality model with eight main characteristics: Functional Suitability, Performance Efficiency, Compatibility, Usability, Reliability, Security, Maintainability, and Portability, breaking each down into sub-characteristics to help evaluate how well software meets user needs and provides value, covering everything from ease of use to security and resource use (International Organization for Standardization, 2011).
- *Strand Alignment.* Strand alignment refers to the process of matching a student's competencies, interests, and skills with the most appropriate Senior High School (SHS) academic strand to ensure academic success and career readiness (Department of Education, 2016).
- *Assessment Dimension.* Assessment dimensions refer to the different measurable factors or categories used in evaluating students' abilities, skills, interests, and behavioral characteristics within an assessment system. These dimensions collectively provide a comprehensive evaluation of a learner's strengths and potential academic pathways, (Nitko, A. J., & Brookhart, S. M. 2014).

CHAPTER TWO

RESEARCH METHODOLOGY

This chapter presents the methods and procedures used in the study. It includes the research design, locale of the study, respondents, sample and sampling procedure, research instrument, data gathering procedure, and data analysis technique.

➤ *Research Design*

This study adopted a developmental research design integrated with an AI-assisted assessment framework to evaluate the effectiveness and acceptability of an AI-Driven Multi-Dimensional Course Assessment and SHS Strand Recommendation System. The design focuses on describing how the developed system functions, how users interact with it, and how its quality is perceived based on established software evaluation standards.

The system was developed using a hybrid Input–Process–Output (IPO) and Agile methodology. The IPO model explains how student data are collected, transformed, and converted into assessment outputs, while Agile methodology governs the iterative development and refinement of system features. This combination allows the research to present both the operational logic of the system and the development process that supports continuous improvement.

Data generated by the system, including assessment scores, strand recommendations, and evaluation reports, served as the primary basis for analysis. The research design emphasizes automation and consistency in evaluation by utilizing an AI-powered computation and interpretation mechanism accessed through an application programming interface (API).

The data flow describes how student information and assessment responses move through the system from initial input to AI-generated evaluation outputs.

- *Input Phase*

At the input stage, Grade 10 students access the web-based assessment platform and provide non-sensitive profile information in compliance with the Data Privacy Act of 2012 (RA 10173). Students then respond to a structured assessment tool composed of thirty (30) dimensions that measure cognitive skills, behavioral tendencies, interests, and technological competencies relevant to SHS strand selection.

All inputs are validated at the interface level to ensure completeness and accuracy prior to submission. Once validated, responses are securely transmitted to the backend server for preprocessing and analysis.

- *Process Phase*

The process phase consists of a multi-layered analytical workflow supported by artificial intelligence.

First, student responses are preprocessed through data structuring and normalization procedures. Assessment items are grouped into competency clusters, and raw scores are computed for each dimension based on predefined scoring rules.

Second, strand weight mapping is applied. Each assessment dimension contributes to one or more SHS strands based on curriculum alignment and competency relevance. Weighted scores are aggregated to determine preliminary strand suitability indicators.

Third, the AI evaluation component interprets the structured data. The AI model receives processed scores in a standardized format and performs pattern analysis to identify strengths, consistency across competency domains, and alignment with specific SHS strands. The model generates interpretive insights rather than recalculating raw scores, ensuring transparency and separation between computation and interpretation.

- *Computation of Raw Scores*

The computation of raw scores begins with scoring each of the 30 dimensions based on the student's numeric Likert-scale responses. For each dimension, Q1 and Q1a (rated 1–5) are aggregated to compute a Response Score using the formula $0.7(Q1) + 0.3(Q1a)$. Each dimension is then mapped to Senior High School (SHS) strands such as STEM, HUMSS, ABM, and TVL through assigned weights derived from curriculum competencies, CHED and DepEd skill requirements, and established career assessment frameworks including those proposed by John L. Holland (1997) and National Economic and Development Authority (2020). The 30 dimensions are organized into four competency clusters: Cognitive Skills (10 dimensions), Literacy and Communication Skills (8 dimensions), Technical and Practical Aptitude (6 dimensions), and Personality and Interest Indicators (6 dimensions). Each cluster score is computed by dividing the sum of the dimension scores by the maximum possible score.

For AI modeling and evaluation report generation, the system utilizes the OpenAI API (e.g., GPT-4.1 or GPT-o1) strictly for interpretive evaluation rather than raw score computation. The AI receives structured input in JSON format and performs

multidimensional pattern interpretation, strength identification per domain, strand- matching analysis aligned with the weighted scoring model, and cross-checking for consistency among cognitive, interest, and behavioral indicators. Using natural-language reasoning, the model evaluates trend patterns, competency alignment, compatibility with SHS strands, areas of strength and improvement, and readiness for specific academic or technical fields. The system then generates a comprehensive evaluation report in a user-friendly format, which includes the recommended SHS strand, a summary of strengths and developmental areas, visual representations of performance across assessment dimensions, an explanatory rationale supporting the recommendation, and suggested college programs aligned with the student's competency profile. These outputs are intended to support informed decision-making among students, parents, and guidance counselors.

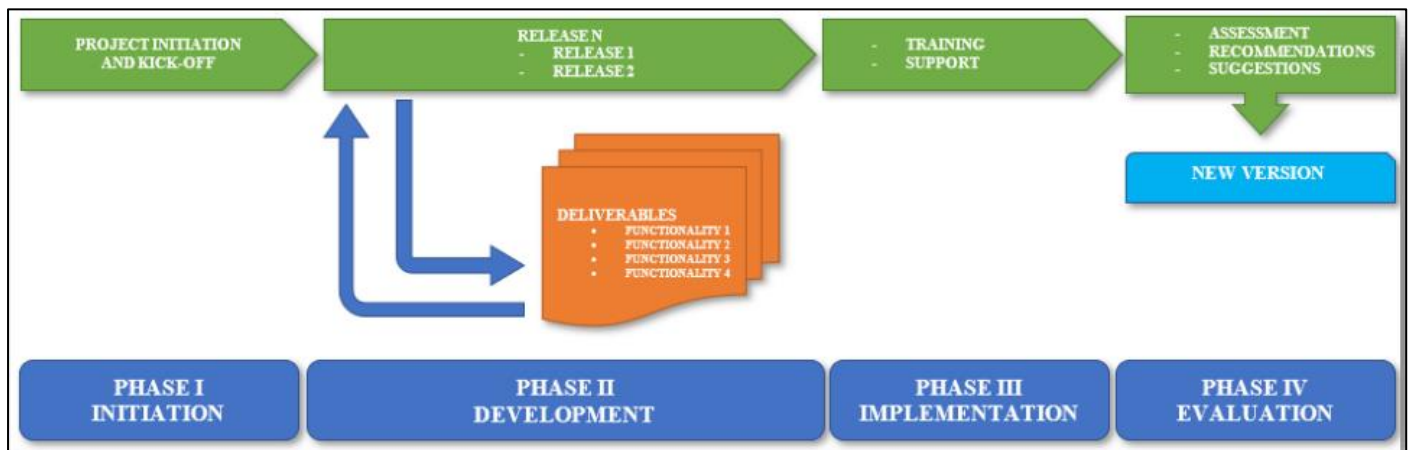


Fig 2 Research Design

In this study, system development went through four (4) phases such as: initialization, system development, system implementation and system evaluation.

The first phase of the project is the Initialization Phase, where the researcher/developer collaborated with NEUST and other individuals to discuss the goals and objectives of the project, set requirements to be established and form teams such as the technical team, quality assurance, and user acceptance testing team that shall oversee the progress of the development.

The second stage involved System Development integrating IPO and Agile methodology. Agile methodology is grounded in the system's need for adaptability, continuous improvement, and responsiveness to user feedback compared to Waterfall or Rapid Prototyping. Waterfall's linear and rigid structure is unsuitable for AI-driven systems that require repeated model retraining and frequent revisions in response to emerging data patterns. Similarly, while Rapid Prototyping supports quick visualization, it lacks the structured iterative cycles and feedback mechanisms needed for long-term model refinement. Agile, by contrast, provides short development sprints that allow the project team to integrate updated datasets, retrain AI models, and modify features based on stakeholder evaluations. This flexibility is essential because the system relies on dynamic algorithms whose accuracy improves only through recurrent exposure to new student responses. Agile's incremental delivery ensures that educators, students, and guidance counselors continuously interact with early versions, enabling real-time feedback that shapes subsequent model enhancements. By adopting Agile, the development team ensures that the AI-driven assessment system evolves into a robust decision-support tool that remains grounded in the lived realities of Senior High School learners in the Philippines.

The alignment of Agile methodology and the Input–Process–Output (IPO) model creates a structured yet flexible framework for system development. Agile emphasizes iterative development, continuous improvement, and responsiveness to user feedback, with each sprint producing incremental system enhancements. In contrast, the IPO model provides a systematic representation of how inputs are transformed through defined processes into outputs. When combined, the IPO model serves as the blueprint that Agile teams repeatedly refine, while Agile operationalizes each IPO component through sprint cycles that progressively enhance system accuracy and efficiency. In essence, IPO defines what the system does, and Agile defines how the system is built and continuously improved.

Agile phases directly correspond to IPO elements. During the Input stage, early Agile sprints focus on planning and initial development by defining required data such as student responses to the 30 assessment dimensions, demographic information, and system-generated raw scores. These inputs are translated into user stories—for example, enabling students to submit assessment responses to generate evaluation reports—which guide prototype creation and feature development. The Process stage, which includes raw score computation, strand weight calculations, and AI modeling, becomes the central focus of successive sprints. Each sprint refines components of the computation pipeline, including scoring algorithms, AI integration, and API connectivity, while incorporating user feedback to improve accuracy, usability, and reliability. The Output stage aligns with Agile deliverables, as every sprint produces a functional component such as score calculators, beta AI-generated reports, dashboard prototypes, or finalized

evaluation outputs powered by the OpenAI API. Thus, IPO outputs become measurable sprint deliverables that ensure steady progress and structured checkpoints.

Agile further strengthens the IPO operational flow by embedding continuous testing, evaluation, and refinement within each stage. Feedback loops from students, teachers, and administrators are collected after every sprint, leading to improvements in input interfaces, scoring formulas, AI prompt engineering, and the clarity and relevance of generated reports. Through this iterative enhancement process, the IPO framework becomes increasingly accurate, efficient, and aligned with user needs. When fully integrated, IPO defines the logical architecture of the assessment system, while Agile divides this structure into manageable sprint-based tasks, ensuring both technical continuity and adaptive development.

Within the Agile development cycle, AI functionality is incorporated strategically across phases. During the planning phase, system features, data requirements, AI model specifications (such as a GPT-based evaluator), strand weighting logic, and stakeholder inputs are defined. In the analysis phase, user requirements and assessment dimensions are identified, AI capabilities are mapped to evaluation processes, API feasibility is assessed, and compliance requirements under the Data Privacy Act are established. The design phase involves workflow modeling, API architecture for AI evaluation, strand weight integration within prompts, database schema planning, and UI/UX prototyping. Development includes building the frontend using ReactJS, creating backend APIs for prompt formatting and transmission, implementing AI scoring and interpretation logic, and constructing an administrator panel. Testing encompasses functional validation, prompt tuning using real responses, evaluation of accuracy and stability, and compatibility assessments. Deployment involves cloud hosting, activation of production API keys, database migration, and user onboarding. Finally, the maintenance phase ensures continuous refinement through updating strand weight models, improving AI prompts based on feedback, resolving system issues, and applying necessary security updates.

➤ *Locale of the Study*

The study was conducted at the Nueva Ecija University of Science and Technology – Laboratory High School (NEUST-LHS), located within the main campus of the Nueva Ecija University of Science and Technology in Cabanatuan City, Nueva Ecija, Philippines. NEUST LHS is a recognized secondary educational institution that offers both junior high school and senior high school programs designed to prepare students for higher education, technical training, and future employment opportunities. As the laboratory high school of a state university, the institution serves as a training and demonstration environment for innovative teaching strategies, academic research, and educational technology integration. NEUST-LHS is known for its commitment to academic excellence, student development, and the promotion of science, technology, and modern learning approaches. The school provides students with quality instruction supported by qualified faculty members, structured academic programs, and student support services such as guidance counseling and career orientation activities. These programs aim to help learners develop the competencies, values, and readiness needed for their chosen educational and career pathways.

The institution was selected as the research locale because it offers an ideal environment for the implementation and evaluation of the AI-Driven Multi-Dimensional Course Assessment and SHS Strand Recommendation System. The presence of Grade 10 students who are preparing to transition into Senior High School made the school highly relevant to the objectives of the study. In addition, the school's openness to innovation and technology-based initiatives provided a suitable setting for testing a web-based assessment and recommendation platform.



Fig 3 View of Research Locale



Fig 4 Map Location of Research Locale

➤ Respondents

The respondents of this study were the Grade 10 students, as they represent the critical transition point in the Philippine basic education system where learners are required to select their Senior High School (SHS) tracks and strands. This stage is widely recognized as a period of heightened career decision-making pressure, making Grade 10 students the most appropriate population for evaluating the effectiveness of an AI-driven SHS assessment system. Their responses directly reflect the system's intended user base and provide data relevant to reducing track–course mismatch.

The sample size was determined using widely accepted educational research guidelines. According to Cohen, Manion, and Morrison (2018), a minimum sample of 30–50 participants is generally adequate for pilot studies intended to test new tools or systems, as it allows reliable identification of trends without requiring population-level generalizability. Additionally, the use of power analysis for descriptive studies typically recommends a sample size ranging from 80–100 respondents to achieve sufficient statistical power when analyzing group patterns and generating meaningful recommendations (Lavrakas, 2018).

Considering these standards, the study will employ a sample size between 80 and 120 Grade 10 students, depending on the actual enrollment and accessibility of participants in the selected schools. This range ensures an adequately powered dataset for evaluating the AI-driven assessment model while remaining feasible within the school setting's logistical constraints. Stratified sampling may also be applied, selecting respondents across different sections to improve representation and reduce sampling bias. This sample size is justified because it provides enough data for strong statistical analysis that shall reflect the actual population that will use the assessment system that supports system refinements by capturing a diverse range of student abilities, interests and assessment responses.

Grade 10 student data is therefore essential for validating the system's capacity to generate accurate SHS track recommendations.

The distribution of the respondents is detailed in Table 1.

Table 1 Distribution of Respondents

Respondents	Number of Respondents (n)	Percentage (%)
System User	104	
Students	100	90
Educators	3	2.7
Principal	1	0.9
IT Experts	7	

Programmer / Developer	3	2.7
System/Database Administrator	1	0.9
IT Project Manager	1	0.9
System Analyst	1	0.9
IT Consultant	1	0.9
Total	111	100%

The researcher/developer collected data from a total of one hundred eleven (111) participants, which includes one hundred four (104) system users and seven (7) IT specialists. These IT experts assessed the AI-Driven Multi-Dimensional Course Assessment and SHS Strand Recommendation System Framework is based on their expertise and familiarity with modern web-applications and AI-integrations. They should have a comprehensive understanding of the metrics and assessment tools being used to evaluate the skills and learning potential of students, as well as a solid grasp of the business rules and workflows associated with the dimensions of questionnaires, particularly in relation artificial intelligence. The researcher/developer has applied a 5% margin of error (E) and a confidence level of 95%, utilizing G Power software for analysis. The data collection focused on one hundred (100) Grade 10 students. The respondents' involvement in this study is to assess the system's quality in accordance with the ISO/IEC 25010 Software Product Quality Standards.

The non-probability purposive sampling technique was employed by the researcher/developer. Other names for purposeful sampling included subjective, judgmental, and selective sampling. When a researcher or developer had to quickly reach a desired sample and proportionality sampling was not the primary objective, this kind of sampling could be quite helpful (Crossman, 2020).

The researcher/developer can freely select the sample using a purposive technique, depending on who he believes would be a good fit for the study. The primary goal of purposeful sampling was selected a sample that would adequately address the study's goals. Purposive sample selection is frequently achieved by using in-depth information about the target population to choose a sample that is representative of a cross-section of the population in a non-random way (Lavrakas, 2011).

Because they are able to analyze and appraise the system's quality, the system user-respondents were chosen on purpose. They possess the knowledge to assess the developed system's efficacy, usability, performance efficiency, and suitability. Likewise, the IT specialist was chosen on the basis of their technical evaluation of the system's effectiveness as well as its suitability, performance efficiency, interoperability, usability, dependability, security, maintainability, and portability.

➤ *Date Gathering Instrument*

The proposed system was evaluated using data collected via an online survey using the Combination Research data collecting approach. Online surveys are a method of gathering data that combines the use of online questionnaires and online interviews. Given that the data being gathered is quantitative in nature, it is prompt, efficient, and effective (Formplus, 2020).

Two (2) sets of research questionnaires were used in the online survey that the researcher/developer uses. For IT professionals, there are four (4) usability, reliability, and maintainability; two (2) compatibility; and three (3) each for functional suitability, performance efficiency, security, and portability. For system users, there are four (4) usability criteria, three (3) functional appropriateness criteria, and performance efficiency criteria. In conclusion, there are 18 (18) items for system users and 32 (26) items for IT specialists.

The evaluation of three (3) things for the system's level of acceptability were based on the three (3) characteristics of the ISO 25010 Product Quality Standards: usability, functional appropriateness, and performance efficiency. The response modalities for the various evaluation criteria of the Development of an AI-Driven Multi-Dimensional Course Assessment and SHS Strand Recommendation System are displayed in the following tables.

Table 2 shows the response mode used to evaluate the Functional Suitability of the Development of an AI-Driven Multi-Dimensional Course Assessment and SHS Strand Recommendation System.

Table 2 Response Mode on Functional Suitability

Rating	Verbal Description	Verbal Interpretation
4	Highly Functional	Excellently meets all the stated and implied needs and no weaknesses are found.
3	Functional	Satisfactorily meets all the stated and implied needs, but acceptable and tolerable weaknesses are found which will however not affect its function.
2	Needs Improvement	Meets only some of the stated and implied needs, and minor weaknesses are found that will slightly affect its function.
1	Poor	Meets very few stated and implied needs, and major weaknesses are found that will greatly affect its function.

Based on the actual usage scenario, this criterion determined whether the system was able to meet the need. The functionality suitability was used by the IT specialists and system users to assess the system's accuracy, completeness, and applicability. The evaluation of functional suitability was based on four (4) descriptors: functional, highly functional, needs improvement, and poor.

Table 3 shows the response mode used to evaluate the Performance Efficiency of the Development of an AI-Driven Multi-Dimensional Course Assessment and SHS Strand Recommendation System.

Table 3 Response Mode on Performance Efficiency

Rating	Verbal Description	Verbal Interpretation
4	Highly Efficient	Efficiently performs all the stated and implied needs relative to the number of resources without any flaws.
3	Efficient	Satisfactorily performs all the stated and implied needs relative to the number of resources used, but tolerable flaws are found which will however not affect the system 's over- all performance.
2	Needs Improvement	Poorly performs the stated and implied needs relative to the number of resources used, and major flaws are found that will greatly affect its performance.
1	Poor	Does not perform the stated and implied needs relative to the number of resources used thus restructuring is needed.

This assessment category shows how well the system performs in relation to the resources consumed in specific situations or conditions. System users and IT specialists assessed the produced system's performance and efficiency. Four (4) descriptors—Poor, Needs Improvement, Efficient, and Highly Efficient—are used to evaluate performance efficiency.

Table 4 shows the response mode to evaluate the Compatibility of the Development of an AI-Driven Multi-Dimensional Course Assessment and SHS Strand Recommendation System.

Table 4 Response Mode on Compatibility

Rating	Verbal Description	Verbal Interpretation
4	Highly Compatible	Efficiently meets the required function while sharing the same hardware and software environment. It can exchange information with other systems with no inadequacies at all.
3	Compatible	Satisfactorily meets the required function while sharing the same hardware and software environment. It can exchange information with other systems, but tolerable inadequacies are found which will not in any way affect the system's over-all compatibility.
2	Needs Improvement	Poorly performs the required function while sharing the same hardware and software environment. It can exchange information with other systems, but major inadequacies are found that will greatly affect its compatibility.
1	Poor	Does not meet the required function while sharing the same hardware and software environment. It cannot exchange information with other systems thus restructuring is needed.

The system's interoperability with other deployed systems inside the organization is referred to as compatibility. the capacity to work in harmony with different software and hardware environments. System users and IT specialists assessed the produced system's compatibility. Four (4) descriptors—Poor, Needs Improvement, Compatible, and Highly Compatible—are used to evaluate compatibility.

Table 5 shows the response mode to evaluate the Usability of the Development of an AI-Driven Multi-Dimensional Course Assessment and SHS Strand Recommendation System.

Table 5 Response Mode on Usability

Rating	Verbal Description	Verbal Interpretation
4	Highly Usable	Provides a user interface that is easy to operate and control such that the users can effortlessly perform their appropriate needs even without guide or supervision.
3	Usable	Provides a user interface that is easy to operate and control such that the users can easily perform their appropriate needs with minimal guide or supervision.
2	Needs Improvement	Provides a user interface that is slightly difficult to operate and control such that the users cannot easily perform their appropriate needs.
1	Poor	Provides a user interface that is difficult to operate and control such that it is difficult for the users to perform their appropriate needs at all thus restructuring is required for the system.

IT professionals and system users assessed the developed system's usability based on its operation, relevancy, user adaptability, error prevention, and overall user interface experience. When the user has successfully finished his task or tasks utilizing the provided system, this criterion refers to whether the system was able to successfully accomplish its intended aim with the designated user. Poor, Needs Improvement, Usable, and Highly Usable are the four (4) adjectives that was used to evaluate usability.

Table 6 shows the response mode to evaluate the Reliability of the Development of an AI-Driven Multi-Dimensional Course Assessment and SHS Strand Recommendation System.

Table 6 Response Mode on Reliability

Rating	Verbal Description	Verbal Interpretation
4	Highly Reliable	Efficiently performs its functions without failure under specified conditions and period of time with no flaws at all.
3	Reliable	Satisfactorily performs its functions without failure under specified conditions and period of time with minimal flaws which will not in any way affect the system's over-all reliability.
2	Needs Improvement	Performs only some its functions without failure under specified conditions and period of time with major flaws which will affect the system's overall reliability.
1	Poor	Cannot perform any of its functions without failure under specified conditions and period of time thus restructuring is required.

This describes how the system reacted over time under particular circumstances. IT professionals assessed the produced system's dependability based on availability, potential future improvements, fail-safe scenarios, and recovery. Poor, Needs Improvement, Reliable, and Highly Reliable are the four (4) descriptions that was used to evaluate reliability.

Table 7 shows the response mode to evaluate Security of the Development of an AI-Driven Multi-Dimensional Course Assessment and SHS Strand Recommendation System.

Table 7 Response Mode on Security

Rating	Verbal Description	Verbal Interpretation
4	Highly Secured	Efficiently protects information and data with no weaknesses at all.
3	Secured	Satisfactorily protects information and data with minimal weaknesses that will not in any way affect the system's overall security.
2	Needs Improvement	Protects only some of its information and data with major weaknesses that will affect the system's overall security.
1	Poor	Cannot protect any information and data thus restructuring is required.

This section assesses how the built system managed the security of the data stored in its database and how access and data were displayed according to user authorization. IT professionals evaluated the system's security implementation in terms of confidentiality, data integrity, and accountability. Poor, Needs Improvement, Secured, and Highly Secured are the four (4) descriptions that formed the basis of the security evaluation.

Table 8 shows the response mode to evaluate the Maintainability of the Development of an AI-Driven Multi-Dimensional Course Assessment and SHS Strand Recommendation System.

Table 8 Response Mode on Maintainability

Rating	Verbal Description	Verbal Interpretation
4	Highly Maintainable	Efficiently retains its original form and can be restored to that form in case of failure with no weaknesses at all.
3	Maintainable	Satisfactorily retains its original form and be restored to that form in case of failure with minimal weaknesses, which however, will not affect its overall maintainability.
2	Needs Improvement	Retains and restores only some of its original features in case of failure with moderate weaknesses which may affect its overall maintainability.
1	Poor	Cannot retain and restore its original form in case of failure thus restructuring is required.

This section assesses the developed system's efficacy and efficiency for future enhancement, correction, and improvement. IT specialists focused on the system's scalability and versatility, which are essential for long-term use. Four (4) descriptors—Poor, Needs Improvement, Maintainable, and Highly Maintainable—were used to evaluate maintainability.

Table 9 shows the response mode evaluated the Portability of the Development of an AI-Driven Multi-Dimensional Course Assessment and SHS Strand Recommendation System.

Table 9 Response Mode on Portability

Rating	Verbal Description	Verbal Interpretation
4	Highly Portable	Efficiently adapts to changes in environment and can be installed / uninstalled in specified environment with no weaknesses at all.
3	Portable	Satisfactorily adapts to changes in environment and can be installed / uninstalled in specified environment with minimal weaknesses, which however, will not affect its overall portability.
2	Needs Improvement	Barely adapts to changes in environment and can be installed / uninstalled in specified environment with moderate weaknesses which may affect its overall portability.
1	Poor	Cannot adapt to changes in environment and cannot be installed / uninstalled in specified environment.

This area evaluates the adaptability of the developed system. The assessment of Portability was based on four (4) descriptors specified as, Poor, Needs Improvement, Portable, and Highly Portable.

Table 10 shows the response mode of system users to evaluate the Level of Acceptability of the Development of an AI-Driven Multi-Dimensional Course Assessment and SHS Strand Recommendation System in terms of its functionalities and features.

Table 10 Response Mode for the Level of Acceptability of the Development of an AI-Driven Multi-Dimensional Course Assessment and SHS Strand Recommendation System

Rating	Verbal Description	Verbal Interpretation
4	Highly Acceptable	The implementation is very clear, detailed and work seamlessly integrate into existing school structures.
3	Acceptable	The implementation gives a clear path for the study.
2	Moderately Acceptable	The implementation is broadly defined, is missing some necessary details.
1	Not Acceptable	The implementation is missing and incomplete.

The system's features, such as User Registration, Assessment (Questionnaires), AI-Integrated Evaluation and Recommendation reports, are what determined the efficacy level. To ascertain the system's efficacy, these capabilities must operate in accordance with the requirements and business regulations established at the start of the project. These descriptions were to determine the efficacy level, which was classified as Not at All, Moderately Effective, Effective, or Very Effective.

The researcher/ developer distributed and deliver the questionnaires to the respondents in order to access the instrument's content as part of the validation process for the principal instrument. The final version of the system's design took into account their input, and specialists confirmed and authorized the instrument's suitability for the research.

➤ Data Gathering Procedure

As an SHS educator, the researcher/developer has been permitted to carry out the study from the research location, which is NEUST. As the study progresses, online survey with pre-made questionnaires for system users and IT specialists were used to gather primary data. In addition to other important sources like journals, published materials from websites, and books from other sources, the product user's office provided the secondary data.

The researcher/developer gathers data and information from NEUST while working on the system. Data includes registration forms, various reports, and the manual flow of assessment and evaluation. Data and information gathered from the product user's office, in addition to data available from other sources, have been used to analyze and develop a system that is specifically adapted to the needs of the product user. Following the system's completion and deployment, various respondents were administered an online survey to review and analyze it.

The respondent's email address or Facebook messenger received survey questionnaires created with Google Forms. In a similar manner, the system was presented to IT specialists in order to assess its functionality and design.

➤ Data Analysis Technique

The data that were gathered for the evaluation of the system were treated using the Microsoft Excel. Mean was used to describe the evaluation of the IT experts and of the end-users and the following Likert Scale was used:

Table 11 Performance Scoring Guide

Mean Range	Verbal Description	Verbal Interpretation
3.25 - 4.00	Highly Functional/ Highly Efficient/ Highly Compatible/ Highly Usable/ Highly Reliable/ Highly Secured/ Highly	Excellent System Quality

	Maintainable / Highly Portable	
2.50 - 3.24	Functional/ Efficient/ Compatible/ Usable/ Reliable/ Secured/ Maintainable/ Portable	Satisfactory System Quality
1.75 - 2.49	Needs Improvement	Slightly Satisfactory System Quality
1.00 - 1.74	Poor	Poor System Quality

Mean was also used to describe the level of acceptability of the implemented system and the following Likert scale was used:

Table 12 Scoring Guide on the Level of Acceptability of the Functionalities of the AI-Driven Multi-Dimensional Course Assessment and SHS Strand Recommendation System

Mean Range	Verbal Description	Verbal Interpretation
3.25 – 4.00	Highly Acceptable	The system meets all requirements and standards. Users are very satisfied with its functionality, usability, reliability, and performance. Only minimal or no revisions are needed.
2.50 – 3.24	Acceptable	The system meets most requirements and performs well. Users are generally satisfied, but minor improvements may enhance its effectiveness.
1.75 – 2.49	Needs Improvement	The system meets some requirements but has noticeable weaknesses. Several features or functions require revision or enhancement.
1.00 – 1.74	Poor	The system does not meet required standards. Major revisions and significant improvements are necessary.

➤ Ethical Concerns

This study adheres to established ethical standards to ensure that all procedures involving student participants protect their rights, privacy, and overall welfare. Participation in the AI-driven assessment system is strictly voluntary, and informed consent is obtained prior to any data collection. Students and their parents or guardians are clearly informed about the purpose of the study, the nature and scope of the information to be gathered, how the data will be used and stored, and their right to withdraw from participation at any time without academic or personal consequences. Privacy and confidentiality are upheld by minimizing the collection of personally identifiable information (PII), implementing secure and encrypted data storage systems, and restricting access exclusively to authorized school personnel. The study also complies with the provisions of Data Privacy Act of 2012 (RA 10173), ensuring that data collection is limited to what is necessary, that data subjects have the right to request access, correction, or deletion of their information, and that all processing activities adhere to the principles of proportionality, transparency, and legitimate purpose. Furthermore, responsible AI use is maintained by monitoring system outputs for fairness and potential bias, with all AI-generated results subject to human oversight, particularly by qualified guidance counselors, to ensure accurate, ethical, and context-sensitive interpretation.

CHAPTER THREE

RESULTS AND DISCUSSION

This chapter discusses the analysis and interpretation of data of the developed AI-Driven Multi-Dimensional Course Assessment and SHS Strand Recommendation System Framework.

The Development of an AI-Driven Multi-Dimensional Course Assessment and SHS Strand Recommendation System was successfully completed based on the different phases of IPO integrated Agile software development manifesto as defined in the conceptual framework of development. Agile development manifesto involves the following phases of development, namely: Individuals and Interactions, Working Software, Customer Collaboration and System Evaluation and Feedback.

➤ *Development of the AI-Driven Multi-Dimensional Course Assessment and SHS Strand Recommendation System*

This section presents the overall development of the AI-Driven Multi-Dimensional Course Assessment and SHS Strand Recommendation System, which was designed to support students in selecting an appropriate Senior High School (SHS) strand based on their competencies, interests, and behavioral characteristics. The system was developed to address common challenges in academic guidance, particularly the mismatch between students' abilities and their chosen educational pathways. By integrating artificial intelligence with a structured multidimensional assessment framework, the system provides data-driven recommendations and evaluation reports that assist students, teachers, and guidance counselors in making informed academic decisions.

• *Project Initiation Phase*

During this phase, a kick-off meeting was initiated to begin the series of activities to determine the scope of the research and the system to be developed. The meeting was attended by the NEUST Principal and her staff (*Figure 5*). During this meeting, the end-users laid out their plans and objectives that they wanted to be accomplished in the system. These plans and objectives had been strongly implemented to develop a tailored-fit application based on the business rules and functionalities based on the end-users' criteria and requirements.

Although the system is designed to be publicly accessible for students, parents, and educators, administrative oversight is still essential to ensure data accuracy, system functionality, and ethical compliance. The administrators of the system will consist of designated school-based and institutional personnel who hold the authority and competence to manage sensitive operations within the platform. These include:

✓ *NEUST Guidance Counselors (Admin)*

They will oversee the approval of assessment configurations, validation of generated reports, and monitoring of student progress. Their role is crucial because they interpret the results and ensure alignment with educational and career guidance standards.

✓ *School ICT Personnel or System Technicians*

These individuals will be responsible for technical maintenance, troubleshooting, and ensuring the platform's availability to the public. They manage system updates, user account concerns, and secure handling of stored data.



Fig 5 Meeting with NEUST Officials

The necessary activities that the development course underwent are shown in the Gantt chart (Figure 6). All refactoring and revisions were incorporated and presented to the product users at the beginning of 2026.

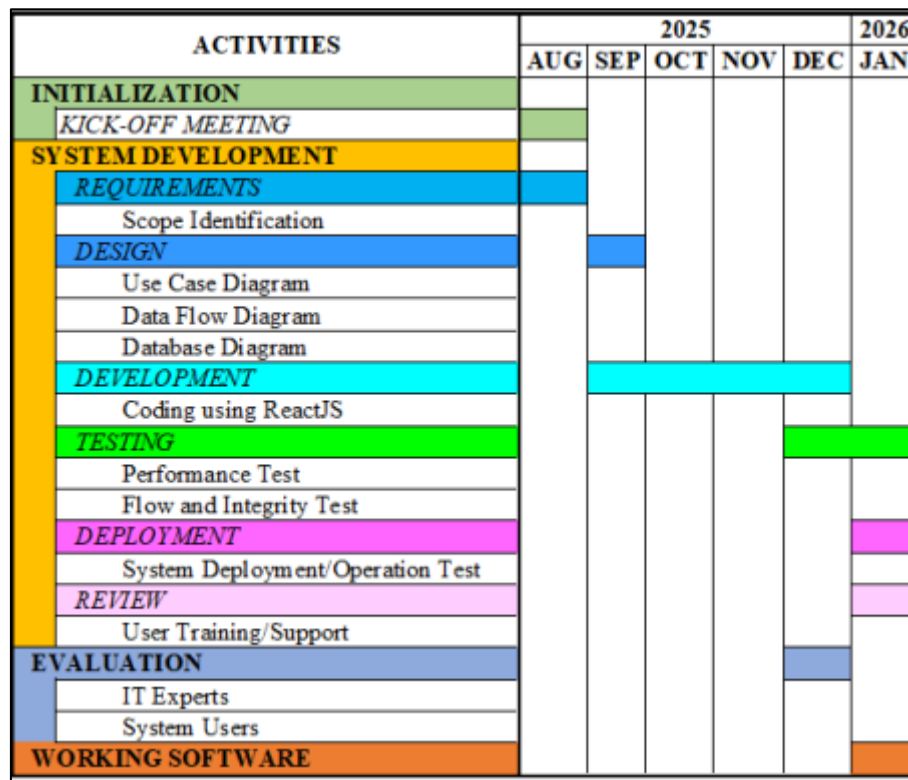


Fig 6 Gantt Chart

• System Development Stage

The system development followed the Agile Software Development Methodology, which emphasizes iterative design, continuous testing, and progressive improvement of system features. The development stages included requirements analysis, system design, development, testing, deployment, and release. During these stages, the researchers implemented key modules such as user registration, assessment questionnaires, raw score computation, cluster aggregation, AI-driven evaluation, and report generation. Each stage allowed the researchers to refine system functionality, improve usability, and ensure the accuracy of the AI-generated strand recommendations. Through this iterative process, the system was developed to be reliable, user-friendly, and capable of producing consistent evaluation results.

✓ Requirements

The defined system development during the project initialization has identified four (4) main features, namely: included (1) User Registration, (2) Assessment Dimensions (Questionnaires and clusters), (3) Raw score computation and AI-Driven Evaluation, and (4) Recommendation Reports had been analyzed in the first iteration (iteration 0) of the requirements analysis stage. In this stage, the functional requirements of each functionality had been plotted through work breakdown structure. The researcher/developer and the people involved in this study conducted several brainstorming to define the requirements of each functionality and to identify other system functionalities and dependencies according to the institutions' business rules. The requirements analysis stage also includes gathering data from existing forms, documents, and current processes (Bauat et al, 2021).

Table 13 shows the minimum required hardware and software specification needed for the cloud server and client/user.

Table 13 System Requirements and Specifications

Cloud Server	
Hardware/Software Requirements	Specifications
Processor Memory Storage Database	8 vCPU (Virtual) 32 Gb vRam 200 Gb MS SQL
Client/User	
Processor Memory Connectivity Operating System Browser	Intel Core i3 or higher/ AMD Ryzen 3 or higher/ Octa-Core Mobile CPU At least 8 Gb RAM for PC/ 4Gb for Mobile LAN or WIFI (with Stable Internet Service) Microsoft, Android, Linux, Mac OS Any

✓ *Design*

The defined deliverables/functionalities during project initialization identified four (4) main features, namely: (included (1) User Registration, (2) Assessment Dimensions (Questionnaires and clusters), (3) Raw score computation and AI- Driven Evaluation, and (4) Recommendation Reports.

In this phase, there were interactions on the concept of the system based on the requirements stated during the kick-off meeting. In designing a system, it is vital that the design was based on the specifics the end-users has laid out, specifically, the design has been derived from the formulated business rules that were tailored-fit to the end-users needs and developed using Visual Studio Code using ReactJS.

➤ *Data Flow Diagram and Use Case Diagram*

The Data Flow Diagram illustrates how data moves through the system, connecting external entities to processes and storage. Students begin by using User Management (1.0) to register or log in. The User Database stores credentials and profile data, which are validated through verification. Identity is verified through secure authentication methods. Assessment Processing (2.0) starts after authentication, with questions retrieved from the Question Database. Student answers progress to the next step for calculations.

The AI Assessment Engine (3.0) processes the gathered answers. The component executes weighted raw score calculations through its scoring formula while it combines dimension scores into cluster scores. The Assessment Results data store holds the computed outcomes for both current reference and future processing work. The AI Evaluation Engine (3.0 – Evaluation) receives data after computation, which applies strand-weight mapping and AI-driven logic for processing. The process evaluates cluster scores against established SHS strand weight criteria which leads to optimal strand recommendations for each student.

The evaluated data moves to the Report Generation (4.0) process. The module transforms the final output into organized reports which present strand recommendations together with score summaries and interpretation results which the system automatically send to the students registered email address.

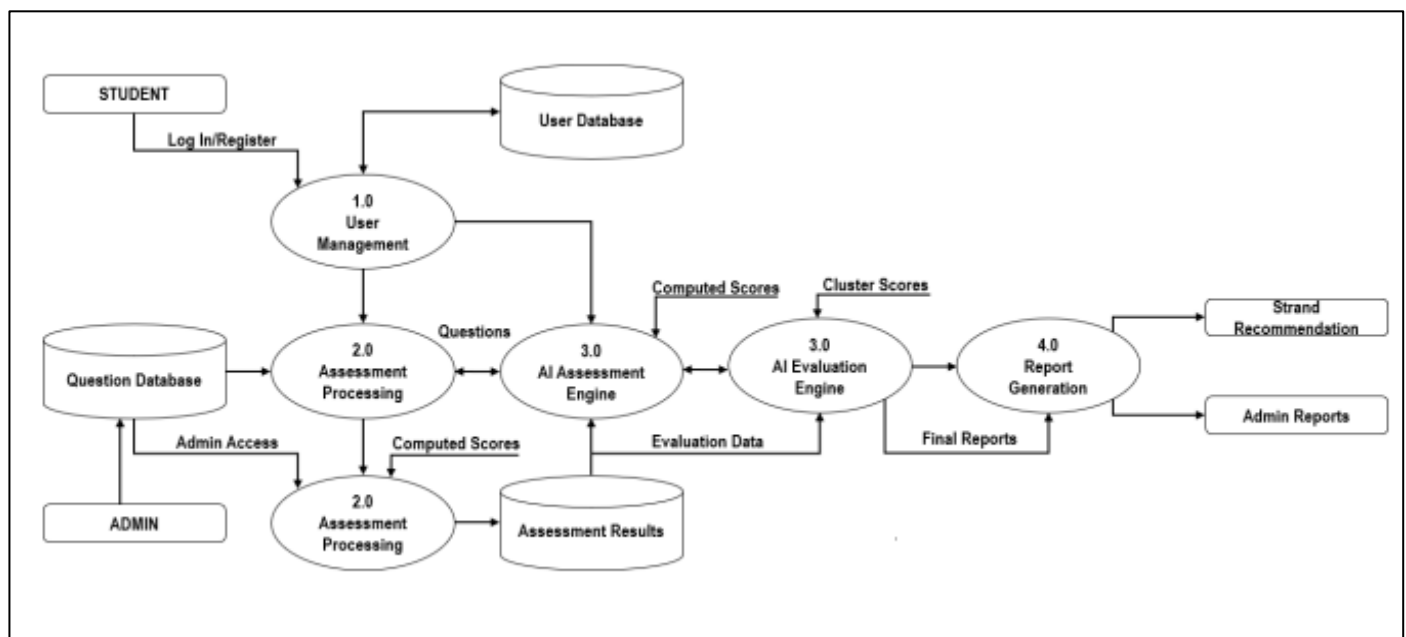


Fig 7 Data Flow Diagram of the Development of an AI-Driven Multi-Dimensional Course Assessment and SHS Strand Recommendation System

Use case diagram (Figure 8) shows the role/s that each actor will perform or will access in the system. Their access may be limited depending on the user-level access that the admin will grant to them.

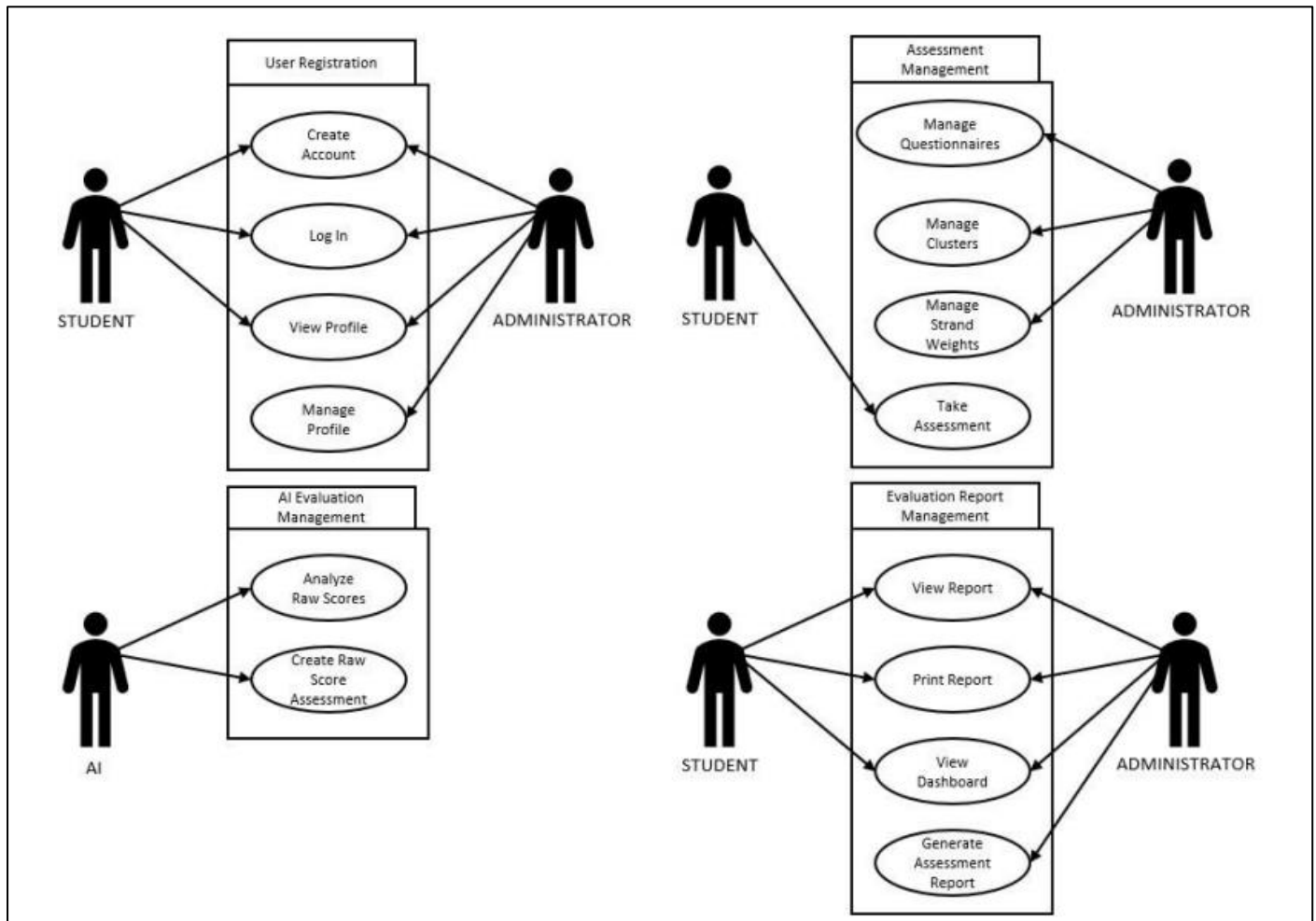


Fig 8 Use Case Diagram of the Development of an AI-Driven Multi-Dimensional Course Assessment and SHS Strand Recommendation System

The system uses Explainable Artificial Intelligence (XAI) to make the strand recommendation process understandable to students and teachers and system administrators. The system implemented XAI because it needs to show how the AI system develops its results instead of treating them as a black box. The system uses XAI to show dimension scores and cluster results and strand compatibility values which the system uses to produce its final recommendation. The evaluation report includes competency profiles and score breakdowns which enable users to identify the skills and attributes that led to the recommended Senior High School strand. The system establishes user trust through its transparent operation which enables users to make informed educational decisions.

The system uses a weighted scoring algorithm to calculate strand recommendation results through a mapping system that combines assessment dimensions with SHS strands. The 30 assessment dimensions include questionnaire items that assess respondents through a Likert scale measurement system. The system first calculates a dimension score through a response aggregation formula which uses a weighted assessment of primary and secondary questionnaire responses. The system uses predefined weights to convert the dimension score into SHS strands which include STEM HUMSS ABM and TVL based on curriculum competency assessment frameworks. The weights show how much each dimension helps determine which strand is appropriate for the student.

The algorithm calculates cluster scores through weighted dimension score aggregation which results in overall strand compatibility values. The recommended track matches the strand that received the highest compatibility score through the calculation process.

➤ Entity Relationship Diagram

The Entity Relationship Diagram – ERD (Figure 9) illustrates how the major data components of the AI-Driven Multi-Dimensional Course Assessment and SHS Strand Recommendation System are structured and related. The main entity is the student, storing profile and registration information. Students' complete assessments with responses on various dimensions stored in Assessment Results. The AI module processes these scores.

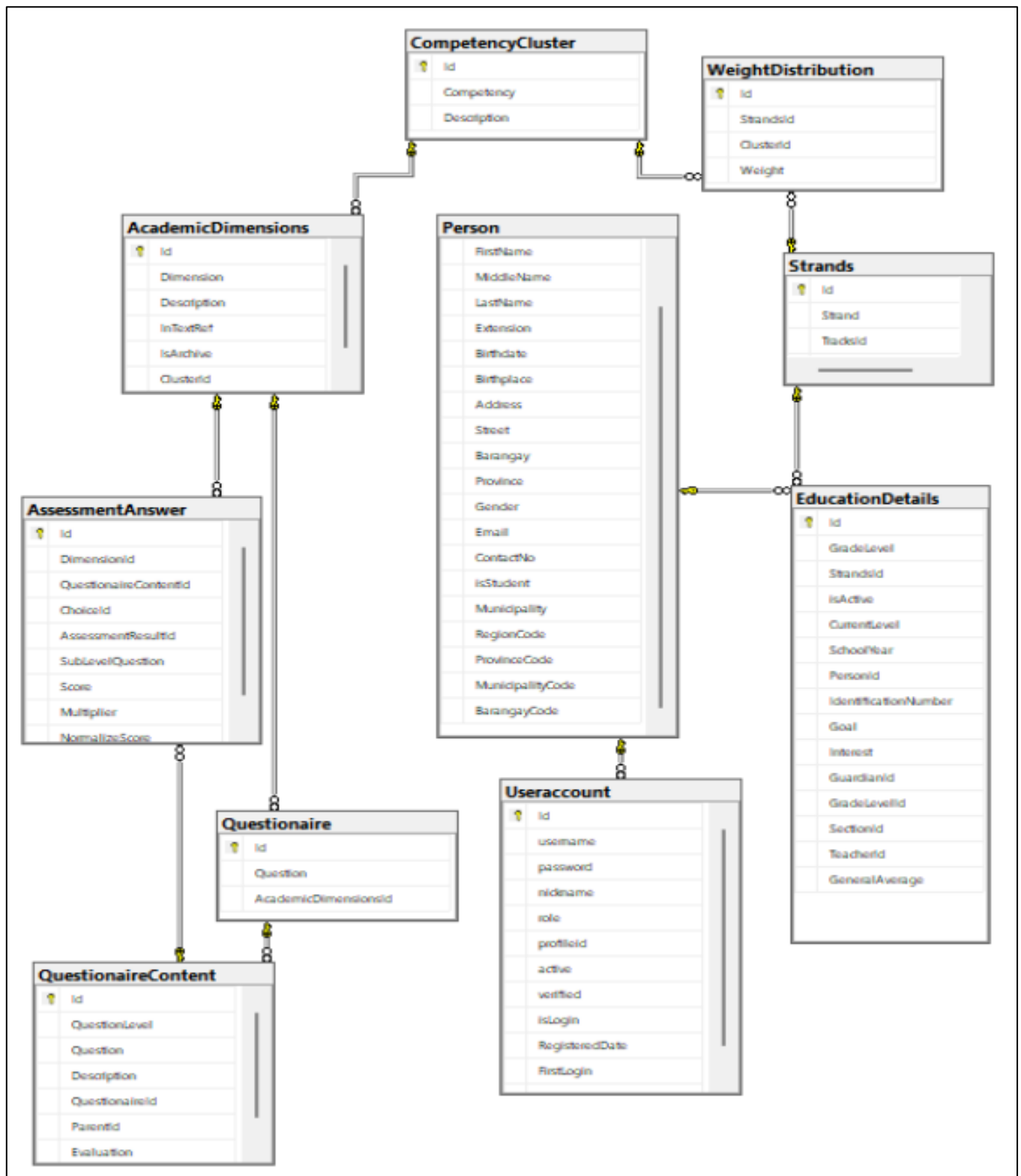


Fig 9 Entity Relationship Diagram

➤ Data Dictionary

The data dictionary is an integral component of any system as it acts as a centralized repository containing organized and detailed definitions and descriptions of the various data elements utilized within the system's framework. This essential reference document not only elucidates the database fields but also outlines the precise data types, comprehensive descriptions, and intricate relationships between the multiple system components. These components encompass a spectrum of crucial elements, including student profiles, assessment responses, dimension scores, strand mappings, and evaluation results.

The paramount importance of the data dictionary lies in its ability to ensure a uniform approach to data management, thereby

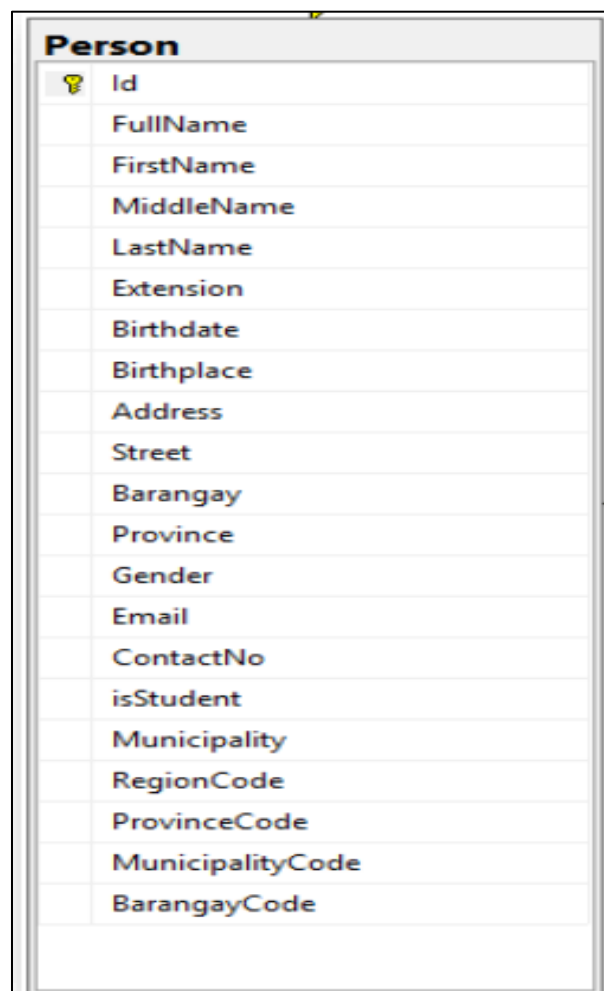
promoting accuracy and consistency throughout the system. Through its meticulous detailing, the data dictionary aids in database normalization, a key process in the optimization of database structures for efficiency and data integrity. Furthermore, the data dictionary plays a crucial role in facilitating streamlined system maintenance and propelling future enhancements by providing a clear roadmap of the intricate web of system components and their interconnections.

By meticulously documenting each system data element with precision and clarity, the data dictionary significantly aids developers and administrators in grasping the intricacies of how information propagates across the assessment and recommendation system. This comprehensive resource empowers stakeholders to comprehend the underlying data architecture, enhance system performance, and cultivate a more profound understanding of the data processes that underpin the system's functionality and integrity.

- **Database Table: Person**

The database for Person (*Figure 9*) shall hold the information of the student, this table is connected to the user log-in credentials.

Log-in credential is classified as administrator and students. Person table is also connected with the student's education details.

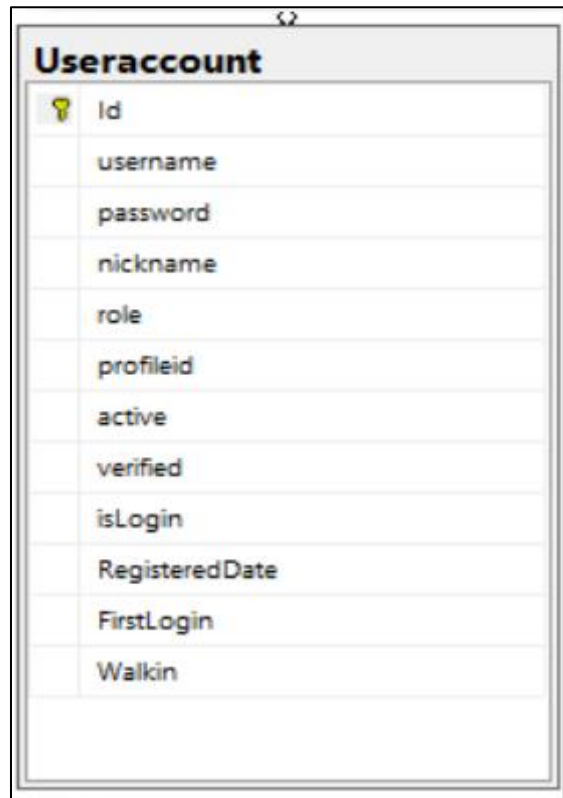


Person	
	Id
	FullName
	FirstName
	MiddleName
	LastName
	Extension
	Birthdate
	Birthplace
	Address
	Street
	Barangay
	Province
	Gender
	Email
	ContactNo
	isStudent
	Municipality
	RegionCode
	ProvinceCode
	MunicipalityCode
	BarangayCode

Fig 10 Database Table for Person

- **Database Table: User Account**

The database table for user account (*Figure 10*) contains the log-in credentials for each classified user, this will serve as the main security feature of the system.

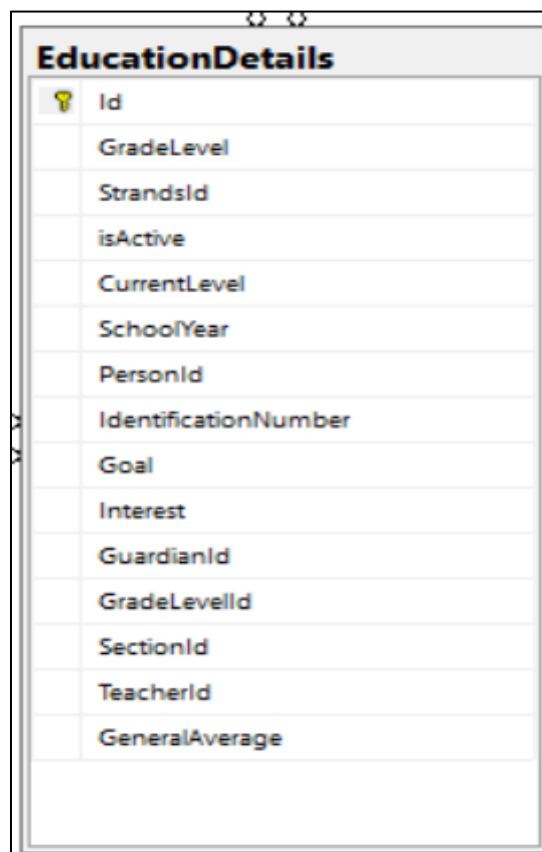


Useraccount	
	Id
	username
	password
	nickname
	role
	profileid
	active
	verified
	isLogin
	RegisteredDate
	FirstLogin
	Walkin

Fig 11 Database Table for User Account

- *Database Table: Education Details*

The database table for Education details (Figure 11) contains the important information of the student related to his/her education, this table is connected to the Strand table.



EducationDetails	
	Id
	GradeLevel
	StrandsId
	isActive
	CurrentLevel
	SchoolYear
	PersonId
	IdentificationNumber
	Goal
	Interest
	GuardianId
	GradeLevelId
	SectionId
	TeacherId
	GeneralAverage

Fig 12 Database Table for Educational Details

- **Database Table: Strands**

The database table for Strands (Figure 12) holds the list of existing senior high school strands which the student will choose which strand he/she preferred which will be compared to the recommendation after his/her assessment process.

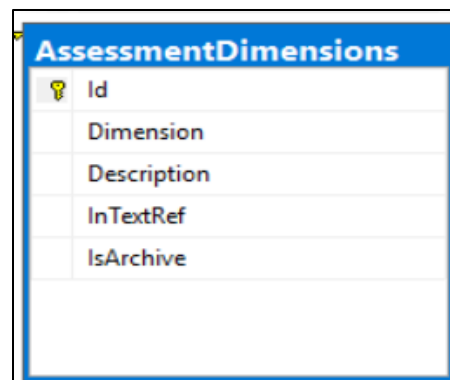


Strands	
	Id
	Strand
	TracksId
	Initial

Fig 13 Database Table for Strands

- **Database Table: Assessment Dimensions**

The database table for Assessment Dimensions (Figure 13) contains the dimensions that the students will go through in the evaluation process. This table is connected to Questionnaire table.

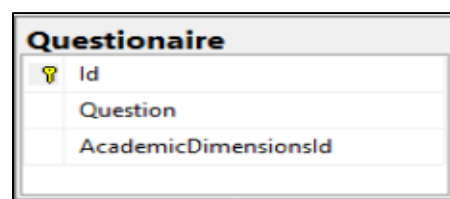


AssessmentDimensions	
	Id
	Dimension
	Description
	InTextRef
	IsArchive

Fig 14 Database Table for Assessment Dimensions

- **Database Table: Questionnaire**

The database table for Questionnaire (Figure 14) holds the assessment questions as per approved dimensions, each dimension has a main question and a sub-level question.

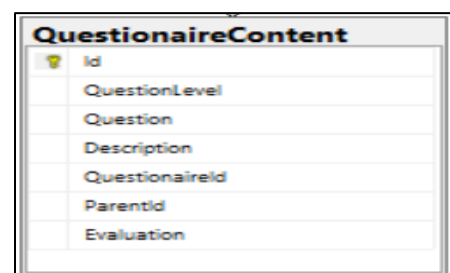


Questionnaire	
	Id
	Question
	AcademicDimensionsId

Fig 15 Database Table for Questionnaire

- **Database Table: Questionnaire Content**

The database table for Questionnaire Content (Figure 15) the specific responses as defined in the assessment dimensions and corresponding questionnaires.

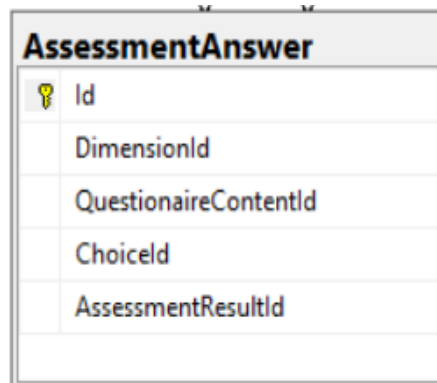


QuestionnaireContent	
	Id
	QuestionLevel
	Question
	Description
	QuestionnaireId
	ParentId
	Evaluation

Fig 16 Database Table for Questionnaire Content

- **Database Table: Assessment Answer**

The database table for Assessment Answer (Figure 16) saves the responses given by the students, this table is connected to assessment result table.

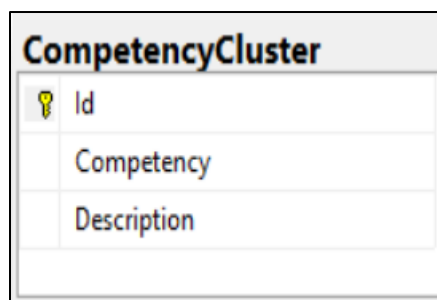


AssessmentAnswer	
	Id
	DimensionId
	QuestionnaireContentId
	ChoiceId
	AssessmentResultId

Fig 17 Database Table for Assessment Answer

- **Database Table: Competency Cluster**

The database table for Competency Cluster (Figure 17) holds the data in which the dimensions was grouped that shall impact the weights of evaluation.

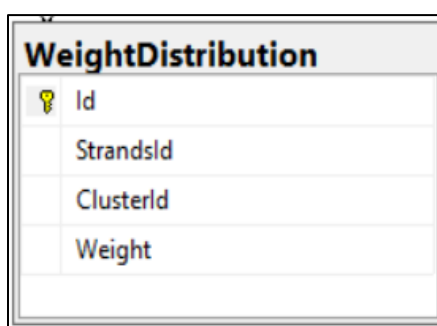


CompetencyCluster	
	Id
	Competency
	Description

Fig 18 Database Table for Competency Cluster

- **Database Table: Weight Distribution**

The database table for Weight Distribution (Figure 18) holds the assigned weight for each given strand, this shall be used to compute the raw score for each strand based on the given weight percentage that will be used by AI for evaluation.



WeightDistribution	
	Id
	StrandsId
	ClusterId
	Weight

Fig 19 Database Table for Weight Distribution

- **Development**

During this phase, coding using ReactJS in Visual Studio Code (Figure 20) began for the AI-Driven Multi-Dimensional Course Assessment and SHS Strand Recommendation System. ReactJS's component-based architecture and high performance make it ideal for Agile development. It enables developers to create reusable components like dashboards, input forms, assessment visualizations, and recommendation panels, supporting rapid prototyping and continuous improvement essential in Agile methodologies.

React's virtual DOM efficiently updates only necessary UI elements for fast rendering of data visuals like radar charts, score summaries, and recommendations. Its ecosystem, with libraries for state management, routing, and data visualization, enables seamless integration with AI models and APIs. ReactJS enhances system scalability without concerns about overwhelming it with additional dimensions, users, or features.

Overall, ReactJS has given the system the advantages of flexibility, speed, and user-centered interactivity thus making it a perfect front-end technology for an AI-powered assessment platform. Also, for the development of the system Microsoft SQL Server Management (Figure 21) were used to store data.

```

16  function CourseAssessment() {
53    useEffect(() => {
54      (async () => {
55        setAssessmentForm((a) => {
56          QuestionLevel: 1,
57          QuestionnaireId: 0,
58          children: [],
59          choices: [],
60        });
61      });
62    });
63    setquestions([]);
64    const aDimensionList = await axios(`api/dimensionList`);
65    let aDimensionData = await aDimensionList.data;
66    console.log(aDimensionData[currentDimension]);
67    setTotalQuestions(
68      aDimensionData.reduce((t, item) => t + Number(item.Questions || 0), 0)
69    );
70    setDimension(aDimensionData);
71    setSelectedDimension((d) => {
72      return {
73        ...d,
74        Id: aDimensionData[currentDimension].Id,
75        Dimension: aDimensionData[currentDimension].Dimension,
76        Questions: aDimensionData[currentDimension].Questions,
77      };
78    });
79    assessment.push({
80      DimensionId: aDimensionData[currentDimension].Id,
81      Dimension: aDimensionData[currentDimension].Dimension,
82    });
83
84    // setquestions((q) => [
85    //   ...q,
86    //   {
87     DimensionId: aDimensionData[currentDimension].Id,
88     Dimension: aDimensionData[currentDimension].Dimension,
89   },
90   ]);
91

```

Fig 20 Visual Studio Code

The screenshot shows the MS SQL Server Enterprise Manager interface. On the left, the 'Server Enterprise' tree is expanded, showing the 'DESKTOP-RQZM5C' server. The 'Databases' folder is expanded, showing the 'AcademicDimensions' database. The 'Tables' folder is expanded, showing the 'AcademicDimensions' table. The 'Columns' tab is selected, showing the columns: Dimension, Description, InTestRef, Question, QuestionnaireId, Id, Questionnaire, QuestionnaireContent, and ParentId. The 'Query' tab is selected, showing a query that joins the 'AcademicDimensions' table with the 'Questionnaire' table. The 'Results' tab is selected, showing the query results.

Dimension	Description	InTestRef	Question	QuestionnaireId	Id	Questionnaire	QuestionnaireContent	ParentId
Academic Dimensions	Academic Dimensions	1	What is the subject of the course?	1	1	1	1	1
Academic Dimensions	Academic Dimensions	2	What is the subject of the course?	2	2	2	2	2
Academic Dimensions	Academic Dimensions	3	What is the subject of the course?	3	3	3	3	3
Academic Dimensions	Academic Dimensions	4	What is the subject of the course?	4	4	4	4	4
Academic Dimensions	Academic Dimensions	5	What is the subject of the course?	5	5	5	5	5
Academic Dimensions	Academic Dimensions	6	What is the subject of the course?	6	6	6	6	6
Academic Dimensions	Academic Dimensions	7	What is the subject of the course?	7	7	7	7	7
Academic Dimensions	Academic Dimensions	8	What is the subject of the course?	8	8	8	8	8
Academic Dimensions	Academic Dimensions	9	What is the subject of the course?	9	9	9	9	9
Academic Dimensions	Academic Dimensions	10	What is the subject of the course?	10	10	10	10	10

Fig 21 MS SQL Server Management

- *Testing*

Following the implementation of each feature, a series of demonstrations were conducted to verify and rectify the product that was built. The representatives of the users scrutinized the system to detect defects and gaps as well as to confirm that the system met the specifications and the business needs established in the initial stage.

The tests were carried out at regular intervals in accordance with the Gantt chart, and the end-users evaluated the functionalities delivered according to the daily scenarios they faced with their current set-up. Through this, the system was able to manage the AI-Driven Multi-Dimensional Course Assessment and SHS Strand Recommendation System Framework effectively. Every main output or functionality was assessed under real conditions and according to procedures.

- ✓ *Log-in Page*

Log-in Page (Figure 22) shows the view the students/admin users to log-in to access the AI-Driven Multi-Dimensional Course Assessment and SHS Strand Recommendation System using their smart devices via their web browser.

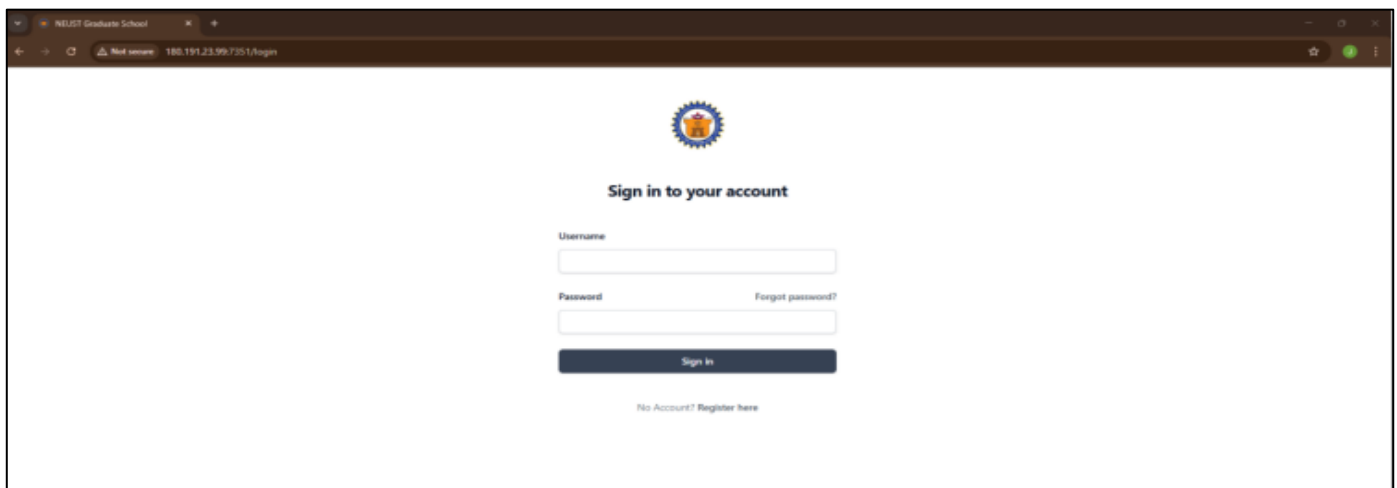


Fig 22 Log-in Page

- *Student Registration*

The student registration view (Figure 23) shows the details the students must provide to create their profile to enable them to access the AI-Driven Multi-Dimensional Course Assessment and SHS Strand Recommendation System. All fields are with data-entry validation to ensure that the necessary information is properly collected and saved. Also, the students can select their preferred strand in which, they will be able to compare their preferred strand from the AI-recommended strand. In addition, the Privacy Policy document can be viewed in this page.

Before they can proceed to their registration, they are required to check the Privacy Policy Agreement before they can proceed.

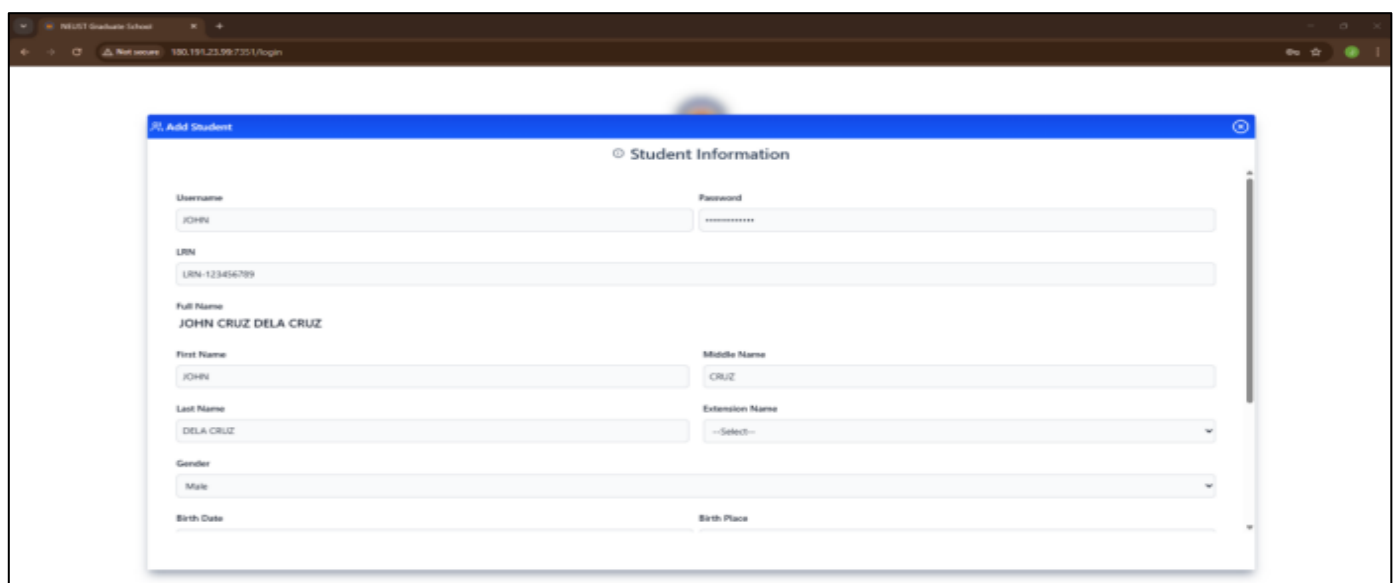


Fig 23 Student Information

- **Student List**

Under the Administrator Dashboard in the Students tab (*Figure 24*) shows students who has successfully registered in the AI-Driven Multi-Dimensional Course Assessment and SHS Strand Recommendation System. Admin users can toggle the active/inactive to mark which students who will take their evaluation. Also, admin users can view the profile of the students.

IDN	Name	Date Registered	Actions
LRN-123456	MARK LAWRENCE PAUS TAGUAM	25/09/2025	View
LRN-123456789	SAM POL USOR	08/11/2025	View
LRN-123456789011	AJAN DELA CRUZ	02/12/2025	View
LRN-245678901	PEDRO DELA CRUZ	02/12/2025	View
LRN-12345677890	JHERD SAMACHON ABON	06/12/2025	View

Fig 24 Student List

- **Assessment Questionnaires**

The Assessment Questionnaires (*Figure 25*) shows the list of dimensions where the students will be evaluated in the AI-Driven Multi-Dimensional Course Assessment and SHS Strand Recommendation System. The dimensions are grouped into clusters. Each dimension has a primary and secondary level of question. An archiving function for each dimension is implemented in case newer evaluation dimension is needed for better student evaluation.

Dimension	Description	Reference
Academic Preparedness	(Measures a student's readiness for higher academic demands through foundational knowledge, study habits, and confidence in learning.)	ref: Deluca, 2025
Logical Reasoning	(Refers to a learner's ability to analyse information, identify patterns, and draw logical conclusions.)	ref: Brown et al., 2022
Mathematical Aptitude	(Gauges numerical reasoning, algebraic thinking, and the capacity to apply mathematical principles in problem-solving.)	ref: Institute of Museum and Library Services (IMLS), 2
Scientific Inquiry	(Assesses curiosity and the ability to explore, hypothesize, and test scientific ideas through experimentation.)	ref: Institute of Museum and Library Services (IMLS), 2
Critical Thinking	(Evaluates the ability to assess information, analyze arguments, and make rational decisions.)	ref: Bartlett for Kids, 2022
Problem-Solving Skills	(Refers to the process of identifying issues, generating options, and selecting the best solutions.)	ref: Bartlett for Kids, 2022

Fig 25 Assessment Questionnaires

- **Settings**

The settings (*Figure 26*) show the core of the raw score computation the AI-Driven Multi-Dimensional Course Assessment and SHS Strand Recommendation System will be using. In this view, Admin (Guidance Councilor) can manage the cluster list where the assessment dimensions will be grouped, add or edit the cluster, enable or disable the cluster. Delete is not an option in the AI-Driven Multi-Dimensional Course Assessment and SHS Strand Recommendation System for the clusters are directly attached to

questionnaires which is directly linked to the student's assessment and evaluation report. If a cluster is disabled and a new one is added, questionnaires selected under the disabled cluster shall be manually move to the newly created cluster. Moreover, Strand List can also be seen in the Settings view as well as the Weight Distribution of percentage as per strand.

These functionalities are the core in assessing the responses of the students where the AI functionality will be using the provide a comprehensive rationale and explanation of the recommendation based on the strengths and weaknesses of the student measured using the dimensions.

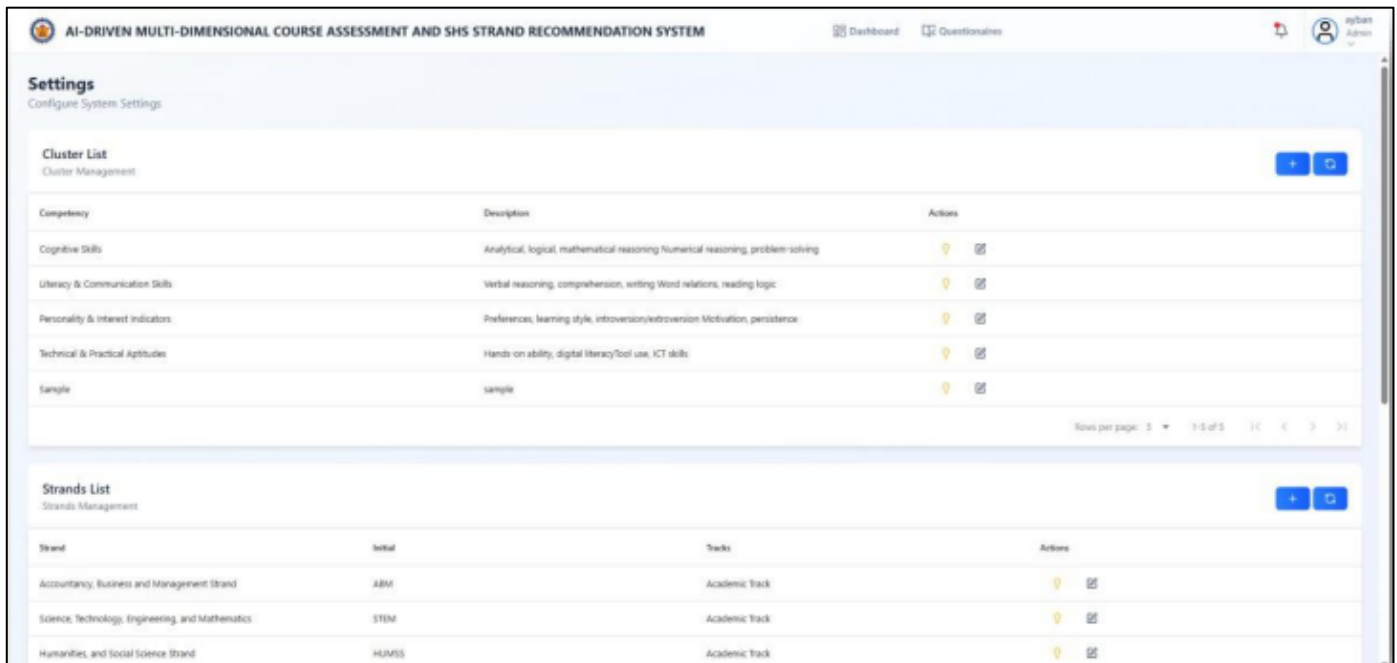


Fig 26 Settings

- Users

The Users tab under the Administrator Dashboard (Figure 27) shows the admin users of the AI-Driven Multi-Dimensional Course Assessment and SHS Strand Recommendation System. In this view, admin can add users and set their role in the system.

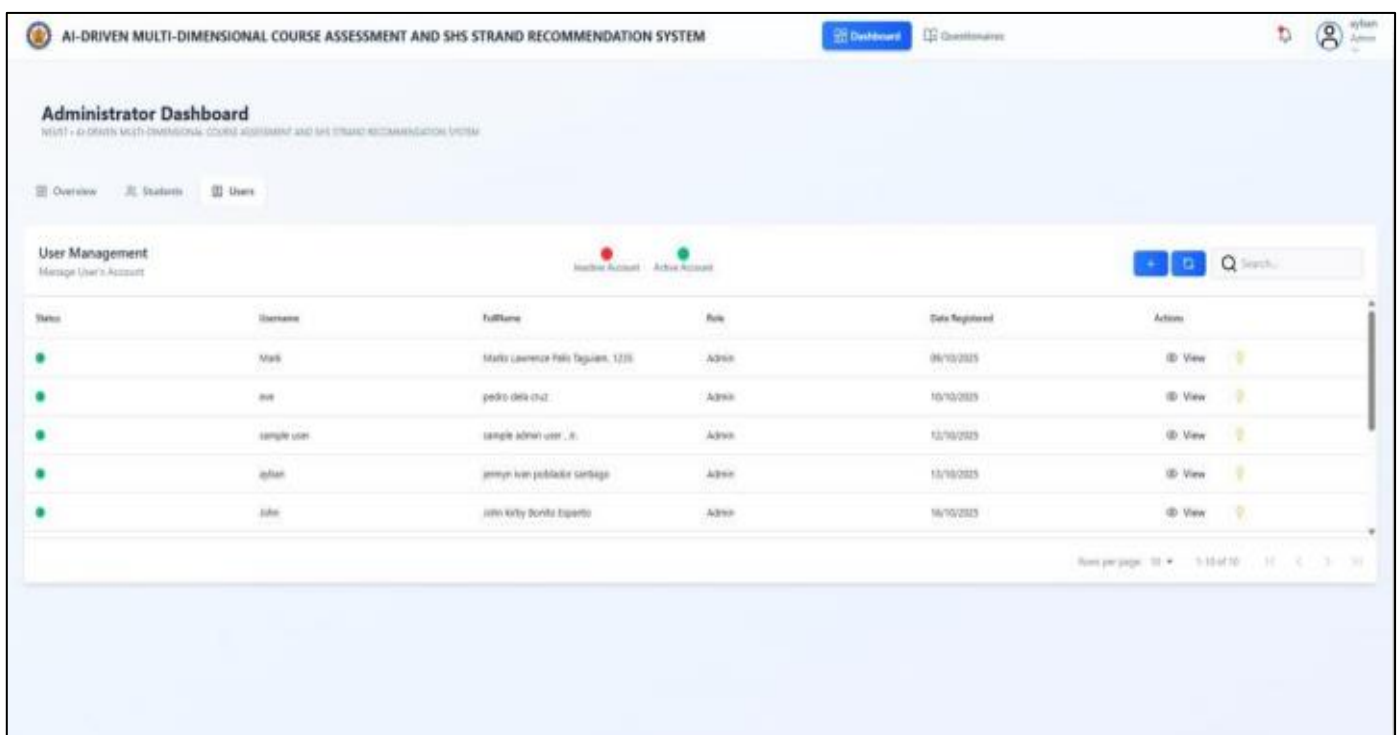


Fig 27 Users

➤ Administrator Dashboard

The Administrator Dashboard (*Figure 28*) shows data of the AI-Driven Multi-Dimensional Course Assessment and SHS Strand Recommendation System. The dashboard is dynamically populated showing the count of registered students, completed assessments, top dimension and top strand that system has processed and evaluated.

Graph and pie charts that are dynamically updated shows the strand recommended percentage and the cluster of competencies showing the distribution of skills which corresponds to the students' responses based on their strengths and weaknesses.

Moreover, the visualization of strengths across all dimensions is also shown in the dashboard which shows the relative response of each student in which reflects the interaction of the system and the students.

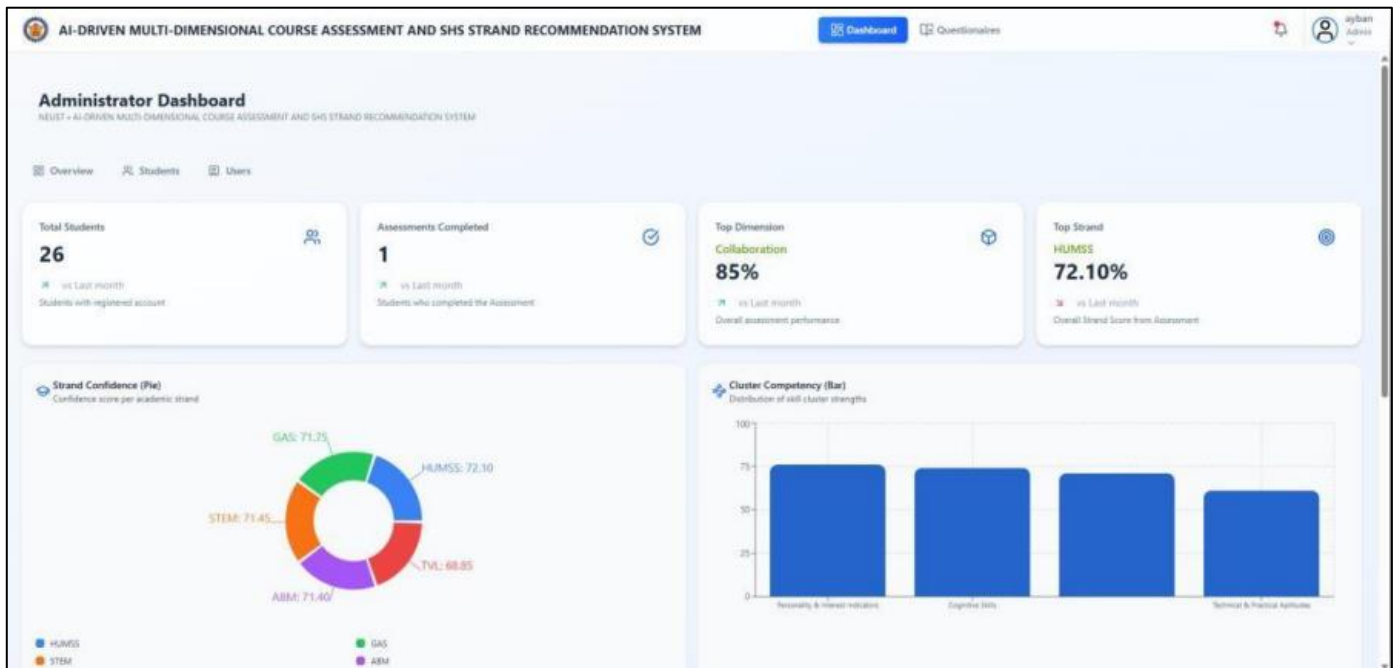


Fig 28 Administrator Dashboard

➤ Student Dashboard

The Student Dashboard (*Figure 29*) shows the student information and assessment data. The student dashboard also let the student take their assessment which is limited to two (2), view their results and recommendations.

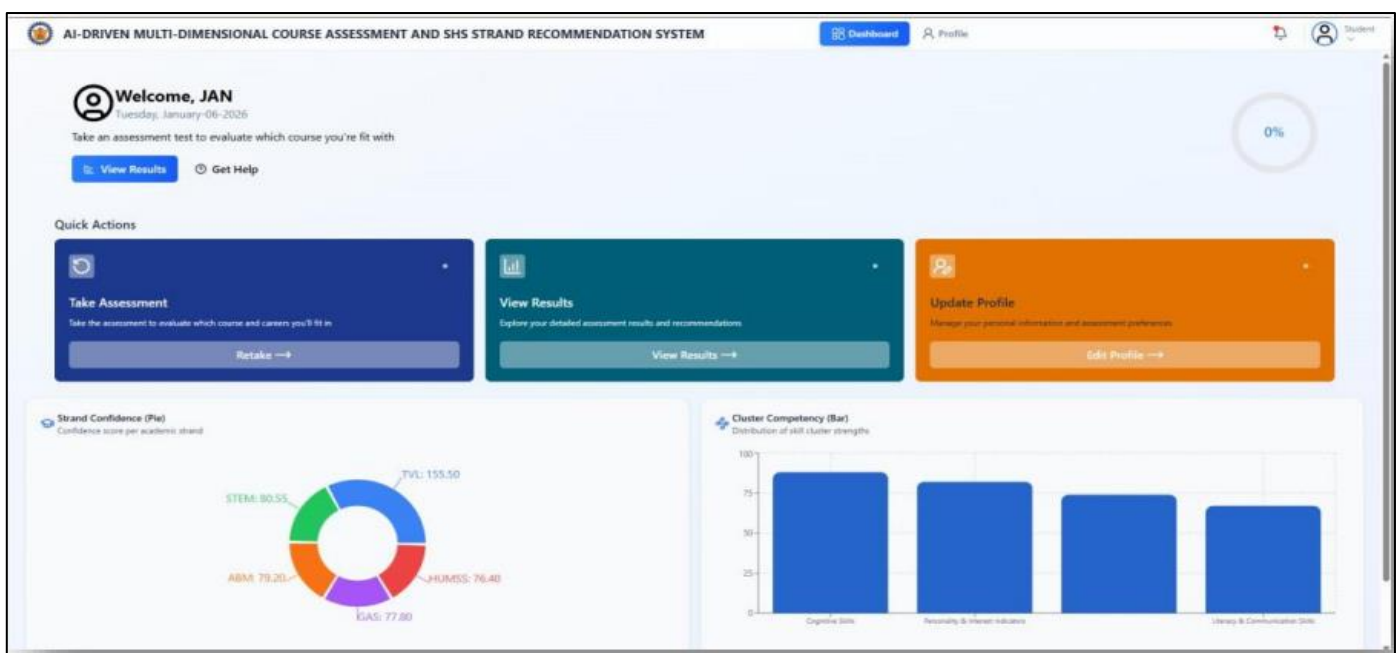


Fig 29 Student Dashboard

- *Deployment*

The approved functionalities have been implemented and deployed to Rizal National High School to undergo further test using live data. The table below shows the quality assurance test result conducted before the deployment of the system.

Table 14 shows the order of testing of deliverables/functionalities of the of the AI-Driven Multi-Dimensional Course Assessment and SHS Strand Recommendation System. The users acknowledged that these functionalities passed the product test and are ready for deployment and use.

Table 14 Quality Assurance Testing Result

Functionality	Result	Completion	Recommendation s
Creation of Cluster	Passed	100%	For Deployment
Creation of Assessment Dimension	Passed	100%	For Deployment
Managing Strand and Strand Weights	Passed	100%	For Deployment
Dashboard of Live Data	Passed	100%	For Deployment
Student Registration	Passed	100%	For Deployment
Student Log-in	Passed	100%	For Deployment
Student Assessment	Passed	100%	For Deployment
Email Notification of Evaluation Report	Passed	100%	For Deployment

- *Review*

In the final phase of the system's software development life cycle, the researcher/developer and end users evaluated the developed system's functionalities to see if it could meet the requirements and ensure that business rules had been fully implemented. This meticulous assessment process involved a series of user acceptance tests, where participants engaged directly with the system to navigate its features and workflows. They provided invaluable feedback on aspects such as usability, performance, and overall satisfaction, which were crucial for identifying any discrepancies between the system's capabilities and the original specifications.

Throughout this phase, the team documented their findings, highlighting areas that required further refinement or enhancement. They conducted focus group discussions to delve deeper into user experiences, facilitating a dialogue that encouraged open communication about potential improvements. This collaborative approach not only fostered user buy-in but also ensured that the final product was truly aligned with the needs of its intended audience.

As the evaluation progressed, the developers worked diligently to address any issues raised, implementing necessary adjustments and conducting subsequent rounds of testing. This iterative process underscored the importance of user feedback in shaping a system that was not only functional but also intuitive and user-friendly. Ultimately, the culmination of these efforts was a robust software solution that promised to enhance productivity and streamline operations, ready for deployment and eager to meet the challenges of its new environment.

➤ *Evaluation of the AI-Driven Multi-Dimensional Course Assessment and SHS Strand Recommendation System by the IT Experts*

Once all necessary modifications have been finalized and the system has received validation from end-users during the customer collaboration phase, the AI-Driven Multi-Dimensional Course Assessment and SHS Strand Recommendation System was evaluated by seven IT professionals based on the technical standards of a software product outlined in ISO 25010. The researcher scheduled the process through online meetings and face to face evaluation

The researcher presented the AI-Driven Multi-Dimensional Course Assessment and SHS Strand Recommendation System to IT specialists with expertise in managing AI-driven applications and systems. These experts, leveraging their understanding of web application development and wide knowledge to their respective fields, they meticulously examined every aspect of the system, taking all factors into account during their assessment.

- *Functional Suitability*

Functional suitability was assessed to determine whether the system's features adequately support SHS strand assessment and recommendation tasks. Respondents evaluated the completeness, correctness, and appropriateness of system functions.

Table 15 IT Experts' Evaluation of AI-Driven Multi-Dimensional Course Assessment and SHS Strand Recommendation System in Terms of Functionality

Functional Suitability	Mean	Verbal Description
1. Functional Completeness. The AI-Driven Multi-Dimensional Course Assessment and SHS Strand Recommendation System functions cover all the specified tasks and user objectives.	3.86	Highly Functional
2. Functional Correctness. The AI-Driven Multi-Dimensional Course Assessment and SHS Strand Recommendation System functions provides correct results with the needed		Highly Functional

degree of precision.	4.00	
3. Functional Appropriateness. The AI-Driven Multi-Dimensional Course Assessment and SHS Strand Recommendation System functions facilitate the accomplishment of specified tasks and objectives.	3.86	Highly Functional
Overall Mean	3.90	Highly Functional

Table 15 shows IT Experts' evaluation of AI-Driven Multi-Dimensional Course Assessment and SHS Strand Recommendation System in terms of functional suitability.

As shown, item 2 "Functional Correctness. The AI-Driven Multi-Dimensional Course Assessment and SHS Strand Recommendation System functions provides correct results with the needed degree of precision" obtained highest mean of 4.00 verbally described as highly functional while item 1 "Functional Completeness. The AI-Driven Multi-Dimensional Course Assessment and SHS Strand Recommendation System functions cover all the specified tasks and user objectives" and item 3 "Functional Appropriateness. The AI-Driven Multi-Dimensional Course Assessment and SHS Strand Recommendation System functions facilitate the accomplishment of specified tasks and objectives" both obtained a mean of 3.86 verbally described as highly functional. Further, the IT experts evaluated the functional suitability of the AI-Driven Multi-Dimensional Course Assessment and SHS Strand Recommendation System with an overall mean of 3.90 verbally described as highly functional which is verbally interpreted that the system excellently met all the stated and implied needs and no weaknesses were found.

- *Performance Efficiency*

Performance efficiency measures how well the system performs relative to the resources used, particularly in terms of response time and processing behavior.

Table 16 Evaluation on Performance Efficiency by IT Experts

Performance Efficiency	Mean	Verbal Description
1. Time Behavior. The AI-Driven Multi-Dimensional Course Assessment and SHS Strand Recommendation System response and processing times and throughput rates of a product or system, when performing its functions, meet the requirements.	4.00	Highly Efficient
2. Resource Utilization. The amount and type of resources used by the AI-Driven Multi-Dimensional Course Assessment and SHS Strand Recommendation System when performing its functions meet the requirements.	4.00	Highly Efficient
3. Capacity. The AI-Driven Multi-Dimensional Course Assessment and SHS Strand Recommendation System can handle the maximum limits of the system parameter.	4.00	Highly Efficient
Overall Mean	4.00	Highly Efficient

The IT experts suggested that the system performed within acceptable limits because it completed assessment tasks and generated reports within required response times. Survey participants reported that the system operated without interruptions during complicated assessment procedures which involved multidimensional data processing. The results demonstrate that the system's implementation of AI-powered interpretation tools maintained its operational performance without any negative effects. The system analysis shows that it can perform multiple functions with high efficiency which enables users to expect quick and accurate results. The system performance improvements through proactive AI technology implementation demonstrate how advanced technology developments create better user experiences. The results of the complete evaluation show that the system maintains its operational efficiency while delivering accurate user service throughout different assessment types.

- *Compatibility*

Compatibility was evaluated to determine the system's ability to operate across different devices and platforms.

Table 17 Compatibility of the AI-Driven Multi-Dimensional Course Assessment and SHS Strand Recommendation System

Compatibility	Mean	Verbal Description
1. Co-existence. The AI-Driven Multi-Dimensional Course Assessment and SHS Strand Recommendation System can perform its required functions efficiently while sharing a common environment and resources with other systems, without detrimental impact to any other system.	4.00	Highly Compatible
2. Interoperability. The AI-Driven Multi-Dimensional Course Assessment and SHS Strand Recommendation System can exchange information with two or more systems and use the information that has been exchanged.	3.86	Highly Compatible
Overall Mean	3.93	Highly Compatible

The experts confirmed that the system showed continuous system operation because it operated successfully on various web browsers and devices which people commonly used. The system demonstrates strong performance capabilities which enable its

operation in multiple technical environments that require no specific hardware or software setup. The system enables organizations to implement it because they do not need to purchase dedicated equipment or modify software settings to match their various operational environments. The system supports multiple browsers and devices which improves access for users while maintaining user-friendly design elements that create smooth interactions with the system. The system provides cross-compatibility which simplifies deployment while enabling both administrators and end users to work more efficiently with the system. The system performs well across multiple platforms which shows its ability to adapt for different technical environments while maintaining its capacity to deliver reliable performance in various operational situations that require flexible solutions.

- *Usability*

Usability evaluation focused on ease of use, interface clarity, and learnability.

Table 18 Usability of the AI-Driven Multi-Dimensional Course Assessment and SHS Strand Recommendation System

Usability	Mean	Verbal Description
1. Appropriateness recognizability. The users can recognize that the developed AI-Driven Multi-Dimensional Course Assessment and SHS Strand Recommendation System is appropriate for their needs.	4.00	Highly Usable
2. Learnability. The AI-Driven Multi-Dimensional Course Assessment and SHS Strand Recommendation System can be used by specified users to achieve specified goals of learning to use the system with effectiveness, efficiency, freedom from risk, and satisfaction in a specified context of use.	4.00	Highly Usable
3. Operability. The AI-Driven Multi-Dimensional Course Assessment and SHS Strand Recommendation System has attributes that makes it easy to operate and control.	4.00	Highly Usable
4. User error protection. The AI-Driven Multi-Dimensional Course Assessment and SHS Strand Recommendation System protects users against making errors.	3.86	Highly Usable
Overall Mean	3.96	Highly Usable

The experts experience assessment through weighted mean calculations demonstrates excellent results because users who interacted with the system found it easy to navigate through its intuitive design. Users who had no previous knowledge of the platform could complete the assessment without major help because the system operated in a user-friendly manner. Users found it easy to use the system because they could access their results without difficulty. The system interface and workflow design enable smooth user interaction which demonstrates its educational value for potential implementation in teaching environments. Experts responded positively to the system because its usability and accessibility features enable educators and students to use its well-organized functionality.

- *Reliability*

Reliability assessment focused on system stability, error handling, and availability.

Table 19 Reliability of the AI-Driven Multi-Dimensional Course Assessment and SHS Strand Recommendation System

Reliability	Mean	Verbal Description
1. Maturity. The AI-Driven Multi-Dimensional Course Assessment and SHS Strand Recommendation System meets the needs for reliability under normal operation.	3.86	Highly Reliable
2. Availability. The AI-Driven Multi-Dimensional Course Assessment and SHS Strand Recommendation System is operational and accessible when required for use.	4.00	Highly Reliable
3. Fault tolerance. The AI-Driven Multi-Dimensional Course Assessment and SHS Strand Recommendation System operates as intended despite the presence of hardware or software faults.	4.00	Highly Reliable
4. Recoverability. The AI-Driven Multi-Dimensional Course Assessment and SHS Strand Recommendation System can recover the data that is directly affected and can reestablish the desired state of the system in the event of an interruption or a failure.	4.00	Highly Reliable
Overall Mean	3.96	Highly Reliable

The evaluation period results demonstrate that the system maintained its performance level throughout the period without experiencing any major operational interruptions or data processing faults. The system operates at a high level of stability according to this finding which shows that it can handle academic work because it executes assessments with complete data protection. The analysis demonstrates that the system operated reliably during the evaluation period which allowed the system to produce accurate results throughout the entire testing period. The results show that the system operates reliably while maintaining its ability to recover from disruptions which makes it suitable for academic work that needs exact and consistent results. The system demonstrates high performance standards because it operates without major interruptions while handling academic assessments which proves its capability to support ongoing student evaluations. The system demonstrated stable and reliable performance throughout the evaluation period which proves its ability to handle frequent academic activities while maintaining data integrity.

- **Security**

Security evaluation examined data protection, access control, and privacy safeguards.

Table 20 Security of the AI-Driven Multi-Dimensional Course Assessment and SHS Strand Recommendation System

Security	Mean	Verbal Description
1. Confidentiality. The AI-Driven Multi-Dimensional Course Assessment and SHS Strand Recommendation System ensures that data are accessible only to those authorized to have access.	4.00	Highly Secure
2. Integrity. The AI-Driven Multi-Dimensional Course Assessment and SHS Strand Recommendation System prevents unauthorized access to, or modification of, computer program or data.	3.57	Highly Secure
3. Accountability. The AI-Driven Multi-Dimensional Course Assessment and SHS Strand Recommendation System can trace the actions of an end-user uniquely to his/her accountability	4.00	Highly Secure
Overall Mean	3.86	Highly Secure

The system evaluation process received positive feedback from respondents who evaluated how well the system protected data privacy and handled access control procedures. The system established user confidence through its implementation of strong authentication systems and access control measures which restricted users from viewing assessment results. The research findings support the assertion that the system operates in accordance with institutional data privacy requirements. The system received positive reviews which demonstrate its effectiveness in protecting sensitive information through its privacy and security measures, thus creating a safe environment for users to trust and work with the system's data management capabilities. User confidence in the system's operational dependability stems from two main factors which include complete compliance with data protection regulations and the establishment of secure access mechanisms. The system demonstrates its effectiveness to fulfill the required data privacy standards because it successfully protects all confidential information which the institution manages through its data processing system.

- **Maintainability**

Maintainability was assessed by IT experts to determine the ease with which the system can be updated, modified, or debugged.

Table 21 Maintainability of the AI-Driven Multi-Dimensional Course Assessment and SHS Strand Recommendation System

Maintainability	Mean	Verbal Description
1. Modularity. The AI-Driven Multi-Dimensional Course Assessment and SHS Strand Recommendation System is composed of distinct components such that a change to one component has minimal impact on other components.	4.00	Highly Maintainable
2. Reusability. The AI-Driven Multi-Dimensional Course Assessment and SHS Strand Recommendation System's asset can be used in more than one system, or in building other assets.	4.00	Highly Maintainable
3. Analyzability. It is possible to assess the impact to the AI-Driven Multi-Dimensional Course Assessment and SHS Strand Recommendation System of an intended change to one or more of its parts, or to diagnose the system for deficiencies or causes of failures, or to identify parts to be modified.	4.00	Highly Maintainable
4. Modifiability. The AI-Driven Multi-Dimensional Course Assessment and SHS Strand Recommendation System can be effectively and efficiently modified without introducing defects or degrading existing product quality.	4.00	Highly Maintainable
Overall Mean	4.00	Highly Maintainable

The evaluation results have unequivocally highlighted the inherent benefits of the system's modular structure and meticulously organized codebase. These structural attributes not only streamline maintenance tasks but also pave the way for seamless integration of future enhancements and updates. This inherent flexibility underscores the system's adaptability, enabling it to swiftly respond to evolving trends and requirements within the realms of assessment dimensions, AI logic, and user preferences. It is noteworthy that the system's capacity for accommodating changes transcends mere superficial adjustments; it stands as a testament to its robust design foundation that can pivot and evolve in response to varying needs and technological advancements. This adaptability diminishes the necessity for extensive redevelopment efforts, thereby enhancing efficiency and ensuring that valuable resources can be allocated judiciously, focusing on innovation and optimization rather than wholesale reconstruction. In essence, the systemic resilience and scalability embedded within the system's architecture not only ensure its relevance and longevity but also empower it to proactively embrace changes and advancements in its operational landscape, reinforcing its position as a dynamic and future-ready solution.

- *Portability*

Portability refers to the system's ability to be transferred and operated in different environments.

Table 22 Portability of the AI-Driven Multi-Dimensional Course Assessment and SHS Strand Recommendation System

Portability	Mean	Verbal Description
1. Adaptability. The AI-Driven Multi-Dimensional Course Assessment and SHS Strand Recommendation System can effectively and efficiently be adapted for different or evolving hardware, software or other operational or usage environments.	4.00	Highly Portable
2. Installability. The AI-Driven Multi-Dimensional Course Assessment and SHS Strand Recommendation System can be successfully installed and/or uninstalled in a specified environment.	4.00	Highly Portable
3. Replaceability. A component of the AI-Driven Multi-Dimensional Course Assessment and SHS Strand Recommendation System can be replaced by another software for the same purpose in the same environment.	4.00	Highly Portable
Overall Mean	4.00	Highly Portable

The findings from the study suggest that the system's adaptability allows for seamless integration into a multitude of institutional environments, requiring only minor configuration tweaks to align with specific requirements. This inherent flexibility serves to amplify the system's appeal and opens up fresh possibilities for widespread implementation within schools and other educational organizations. By minimizing the need for extensive adjustments, the system becomes more accessible and user-friendly, paving the way for enhanced usability and broader acceptance across diverse educational settings. Such versatility not only streamlines the deployment process but also underscores the system's capacity to cater to the diverse needs and preferences of different institutions, making it a versatile and attractive choice for a wide range of users. The ability to function effectively across various contexts and scenarios underscores the system's potential to revolutionize educational practices and significantly impact the way technology is utilized within the educational landscape. In essence, this adaptability not only enhances the system's reach and relevance but also highlights its transformative potential in shaping the future of educational technology integration, positioning it as a valuable asset for educational institutions seeking innovative solutions to enhance learning experiences.

- *Summary of Evaluation of IT Experts*

Table 23 shows the summary of evaluation made by the IT experts on the implemented system.

Table 23 Summary of the IT Experts' Evaluation of the AI-Driven Multi-Dimensional Course Assessment and SHS Strand Recommendation System

Software Product Quality Categories	Overall Mean	Verbal Description
1. Functional Suitability	3.90	Highly Functional Highly Efficient
2. Performance Efficiency	4.00	Highly Compatible Highly Usable Highly
3. Compatibility	3.93	Reliable Highly Secure Highly
4. Usability	3.96	Maintainable
5. Reliability	3.96	Highly Portable
6. Security	3.86	
7. Maintainability	4.00	
8. Portability	4.00	
Grand Mean	3.95	Excellent

Overall, the system received favorable evaluations across all ISO/IEC 25010 quality characteristics. The findings demonstrate that the AI-driven assessment system meets essential software quality standards and is suitable for use as an academic guidance support tool. The consistently positive ratings indicate that both users and IT experts perceived the system as reliable, efficient, and user-centered.

System acceptability was measured to determine the extent to which respondents were willing to use the system for SHS strand assessment and recommendation. The results indicate a high level of acceptability among respondents. Students expressed confidence in the system's recommendations, while IT experts acknowledged its practical value as a decision-support tool. The positive acceptability ratings suggest that the system has strong potential for integration into existing guidance services.

The results of the system evaluation indicate that integrating artificial intelligence into SHS strand assessment can enhance the objectivity and efficiency of academic guidance. The system's ability to analyze multiple student attributes and generate data-driven recommendations addresses key limitations of traditional guidance methods.

The positive evaluations across usability, performance, and reliability suggest that AI-driven tools can be implemented without

introducing unnecessary complexity for users. Furthermore, the system's alignment with ISO/IEC 25010 quality standards supports its technical viability and readiness for institutional deployment.

The findings of this study highlight the potential of AI-assisted assessment systems to support informed academic decision-making at the secondary education level. By providing structured, multidimensional evaluations, the system can assist guidance counselors in addressing strand–course mismatch and improving educational alignment.

For educational institutions, the system offers a scalable and adaptable solution that can complement existing guidance practices. For future researchers, the study provides a foundation for further exploration of AI applications in educational assessment and career guidance.

➤ *End-Users' Evaluation of the AI-Driven Multi-Dimensional Course Assessment and SHS Strand Recommendation System*

This section presents the evaluation results provided by system users regarding the quality and usability of the AI-Driven Multi-Dimensional Course Assessment and SHS Strand Recommendation System. The assessment focused on selected ISO/IEC 25010 quality characteristics applicable to end users, specifically functional suitability, performance efficiency, and usability. Responses were analyzed using weighted mean computation to determine the level of agreement with each evaluation criterion.

The system testing process required students to take the lead because they serve as the main recipients of the AI-driven assessment and recommendation process which *Figure 33 and 34* demonstrates. The evaluation procedure began with the presentation of the computation of raw scores using cluster competency in which the assessment dimension was grouped. Then the computation of weights based on the calculated distribution per cluster in every strand in which will determine the likelihood of the student's recommended strand.

After the presentation of the computation of raw scores, next is the student profile creation and application phase, during which students interacted directly with the system by inputting their information and responding to the multi-dimensional assessment. The system received student feedback which provided essential information about its navigation system and user interface and their overall experience with the system.

• *Functional Suitability*

This section presents the evaluation of the system's functional suitability as perceived by the system users, particularly the students and school staff who interacted directly with the platform. Functional suitability refers to the degree to which the system provides functions that meet the stated and implied needs of users when used under specified conditions. In this study, system users evaluated how well the AI-Driven Multi-Dimensional Course Assessment and SHS Strand Recommendation System performs its intended functions, including student registration, assessment completion, AI-driven evaluation, and report generation. The evaluation results reflect the users' perception of whether the system effectively delivers the required features for conducting multidimensional assessments and generating accurate strand recommendations.

Table 24 Evaluation on Functional Suitability by System Users

Functional Suitability	Mean	Verbal Description
1. Functional Completeness. The AI-Driven Multi-Dimensional Course Assessment and SHS Strand Recommendation System functions cover all the specified tasks and user objectives.	3.96	Highly Functional
2. Functional Correctness. The AI-Driven Multi-Dimensional Course Assessment and SHS Strand Recommendation System functions provides correct results with the needed degree of precision.	3.97	Highly Functional
3. Functional Appropriateness. The AI-Driven Multi-Dimensional Course Assessment and SHS Strand Recommendation System functions facilitate the accomplishment of specified tasks and objectives.	3.94	Highly Functional
Overall Mean	3.96	Highly Functional

System users conducted an evaluation to assess how effectively the system supported SHS strand assessment tasks and recommendation procedures. Users evaluated the system's ability to deliver accurate assessment results through the analysis of the computed weighted mean. Respondents reached a common agreement that the system features functioned effectively to identify students' academic strengths and connect them with suitable SHS strands. The collective agreement shows that primary users of the system believe it successfully achieves its main purpose while they maintain high user satisfaction and trust in its abilities. Users provided overall positive feedback about the system which performs well to support SHS strand assessment and recommendation procedures while demonstrating its effectiveness to users who need assistance with their academic planning and student development tasks.

- *Performance Efficiency*

This section discusses the evaluation of the system's performance efficiency based on the responses of system users. Performance efficiency refers to how well the system performs its functions while utilizing system resources effectively and maintaining acceptable response times. The system users assessed how quickly and smoothly the platform processes student assessments, computes raw scores, generates AI-based evaluations, and produces downloadable reports. Their evaluation provides insights into whether the system operates efficiently during real-time usage and whether it can handle assessment processes without delays or technical issues.

Table 25 Evaluation on Performance Efficiency by System Users

Performance Efficiency	Mean	Verbal Description
1. Time Behavior. The AI-Driven Multi-Dimensional Course Assessment and SHS Strand Recommendation System response and processing times and throughput rates of a product or system, when performing its functions, meet the requirements.	3.96	Highly Efficient
2. Resource Utilization. The AI-Driven Multi-Dimensional Course Assessment and SHS Strand Recommendation System when performing its functions meet the requirements.	3.97	Highly Efficient
3. Capacity. The AI-Driven Multi-Dimensional Course Assessment and SHS Strand Recommendation System can handle the maximum limits of the system parameter.	3.95	Highly Efficient
Overall Mean	3.96	Highly Efficient

The evaluation process assessed performance efficiency through system responsiveness testing and processing speed assessment which occurred during user assessment completion and report generation activities. The analysis showed that users experienced only minor delays when they used the system because it operated at a steady performance level throughout the entire testing period. The system functioned without interruptions while it processed complex multidimensional assessment data because AI-driven interpretation tools operated at full efficiency without harming system performance. The results indicate that the system can handle standard operational demands found in educational settings because it produces fast and dependable results while maintaining system usability for all users. The system demonstrates capabilities to fulfill school requirements because it has shown positive performance results and provides users with an effortless experience which makes it a useful tool for improving educational operations and boosting user contentment.

- *Usability*

This section focuses on the evaluation of the system's usability, which measures how easy and convenient the system is to learn, operate, and interact with. System users evaluated the clarity of the interface, the simplicity of navigation, and the overall user experience when completing the assessment and accessing evaluation results. The usability evaluation determines whether students and administrators can effectively use the system without difficulty, ensuring that the platform remains accessible, intuitive, and supportive of the assessment and recommendation process.

Table 26 Usability by System Users

Usability	Mean	Verbal Description
1. Appropriateness recognizability. The users can recognize that the developed AI-Driven Multi-Dimensional Course Assessment and SHS Strand Recommendation System is appropriate for their needs.	3.97	Highly Usable
2. Learnability. The AI-Driven Multi-Dimensional Course Assessment and SHS Strand Recommendation System can be used by specified users to achieve specified goals of learning to use the system with effectiveness, efficiency, freedom from risk, and satisfaction in a specified context of use.	3.96	Highly Usable
3. Operability. The AI-Driven Multi-Dimensional Course Assessment and SHS Strand Recommendation System has attributes that makes it easy to operate and control.	3.97	Highly Usable
4. User error protection. The AI-Driven Multi-Dimensional Course Assessment and SHS Strand Recommendation System protects users against making errors.	3.97	Highly Usable
Overall Mean	3.97	Highly Usable

The usability evaluation assessed multiple components of the interface which included testing its visual clarity and monitoring user progress through various sections and evaluating the complete user experience. The evaluation results showed a weighted mean which demonstrated that participants regarded the system's usability in a favorable manner. The respondents identified that the provided instructions contained straightforward content which they found easy to understand thereby enabling first-time system users to follow instructions without difficulty. The system design evaluation shows a major advantage because it enables students to operate the system without needing help from other people or technical support. System design evaluation results show that users can move between different system functions without difficulties which results in a satisfying user experience. The system design process used straightforwardness and user empowerment to create a system which enables students with different technical skills to use its functions without difficulty.

Table 27 Summary of Evaluation by System Users

Software Product Quality Categories	Overall Mean	Verbal Description
1. Functional Suitability	3.96	Highly Functional Highly Efficient Highly Usable
2. Performance Efficiency	3.96	
3. Usability	3.97	
Grand Mean	3.95	Excellent

In summary, system users provided positive evaluations across all assessed quality characteristics. The findings indicate that the AI-Driven Multi-Dimensional Course Assessment and SHS Strand Recommendation System is functional, efficient, and user-friendly. These results support the system's acceptability as a supplementary tool for SHS strand selection and academic guidance.

➤ *Level of Acceptability of the AI-Driven Multi-Dimensional Course Assessment and SHS Strand Recommendation System by the System Users*

The researcher used a common evaluation tool to assess the success of AI-Driven Multi-Dimensional Course Assessment and SHS Strand Recommendation System by testing its performance with IT professionals and system users. The assessment method enabled consistent system efficiency measurement across multiple user groups while delivering detailed insights into system operational capabilities.

The evaluation involved 111 participants who included 104 system users who were both students and school staff and 7 IT experts. The respondents received ten evaluative statements which assessed the system performance efficiency through its four (4) core functionalities that included (1) User Registration, (2) Assessment Dimensions (Questionnaires and clusters), (3) Raw score computation and AI-Driven Evaluation, and (4) Recommendation Reports. These functional areas represent the critical processes through which the system delivers its AI-driven assessment and recommendation services.

The responders evaluated the system speed together with its responsiveness and efficiency through its different functions which operated without any waiting times or heavy resource consumption. The results shown in Table 28 demonstrate that both IT experts and system users found the system to be highly acceptable. The system can operate efficiently in actual educational environments according to this finding which shows that it has reached the stage of deployment as an AI-driven tool for SHS strand and course assessment.

Table 28 Level of Acceptability of the Functionalities of the AI-Driven Multi-Dimensional Course Assessment and SHS Strand Recommendation System of System Users

Statements	Mean	Verbal Description
1. It allows students to register account online	4.00	Highly Acceptable
2. It allows registered students to access their account using their registered credentials	4.00	Highly Acceptable
3. It allows registered students to proceed to their assessment and evaluation upon logging in to the system	4.00	Highly Acceptable
4. After completing the assessment and evaluation an email of the evaluation report was sent to the registered email of the student	4.00	Highly Acceptable
5. It allows students to view the AI-driven rationale and recommendation	4.00	Highly Acceptable
6. It allows admin users to manage cluster, dimensions, and assessment questionnaires for student assessment and evaluation	4.00	Highly Acceptable
7. It allows admin users to create strands and strand weights for raw score computation	4.00	Highly Acceptable
8. It allows admin users to view student registration list and student profile	4.00	Highly Acceptable
9. It allows admin users to view the student's evaluation results and print evaluation report	4.00	Highly Acceptable
10. System dashboard automatically updates using live data of student assessment and evaluation	4.00	Highly Acceptable
Overall Mean	4.00	Highly Acceptable

The evaluation results show that the developed AI-Driven Multi-Dimensional Course Assessment and SHS Strand Recommendation System achieved high effectiveness and acceptability ratings from both IT experts and system users. The system received an overall mean score of 3.95 from IT experts and 4.00 from system users which leads to a Highly Acceptable rating under the ISO/IEC 25010 software quality framework. The findings of this research back up earlier studies which Chapter 1 discussed about artificial intelligence becoming more important in educational decision support systems. Research has shown that educational institutions face a common challenge which occurs when students select academic tracks that do not match their actual abilities because they use inadequate assessment methods and traditional guidance techniques. Studies conducted by the Commission on Higher Education show that career-strand mismatches lead to negative academic outcomes which decrease future employability. The present system addresses this issue by providing a multidimensional AI-based evaluation that objectively analyzes students' competencies and recommends appropriate SHS strands.

The high evaluation scores stem from multiple system features which match the requirements of contemporary AI-powered recommendation systems. First, the system integrates a 30-dimension assessment model that evaluates cognitive skills, literacy and communication competencies, technical aptitude, and personality-interest indicators. The AI algorithm achieved better preciseness through this multidimensional framework because it created personalized recommendations which traditional assessment tools could not deliver. The system implemented Explainable Artificial Intelligence (XAI) principles which generated evaluation report rationales and competency profiles through transparent explanation methods. The system enabled users to better understand its recommendations through transparent explanations which increased their trust in the system, resulting in higher usability rates and user acceptance of the system.

The assessed ISO 25010 quality traits showed multiple criteria which achieved outstanding performance results. The system achieved high ratings for functional suitability and usability because it delivered all necessary features which students needed to complete registration and assessments through AI-powered evaluation and report generation while offering both students and administrators a user-friendly interface. The system achieved high performance efficiency because it processed extensive assessment data while producing recommendations with very short waiting periods. The educational institution evaluation system can operate at real-time because its system design supports continuous evaluation processes.

The evaluation criteria received excellent ratings but the system showed lower performance in compatibility and portability which creates possibilities for future enhancements. The system operates on different devices and platforms yet needs extra work to achieve better cross-platform support and cloud deployment capabilities which will make it easier to access and expand its use. The school system will benefit from better maintenance capabilities and better integration with other school information systems because these two factors will help schools maintain their systems and adopt them for longer periods. The study results suggest that future system development should focus on three main areas which are system scalability through cloud infrastructure implementation and AI recommendation model development with labor market data and academic performance analytics and institutional information system integration enhancement. The system improvements will enhance technical system capabilities while the platform will maintain its ability to support educational decisions through data analysis which will help students avoid academic-career mismatches.

The current research demonstrates positive results because previous studies confirm that AI-based recommendation systems and career development platforms bring educational benefits. Research by Holmes Bialik and Fadel 2019 demonstrated that artificial intelligence enhances educational decision-making through its ability to deliver personalized guidance and data-based information and flexible learner support systems. The research results demonstrated that AI systems deliver their greatest value when they help students decide on their academic paths instead of substituting for human decision-making abilities. The current study demonstrates that an AI-assisted assessment system functions as an effective support tool which assists students with their SHS strand selection process.

Luckin, Holmes, Griffiths, and Forcier (2016) discovered that artificial intelligence in educational settings creates personalized learning experiences through its capability to analyze student information and produce customized learning recommendations according to student requirements, abilities, and learning developments. Their study showed that intelligent systems can transform unprocessed student data into useful educational recommendations because the current system uses multiple student data types to recommend appropriate academic pathways.

The research conducted by Ricci, Rokach, and Shapira in 2015 showed that recommendation systems become more effective when they deliver relevant personalized evidence-based recommendations to users. The research results prove that AI-driven systems successfully match student capabilities and preferences with suitable SHS strands by using structured recommendation systems.

Shneiderman and his colleagues established in their 2018 research that systems which provide users with intuitive interfaces together with clear navigation and understandable system outputs achieve higher user acceptance rates. The developed system received positive user feedback because usability functions as an essential element for achieving educational technology success.

The research by Sidek et al. (2023) discovered that students continue to experience problems with strand-course mismatches because many students change their academic programs after making incorrect strand selections combined with lacking career guidance. The results of their research demonstrate the necessity for the current study to implement systems which will decrease mismatches through their use of objective data-based recommendations.

The existing studies provide support for the current research results because they demonstrate that AI-based educational recommendation systems enhance personalized learning and better decision-making and improved product usability and student achievement across different academic fields.

CHAPTER FOUR

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

The chapter presents the summary of results, conclusions and recommendations of the developed AI-Driven Multi-Dimensional Course Assessment and SHS Strand Recommendation System.

A. Summary of Findings

This study employed developmental research design using Agile Software Development Methodology to develop and implement the AI-Driven Multi-Dimensional Course Assessment and SHS Strand Recommendation System in a cloud-based server setup. It underwent four (4) phases: project initialization, system development, system implementation, and system evaluation.

B. Conclusions

➤ Development of the AI-Driven Multi-Dimensional Course Assessment and SHS Strand Recommendation System

This section presents a brief overview of how the AI-Driven Multi-Dimensional Course Assessment and SHS Strand Recommendation System was developed. It summarizes the process undertaken by the researchers in designing and implementing the system using an Agile-based approach integrated with the Input–Process–Output framework. The development focuses on creating an intelligent assessment platform capable of analyzing student competencies and generating appropriate strand recommendations.

• Project Initialization Phase

The development of the AI-Driven Multi-Dimensional Course Assessment and SHS Strand Recommendation System begins with identifying the strand–course mismatch problem and defining the overall project objectives. During this phase, stakeholder consultations, needs assessment, and feasibility analysis are conducted to determine system scope and constraints. A product backlog is created, outlining initial features such as questionnaire modules, AI-driven evaluation, scoring computation, and reporting functions. The project timeline, sprint planning structure, and resource allocation are also established in preparation for iterative Agile development.

• Work Package Development Stages

The work packages development stages show the different stages followed in the creation of the system. It outlines the systematic progression of activities including requirements analysis, system design, development, testing, deployment, and release. These stages demonstrate how the project was organized and implemented in iterative cycles to ensure the functionality, reliability, and continuous improvement of the system.

✓ Requirements

In this stage, functional and non-functional requirements are gathered through user stories and stakeholder input. Functional requirements include user registration, multidimensional questionnaires, raw score computation, AI-based strand mapping, and report generation. Non-functional requirements address usability, performance efficiency, security, compatibility, reliability, and maintainability. These requirements are documented and prioritized in the Agile product backlog.

✓ Design

The design phase establishes the system architecture, database schema, and workflow structure using the Input–Process–Output model. Database normalization (1NF, 2NF, and 3NF) is applied to ensure data integrity and eliminate redundancy. Interface wireframes, process flow diagrams, and scoring logic models are created. The weighted raw score formula and strand-weight mapping framework are also designed to ensure accurate and fair AI-driven recommendations.

✓ Development

During development, system modules are coded incrementally in sprint cycles. The questionnaire clusters, scoring computation engine, AI evaluation logic, and reporting modules are implemented and integrated. Frontend and backend components are connected to the database, and role-based access for students and administrators is configured. Continuous integration is applied to ensure smooth module interaction.

✓ Development

Testing includes unit testing of individual components, integration testing of interconnected modules, and user acceptance testing with IT experts and students. Identified errors, bugs, or inconsistencies are corrected in succeeding sprints. Performance testing, security validation, and compatibility checks are conducted to ensure compliance with ISO/IEC 25010 quality standards.

✓ Deployment

In the deployment phase, the system is configured in a secure web-based hosting environment. Database connectivity, user authentication, and cross-browser compatibility are verified. Final system validation is conducted to ensure readiness for operational

use within the institution.

✓ *Release*

The release phase involves pilot implementation and formal rollout to end-users. Feedback from students and administrators is collected for further refinement. Following Agile principles, continuous monitoring and iterative enhancement are performed to improve functionality, usability, and overall system performance.

➤ *IT Experts evaluation of the AI-Driven Multi-Dimensional Course Assessment and SHS Strand Recommendation System*

This section provides an introduction to the evaluation of the system conducted by IT experts using the ISO/IEC 25010 software quality model. The evaluation focuses on determining the technical quality of the developed system in terms of functional suitability, performance efficiency, compatibility, usability, reliability, security, maintainability, and portability. The results of this evaluation serve as an important basis for determining whether the system meets established software quality standards.

- *Functional Suitability*

The system obtained a mean score of 3.90, interpreted as Very Acceptable. IT experts confirmed that the system accurately performs multidimensional score computation, AI-driven strand mapping, and report generation. The features were evaluated as complete, appropriate, and capable of delivering correct recommendations.

- *Performance Efficiency*

The system received a mean score of 4.00, interpreted as Highly Efficient. Experts observed that the assessment processing and AI evaluation produce results promptly with efficient resource utilization and minimal response delay.

- *Compatibility*

The system obtained a mean score of 3.93, interpreted as Highly Compatible. the system demonstrated effective functionality across various browsers and devices. It also integrates properly with database and hosting environments without technical conflicts.

- *Usability*

The usability criterion obtained a mean score of 3.96, interpreted as Highly Usable. IT experts noted that the interface is intuitive, well-organized, and easy to navigate, allowing users to complete tasks efficiently.

- *Reliability*

The system achieved a mean score of 3.96, interpreted as Highly Reliable. Experts confirmed stable performance, consistent output generation, and minimal system errors during testing.

- *Security*

Security received a mean score of 3.86, interpreted as Highly Secured. IT experts verified that authentication mechanisms, access controls, and data protection measures effectively safeguard user information and assessment results.

- *Maintainability*

The maintainability criterion obtained a mean score of 4.00, interpreted as Highly Maintainable. The modular architecture and structured coding practices allow for easier system updates and future enhancements.

- *Portability*

Portability received a mean score of 4.00, interpreted as Highly Portable. Experts confirmed that the system can be deployed and configured in different institutional environments with minimal adjustments.

➤ *System-User's evaluation of the AI-Driven Multi-Dimensional Course Assessment and SHS Strand Recommendation System*

This section introduces the evaluation conducted by system users, which includes students and school staff who interacted with the system. Their evaluation focuses on selected ISO/IEC 25010 quality characteristics such as functional suitability, performance efficiency, and usability. The feedback from system users provides valuable insights regarding the effectiveness, accessibility, and overall user experience of the implemented AI-driven assessment and recommendation system.

- *Functional Suitability*

The system obtained a mean score of 3.96, Highly Functional. System-users confirmed that the platform provides the necessary features for multidimensional assessment and strand recommendation. They found the questionnaire structure, AI-generated outputs, and report details relevant and appropriate to their needs.

- *Performance Efficiency*

The system received a mean score of 3.97, Highly Efficient. Users observed that the system processes responses quickly and generates recommendations without noticeable delays. The smooth loading time and fast report generation contributed to a positive

user experience.

- *Usability*

The usability criterion obtained a mean score of 3.95, Highly Usable. System-users reported that the interface is clear, easy to understand, and simple to navigate. Instructions were comprehensible, and the assessment flow allowed them to complete the process without confusion.

➤ *Level of Acceptability of the AI-Driven Multi-Dimensional Course Assessment and SHS Strand Recommendation System*

The overall level of acceptability of the AI-Driven Multi-Dimensional Course Assessment and SHS Strand Recommendation System obtained a grand mean score of 4.00, interpreted as Highly Acceptable across all evaluated categories. This indicates that end-users strongly approved the system's functionality, structure, and overall performance. The result reflects consistent satisfaction across the four core modules of the system.

In terms of the Student Registration Module, users rated the system highly for providing a secure, simple, and efficient account creation and login process. The authentication mechanism and credential validation were perceived as reliable, enabling students to access the platform smoothly without technical barriers. This confirms that the system successfully establishes a secure entry point while maintaining user convenience.

Regarding the Assessment Dimensions and Cluster Management Module, the high acceptability score indicates that students found the 30-dimension questionnaire comprehensive, relevant, and logically organized. The clustering of dimensions into Cognitive Skills, Literacy and Communication Skills, Technical and Practical Aptitude, and Personality and Interest Indicators was perceived as meaningful and reflective of their actual competencies. This suggests that the multidimensional framework effectively captures diverse learner characteristics necessary for strand alignment.

For the Raw Score Computation and AI-Driven Evaluation Module, the mean score demonstrates strong user confidence in the fairness and preciseness of the scoring process. Students recognized that the weighted computation and AI interpretation produced recommendations aligned with their abilities and interests. The transparency of the evaluation and clarity of the rationale contributed to user trust in the system's decision-support capability.

Finally, the Reports Generation Module was rated highly acceptable, as users found the evaluation reports clear, organized, and informative. The presentation of strand recommendations, competency summaries, and explanatory insights was considered helpful for academic decision-making. The ability to access and review structured outputs enhanced the perceived usefulness of the system.

The study succeeded in creating the AI-Driven Multi-Dimensional Course Assessment and SHS Strand Recommendation System which combines Explainable Artificial Intelligence (XAI) with a 30-dimension assessment model through an Input–Process–Output (IPO) framework that Agile Software Development Methodology supports. The system was designed to assist Grade 10 students in identifying the most suitable Senior High School (SHS) strand by analyzing their cognitive skills, communication abilities, technical aptitude, personality traits, and interests. The system developed clear and understandable recommendations through its combination of structured scoring algorithms and AI-based interpretation which used competency profiles and explanatory reports as evidence.

The evaluation results confirmed the effectiveness and technical quality of the developed system. IT experts evaluated the system based on the ISO/IEC 25010 software quality model which resulted in an overall weighted mean score of 3.95 that showed high software performance across essential quality features such as functional suitability and performance efficiency and compatibility and usability and reliability and security and maintainability and portability. The system users which included students and school staff gave the platform an overall mean score of 4.00 which researchers interpreted as Highly Acceptable. The system shows its ability to conduct necessary assessment and recommendation processes while delivering a straightforward user experience and maintaining effective system operations.

The study revealed multiple system limitations which impeded progress despite achieving positive results. The recommendation model depends on student assessment questionnaire answers which lead to output results that depend on how well students reply through their honesty and understanding and self-awareness. The system currently needs to enhance its recommendation process by including additional factors which include long-term academic performance records and socioeconomic influences and real-time labor market data. The system contains deployment restrictions which limit its operational capabilities. The application functions as a web-based platform which needs users to have stable internet connections and suitable devices to achieve its best performance.

The system may face operational difficulties because schools in remote regions lack proper internet infrastructure. The current system functions solely for one educational institution which needs modifications before it can operate in multiple school environments. The study assesses system scalability issues because they affect research outcomes. The system operates effectively

in its current environment but needs additional server capacity and database optimization and cloud deployment resources to support increased student access and multiple educational institution usage.

The study confirms that recommendation results can be affected by biased factors. The recommendation algorithm uses predefined weights that map assessment dimensions to SHS strands. The weights were developed from curriculum frameworks and competency requirements yet they still contain design process assumptions. The system serves as a decision-support tool which should not be used to determine a student's academic pathway.

C. Recommendations

Based on the findings and conclusions of the study, several recommendations are proposed to further improve the effectiveness, sustainability, and broader adoption of the AI-Driven Multi-Dimensional Course Assessment and SHS Strand Recommendation System.

- Future enhancements should address the identified system limitations by expanding the scope of data used in the evaluation process. While the current system relies primarily on responses from the 30-dimension assessment tool, incorporating additional variables such as academic performance records, aptitude test results, and extracurricular achievements may improve the preciseness and depth of the recommendations. Integrating labor market information and emerging industry trends may also help align recommended strands with future career opportunities.
- Improvements should be made to address deployment constraints, particularly in educational environments with limited technological resources. Since the system operates as a web-based application, its effectiveness depends on reliable internet connectivity and device compatibility. Schools implementing the system should ensure adequate infrastructure to support its operation. Developers may also consider optimizing the application for low-bandwidth environments or developing offline data capture mechanisms that synchronize once connectivity becomes available.
- The scalability of the system should be strengthened to support larger user populations and institutional adoption across multiple schools. Deploying the platform on a cloud-based server infrastructure would allow the system to handle higher volumes of concurrent users, improve data storage capacity, and ensure system reliability. Cloud deployment would also support easier maintenance, automated backups, and improved security management.
- It is recommended that the system incorporate an OpenAI On-the-Go subscription or similar AI service integration to support continuous AI-powered evaluation and narrative report generation. Utilizing a reliable AI service subscription would ensure that the system maintains consistent access to advanced natural language processing capabilities for generating explainable evaluation reports. This would also allow the system to scale its AI processing capacity as the number of users increases while ensuring that recommendations remain clear, interpretable, and responsive to student inputs.
- Developers and researchers should continue to monitor and address potential bias in recommendation results. Since the recommendation algorithm uses predefined weights that map assessment dimensions to specific SHS strands, these weights should be periodically reviewed and updated with the assistance of education experts and guidance counselors. Future system versions may also incorporate adaptive learning algorithms that refine recommendations based on accumulated student outcomes and feedback.
- Finally, educational institutions should use the system as a decision-support tool rather than a sole determinant of student academic pathways. Guidance counselors and educators should interpret the AI-generated recommendations alongside their professional judgment and knowledge of each student's circumstances. By combining human expertise with AI-assisted insights, the system can contribute to more informed decision-making, reduce strand-course mismatches, and support students in selecting academic pathways that align with their competencies and long-term career goals.

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APPENDICES

APPENDIX A

Data Gathering Instrument

[Date]

Dear Respondents:

Greeting in the name of our Lord.

I am conducting a research study for the AI-DRIVEN MULTI-DIMENSIONAL COURSE ASSESSMENT AND SHS STRAND RECOMMENDATION SYSTEM as a course requirement for the degree of Master of Science in Information Technology at the Nueva Ecija University of Science and Technology.

This evaluation aims to obtain objective, expert-driven insights that will guide the refinement and enhancement of the system before full implementation. Your professional assessment will strengthen the system's technical integrity, improve user experience, and ensure that the platform remains robust, secure, and aligned with the needs of students, educators, and stakeholders.

Thank you for contributing your time, knowledge, and technical proficiency. Your participation plays a crucial role in advancing a reliable, innovative, and high-impact educational tool for future users.

Very truly yours,

John Kirby B. Espanto

APPENDIX B**Evaluation for the AI-Driven Multi-Dimensional Course Assessment and SHS Strand Recommendation System****Part I. (System Evaluation Form for IT Experts)**

Name (Optional): _____

Position: _____

Please evaluate the software quality and functionality of the AI-DRIVEN MULTI-DIMENSIONAL COURSE ASSESSMENT AND SHS STRAND RECOMMENDATION SYSTEM based on the eight main characteristics of ISO 25010 Software Product Quality Standards. Place a check mark (✓) in the appropriate box using the four-point scale with its corresponding verbal descriptions.

➤ *Functional Suitability.*

Functional Suitability – represents the degree to which the AI-DRIVEN MULTI-DIMENSIONAL COURSE ASSESSMENT AND SHS STRAND RECOMMENDATION SYSTEM provides functions that meet stated and implied needs when used under specified conditions.

Rating	Verbal Interpretation	Descriptors
4	Highly Functional	Efficiently meets all the stated and implied needs; and no weaknesses are found
3	Functional	Satisfactorily meets all the stated and implied needs but acceptable / tolerable weaknesses are found which will however not affect its function
2	Needs Improvement	Meets only some of the stated and implied needs and minor weaknesses are found that will slightly affect its function
1	Poor	Meets very few stated and implied needs; and major weaknesses are found that will greatly affect its function

SOFTWARE PRODUCT QUALITY	4	3	2	1
Functional Completeness. The system functions cover all the specified tasks and user objectives.				
Functional Correctness. The system functions and provides correct results with the needed degree of precision.				
Functional Appropriateness. The system functions facilitate the accomplishment of specified tasks and objectives.				

➤ *Performance Efficiency*

Performance Efficiency – represents the performance relative to the number of resources used under stated conditions.

Rating	Verbal Interpretation	Descriptors
4	Highly Efficient	Efficiently performs all the stated and implied needs relative to the number of resources without any flaws
3	Efficient	Satisfactorily performs all the stated and implied needs relative to the number of resources used but tolerable flaws are found which will however not affect system's overall performance
2	Needs Improvement	Poorly performs the stated and implied needs relative to the number of resources used and major flaws are found that will greatly affect its performance
1	Poor	Does not perform the stated and implied needs relative to the number of resources used. Thus, restructuring is needed

SOFTWARE PRODUCT QUALITY	4	3	2	1
Time Behavior. The system response and processing times and throughput rates of a product or system, when performing its functions, meet the requirements.				
Resource Utilization. The amount and type of resources used by the system when performing its functions meet the requirements.				
Capacity. The System can handle the maximum limits of the system parameter.				

➤ *Compatibility*

Compatibility – refers to the degree to which the AI-DRIVEN MULTI-DIMENSIONAL COURSE ASSESSMENT AND SHS STRAND RECOMMENDATION SYSTEM or component can exchange information with other systems or components, and/or perform its required functions while sharing the same hardware or software environment.

Rating	Verbal Interpretation	Descriptors
4	Highly Compatible	Efficiently meets the required function while sharing the same hardware and software environment. It can exchange information with other systems with no inadequacies at all.
3	Compatible	Satisfactorily meets the required function while sharing the same hardware and software environment. It can exchange information with other systems but tolerable inadequacies are found which will not in any way affect the system's over-all compatibility.
2	Needs Improvement	Poorly performs the required function while sharing the same hardware and software environment. It can exchange information with other systems but major inadequacies are found that will greatly affect its compatibility.
1	Poor	Does not meet the required function while sharing the same hardware and software environment. It cannot exchange information with other systems thus restructuring is needed.

SOFTWARE PRODUCT QUALITY	4	3	2	1
Co-existence. The system can perform its required functions efficiently while sharing a common environment and resources with other systems, without detrimental impact to any other system.				
Interoperability. The system can exchange information with two or more systems and use the information that has been exchanged.				

➤ *Usability*

Usability – refers to the degree to which the AI-DRIVEN MULTI-DIMENSIONAL COURSE ASSESSMENT AND SHS STRAND RECOMMENDATION SYSTEM can be used by specified users to achieve specified goals with effectiveness, efficiency, and satisfaction in a specified context of use.

Rating	Verbal Interpretation	Descriptors
4	Highly Usable	Provides a user interface that is easy to operate and control such that the users can effortlessly perform their appropriate needs even without guide or supervision
3	Usable	Provides a user interface that is easy to operate and control such that the users can easily perform their appropriate needs with minimal guide or supervision
2	Needs Improvement	Provides a user interface that is slightly difficult to operate and control such that the users cannot easily perform their appropriate needs
1	Poor	Provides a user interface that is difficult to operate and control such that it is difficult for the users to perform their appropriate needs at all. Thus, restructuring is required for the system

SOFTWARE PRODUCT QUALITY	4	3	2	1
Appropriateness recognizability. The users can recognize that the developed system is appropriate for their needs.				
Learnability. The system can be used by specified users to achieve specified goals of learning to use the system with effectiveness, efficiency, freedom from risk, and satisfaction in a specified context of use.				
Operability. The strand Recommendation System has attributes that makes it easy to operate and control.				
User error protection. system protects users against making errors.				

➤ *Reliability*

Reliability – refers to the degree to which the AI-DRIVEN MULTI-DIMENSIONAL COURSE ASSESSMENT AND SHS STRAND RECOMMENDATION SYSTEM performs specified functions under specified conditions for a specified period.

Rating	Verbal Interpretation	Descriptors
4	Highly Reliable	Efficiently performs its functions without failure under specified conditions and period with no flaws at all.
3	Reliable	Satisfactorily performs its functions without failure under specified conditions and period with minimal flaws which will not in any way affect

		application's over-all reliability.
2	Needs Improvement	Performs only some its functions without failure under specified conditions and period with major flaws which will affect the application's over-all reliability.
1	Poor	Cannot perform any of its functions without failure under specified conditions and period, thus restructuring is required.

SOFTWARE PRODUCT QUALITY	4	3	2	1
Maturity. The system meets the needs for reliability under normal operation.				
Availability. The system is operational and accessible when required for use.				
Fault tolerance. The system operates as intended despite the presence of hardware or software faults.				
Recoverability. The system can recover the data that is directly affected and can reestablish the desired state of the system in the event of an interruption or a failure.				

➤ *Security*

Security – refers to the degree to which the AI-DRIVEN MULTI-DIMENSIONAL COURSE ASSESSMENT AND SHS STRAND RECOMMENDATION SYSTEM protects information and data so that persons or other products or systems have the degree of data access appropriate to their types and levels of authorization.

Rating	Verbal Interpretation	Descriptors
4	Highly Secured	Efficiently protects information and data with no weaknesses at all
3	Secured	Satisfactorily protects information and data with minimal weaknesses which will not in any way affect the system's overall security
2	Needs Improvement	Protects only some of its information and data with major weaknesses which will affect the system's over-all security
1	Poor	Cannot protect any information and data, thus restructuring is required

SOFTWARE PRODUCT QUALITY	4	3	2	1
Confidentiality. The system ensures that data are accessible only to those authorized to have access.				
Integrity. The system prevents unauthorized access to, or modification of, computer program or data.				
Accountability. The system can trace the actions of an end-user uniquely to his/her accountability				

➤ *Maintainability*

Maintainability- represents the degree of effectiveness and efficiency with which the AI-DRIVEN MULTI-DIMENSIONAL COURSE ASSESSMENT AND SHS STRAND RECOMMENDATION SYSTEM can be modified to improve it, correct it, or adapt it to changes in environment, and in requirements.

Rating	Verbal Interpretation	Descriptors
4	Highly Maintainable	Efficiently retains its original form and can be restored to that form in case of failure, with no weaknesses at all
3	Maintainable	Satisfactorily retains its original form and be restored to that form in case of failure; with minimal weaknesses, which however, will not affect its overall maintainability
2	Needs Improvement	Retains and restores only some of its original features in case of failure; with moderate weaknesses which may affect its over-all maintainability
1	Poor	Cannot retain and restore its original form in case of failure, thus restructuring is required

SOFTWARE PRODUCT QUALITY	4	3	2	1
Modularity. The system is composed of distinct components such that a change to one component has minimal impact on other components.				
Reusability. The system's asset can be used in more than one system, or in building other assets.				
Analyzability. It is possible to assess the impact of the system to an intended change to one or more of its parts, or to diagnose the system for deficiencies or causes of failures, or to identify parts to be modified.				
Modifiability. The system can be effectively and efficiently modified without introducing defects or degrading existing product quality.				

➤ *Portability*

Portability-refers to the degree of effectiveness and efficiency with which the AI-DRIVEN MULTI-DIMENSIONAL COURSE ASSESSMENT AND SHS STRAND RECOMMENDATION SYSTEM can be transferred from one hardware, software or other operational or usage environment to another.

Rating	Verbal Interpretation	Descriptors
4	Highly Portable	Efficiently adapts to changes in environment and can be installed / uninstalled in specified environment, with no weaknesses at all
3	Portable	Satisfactorily adapts to changes in environment and can be installed / uninstalled in specified environment, with minimal weaknesses, which however, will not affect its overall portability
2	Needs Improvement	Barely adapts to changes in environment and can be installed / uninstalled in specified environment with moderate weaknesses which may affect its over-all portability
1	Poor	Cannot adapt to changes in environment and cannot be installed / uninstalled in specified environment.

SOFTWARE PRODUCT QUALITY	4	3	2	1
Adaptability. The system can effectively and efficiently be adapted for different or evolving hardware, software or other operational or usage environments.				
Installability. The system can be successfully installed and/or uninstalled in a specified environment.				
Replaceability. A component of the system can be replaced by another software for the same purpose in the same environment.				

Comments/Suggestions:

Your participation and contribution are greatly appreciated. Thank you and God Bless!

APPENDIX C**EVALUATION FOR THE AI-DRIVEN MULTI-DIMENSIONAL COURSE ASSESSMENT AND SHS STRAND RECOMMENDATION SYSTEM****Part II. (System Evaluation Form for Users)**

Name (Optional): _____

Position: _____

Please evaluate the software quality of the AI-DRIVEN MULTI-DIMENSIONAL COURSE ASSESSMENT AND SHS STRAND RECOMMENDATION SYSTEM based on the eight main characteristics of ISO 25010 Software Product Quality Standards. Place a check mark (✓) in the appropriate box using the four-point scale with its corresponding verbal descriptions.

➤ *Functional Suitability*

Functional Suitability – represents the degree to which the AI-DRIVEN MULTI-DIMENSIONAL COURSE ASSESSMENT AND SHS STRAND RECOMMENDATION SYSTEM provides functions that meet stated and implied needs when used under specified conditions.

Rating	Verbal Interpretation	Descriptors
4	Highly Functional	Efficiently meets all the stated and implied needs; and no weaknesses are found
3	Functional	Satisfactorily meets all the stated and implied needs but acceptable / tolerable weaknesses are found which will however not affect its function
2	Needs Improvement	Meets only some of the stated and implied needs and minor weaknesses are found that will slightly affect its function
1	Poor	Meets very few stated and implied needs; and major weaknesses are found that will greatly affect its function

SOFTWARE PRODUCT QUALITY	4	3	2	1
Functional Completeness. The system covers all the specified tasks and user objectives.				
Functional Correctness. The system functions and provides correct results with the needed degree of precision.				
Functional Appropriateness. The system functions facilitate the accomplishment of specified tasks and objectives.				

➤ *Performance Efficiency*

Performance Efficiency – represents the performance relative to the number of resources used under stated conditions.

Rating	Verbal Interpretation	Descriptors
4	Highly Efficient	Efficiently performs all the stated and implied needs relative to the number of resources without any flaws
3	Efficient	Satisfactorily performs all the stated and implied needs relative to the number of resources used but tolerable flaws are found which will however not affect system's over-all performance
2	Needs Improvement	Poorly performs the stated and implied needs relative to the number of resources used and major flaws are found that will greatly affect its performance
1	Poor	Does not perform the stated and implied needs relative to the number of resources used. Thus, restructuring is needed

SOFTWARE PRODUCT QUALITY	4	3	2	1
Time Behavior. The system response and processing times and throughput rates of a product or system, when performing its functions, meet the requirements.				
Resource Utilization. The amount and type of resources used by the system when performing its functions meet the requirements.				
Capacity. The system can handle the maximum limits of the system parameter.				

➤ *Usability*

Usability – refers to the degree to which the AI-DRIVEN MULTI-DIMENSIONAL COURSE ASSESSMENT AND SHS STRAND RECOMMENDATION SYSTEM can be used by specified users to achieve specified goals with effectiveness, efficiency, and satisfaction in a specified context of use.

Rating	Verbal Interpretation	Descriptors
4	Highly Usable	Provides a user interface that is easy to operate and control such that the users can effortlessly perform their appropriate needs even without guide or supervision
3	Usable	Provides a user interface that is easy to operate and control such that the users can easily perform their appropriate needs with minimal guide or supervision
2	Needs Improvement	Provides a user interface that is slightly difficult to operate and control such that the users cannot easily perform their appropriate needs
1	Poor	Provides a user interface that is difficult to operate and control such that it is difficult for the users to perform their appropriate needs at all. Thus, restructuring is required for the system

SOFTWARE PRODUCT QUALITY	4	3	2	1
Appropriateness recognizability. The users can recognize that the developed system is appropriate for their needs.				
Learnability. The system can be used by specified users to achieve specified goals of learning to use the system with effectiveness, efficiency, freedom from risk, and satisfaction in a specified context of use.				
Operability. The system has attributes that makes it easy to operate and control.				
User error protection. The system protects users against making errors.				

➤ *Level of Effectiveness*

LEVEL OF EFFECTIVENESS OF FUNCTIONALITIES AI-DRIVEN MULTI-DIMENSIONAL COURSE ASSESSMENT AND SHS STRAND RECOMMENDATION SYSTEM The level of effectiveness of the functionalities of the AI-DRIVEN MULTI-DIMENSIONAL COURSE ASSESSMENT AND SHS STRAND RECOMMENDATION SYSTEM should be assessed based on the three (3) features of the ISO 25010 Product Quality Standards namely functional suitability, efficiency of performance, and usability. Using the four-point scale with its accompanying verbal explanations, select and place a check mark (✓) in the appropriate box.

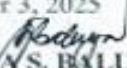
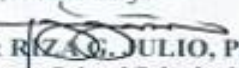
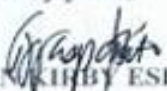
Rating	Verbal Interpretation	Descriptors
4	Very Effective	The implementation is very clear in detail and procedure with regards to specific functionalities per defined user of the system
3	Effective	The implementation is clear in detail and procedure with regards to specific functionalities per defined user of the system
2	Moderately Effective	The implementation is broadly defined, is missing some necessary details.
1	Not at All	The implementation is missing and incomplete.

STATEMENTS	4	3	2	1
1. It allows students to register account online				
2. It allows registered students to access their account using their registered credentials				
3. It allows registered students to proceed to their assessment and evaluation upon logging in to the system				
4. After completing the assessment and evaluation an email of the evaluation report was sent to the registered email of the student				
5. It allows students to view the AI-driven rationale and recommendation				
6. It allows admin users to manage cluster, dimensions, and assessment questionnaires for student assessment and evaluation				
7. It allows admin users to create strands and strand weights for raw score computation				
8. It allows admin users to view student registration list and student profile				
9. It allows admin users to view the student's evaluation results and print evaluation report				
10. System dashboard automatically updates using live data of student assessment and evaluation				

Comments/Suggestions:

Your participation and contribution are greatly appreciated. Thank you and God Bless!

APPENDIX D**APPROVAL LETTER**

	Republic of the Philippines NUEVA ECIIA UNIVERSITY OF SCIENCE AND TECHNOLOGY Cabanatuan City, Nueva Ecija, Philippines ISO 9001:2015 CERTIFIED
GRADUATE SCHOOL	
JOHN KIRBY ESPANTO Nueva Ecija University of Science and Technology Gen. Tinio St, Cabanatuan City, Nueva Ecija johnkirby.espanto@deped.gov.ph	
September 3, 2025	
 BENILDA S. BALUYAN, PhD School Principal IV Rizal National High School Rizal, Nueva Ecija	
 Thru: RIZAL Q. JULIO, PhD Assistant School Principal II Rizal National High School Rizal, Nueva Ecija	
Subject: Request to Conduct Thesis Writing Activity	
Dear Dr. Baluyan and Dr. Julio:	
Greetings of respect and goodwill.	
I am writing to formally request permission to conduct my thesis with a proposed title "AI-Driven College Course Assessment and Evaluation System of Incoming SHS" at Rizal National High School for school year 2025-26. This undertaking is an essential requirement in connection with my ongoing Master's Degree program (MSIT) at the Nueva Ecija University of Science and Technology (NEUST).	
The conduct of this thesis activity will be carried out in accordance with the school's policies and guidelines, as well as ethical research standards that shall include data gathering and face-to-face interview with school staff and students, specifically the grade 10 students and the SHS department. All necessary measures will be taken to ensure minimal disruption to regular classes and to protect the confidentiality and welfare of the participants, in compliance with the Data Privacy Act of 2012 (RA 10173). I assure you that the results of this academic activity will be used solely for academic purposes.	
I humbly seek your favorable consideration of this request, and I am prepared to provide any additional documentation or requirements you may require.	
Thank you very much for your time, understanding, and support in the pursuit of academic advancement.	
Respectfully yours,	
 JOHN KIRBY ESPANTO Student	

APPENDIX E

Republic of the Philippines

NUEVA ECIJA UNIVERSITY OF SCIENCE AND TECHNOLOGY

Cabanatuan City, Nueva Ecija

GRADUATE SCHOOL**CERTIFICATE OF UTILIZATION**

This is to certify that **NUEVA ECIJA UNIVERSITY OF SCIENCE AND TECHNOLOGY** located at **BRGY. SUMACAB ESTE, CABANATUAN CITY** has adopted and utilized the result of the research study or project entitled **AI-DRIVEN MULTI-DIMENSIONAL COURSE ASSESSMENT AND SHS STRAND RECOMMENDATION SYSTEM** developed by **JOHN KIRBY B. ESPANTO and ROLAIDA L. SONZA, DIT** from Nueva Ecija University of Science and Technology, Cabanatuan City. Below are some of the details pertaining to the utilized project/product.

PROJECT

Research Title: **AI-Driven Multi-Dimensional Course Assessment and SHS Strand Recommendation System**

Project Description/Abstract: Senior High School (SHS) students often face challenges in selecting the most appropriate academic strand due to limited assessment tools and the continued reliance on traditional guidance practices. These methods frequently lack objectivity and comprehensive evaluation, resulting in mismatches between students' competencies, interests, and their chosen academic pathways. Such misalignment may affect students' academic performance, educational direction, and future career readiness.

This study aimed to develop an AI-Driven Multi-Dimensional Course Assessment and SHS Strand Recommendation System designed to objectively evaluate student competencies and generate strand recommendations that align with learners' abilities, interests, and career potential. The system intends to support students, teachers, and guidance personnel by providing data-driven insights that can assist in making informed academic decisions. The research employed a quantitative-descriptive design integrated with Explainable Artificial Intelligence (XAI). The system was developed using an Input-Process-Output (IPO) conceptual framework combined with Agile Software Development Methodology, enabling iterative system improvement and structured data processing. The platform utilizes a 30-dimension assessment model measuring cognitive skills, literacy and communication abilities, technical aptitude, and personality-interest indicators. Student responses are processed through a structured scoring model and analyzed using an AI-powered evaluation module to generate strand recommendations, competency profiles, and career-related insights, which are presented in a downloadable evaluation report.

The results are presented in a comprehensive evaluation report that users can download and use for academic guidance and decision-making. Evaluation results showed strong system performance and user acceptance. Based on the ISO/IEC 25010 software quality model, IT experts gave the system an overall mean score of 3.95, indicating a high level of software quality and functionality. System users rated the platform with an overall mean score of 4.00, interpreted as Highly Acceptable, reflecting positive user experience and effectiveness. This finding clearly demonstrates that the system can provide data-driven guidance in SHS strand selection, reduce academic-career mismatches, and support better educational alignment and long-term career readiness among students.

Proponent/s: **JOHN KIRBY B. ESPANTO and ROLAIDA L. SONZA, DIT**

RECIPIENT

Institution/Company/Community Name: **NUEVA ECIJA UNIVERSITY OF SCIENCE AND TECHNOLOGY**

Name of Representative: **MARY CLAIRE CALURA**

Position:

Address:

Contact Number:

Email or website:

Given this 07 day of April, 2026 here at Brgy. Sumacab Este, Cabanatuan City

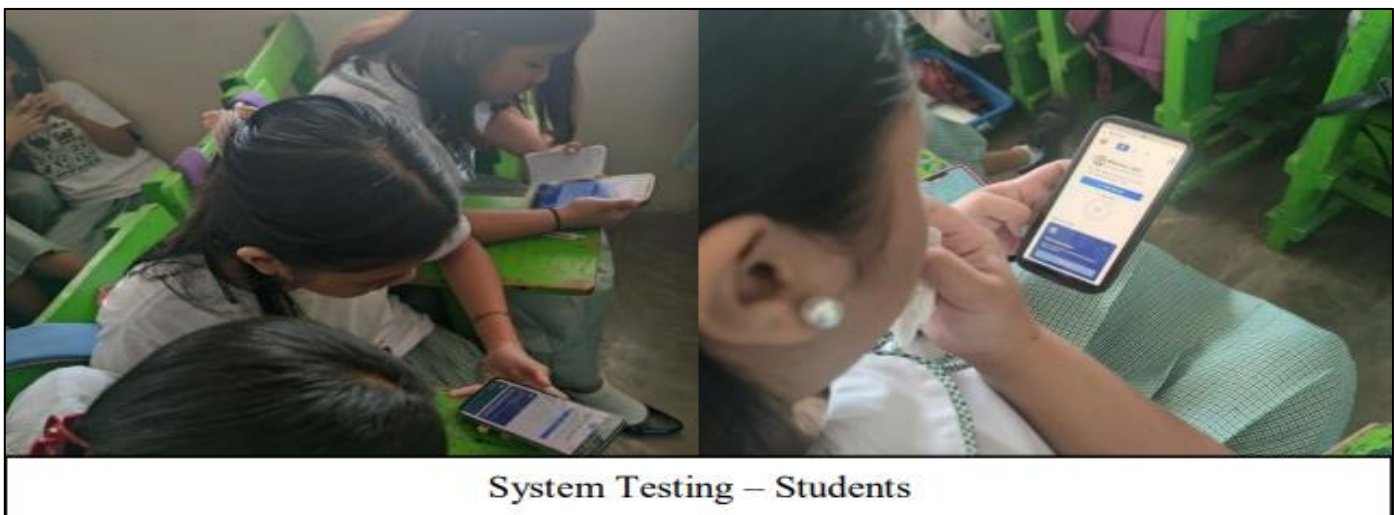
Signed by:

MARY CLAIRE CALURA

University Guidance Counselor

APPENDIX F

EVIDENCE OF DATA GATHERING





System Evaluation – Students



System Testing and Evaluation – IT Expert

APPENDIX G

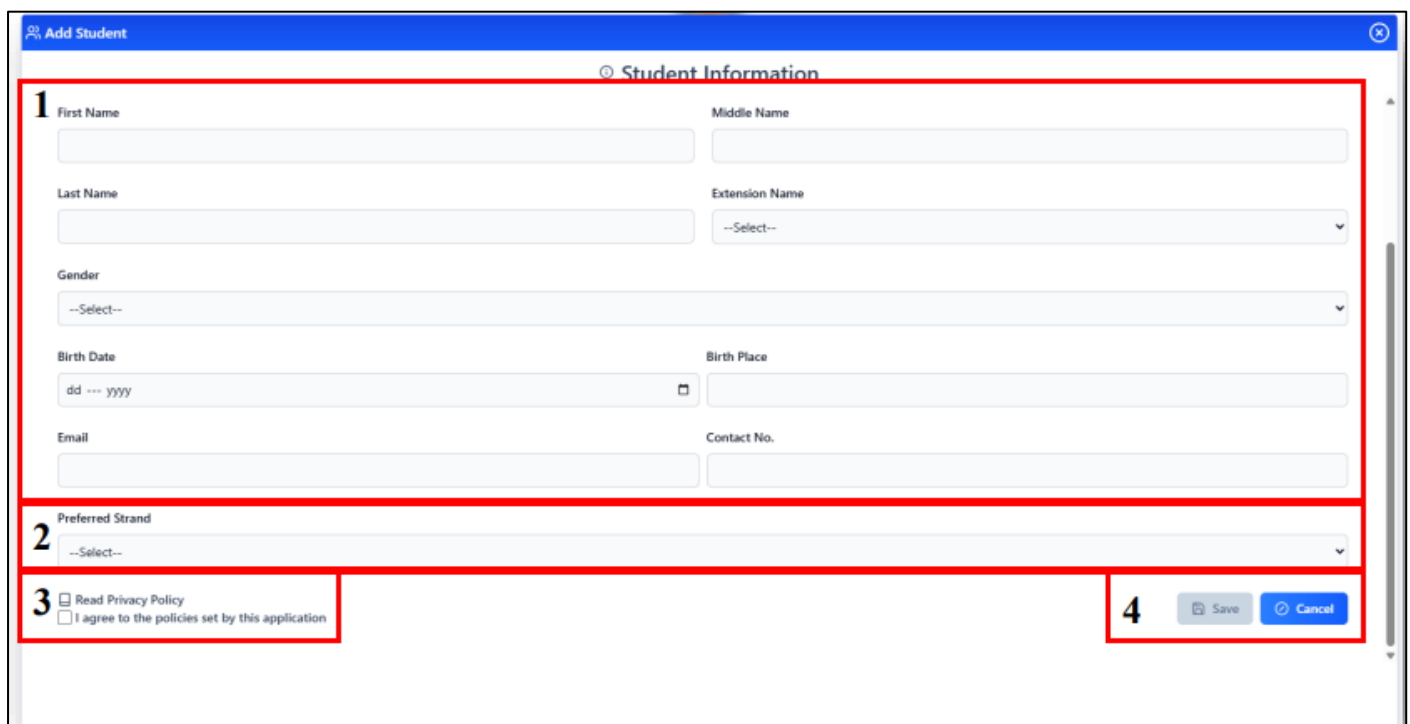
USER MANUAL

➤ Student Registration/Log In



The image shows a 'Sign in to your account' form. At the top is a circular logo with a gear and a book. Below the title are two input fields: 'Username' and 'Password'. To the right of the password field is a link that says 'Forgot password?'. Below these fields is a dark blue 'Sign in' button. At the bottom, there is a red-bordered box containing the text 'No Account? Register here'.

Step 1. Click Register here.



The image shows a 'Add Student' form with a blue header bar. The form is titled 'Student Information'. It contains several input fields and dropdown menus, numbered 1 through 4. 1. First Name, Middle Name, Last Name, Extension Name (dropdown), Gender (dropdown), Birth Date (calendar icon), Birth Place, Email, Contact No. 2. Preferred Strand (dropdown). 3. Two checkboxes: 'Read Privacy Policy' and 'I agree to the policies set by this application'. 4. 'Save' and 'Cancel' buttons.

Step 1. Fill up information details.

Step 2. Select Preferred Strand.

Step 3. Click the Checkbox (Read the policy first)

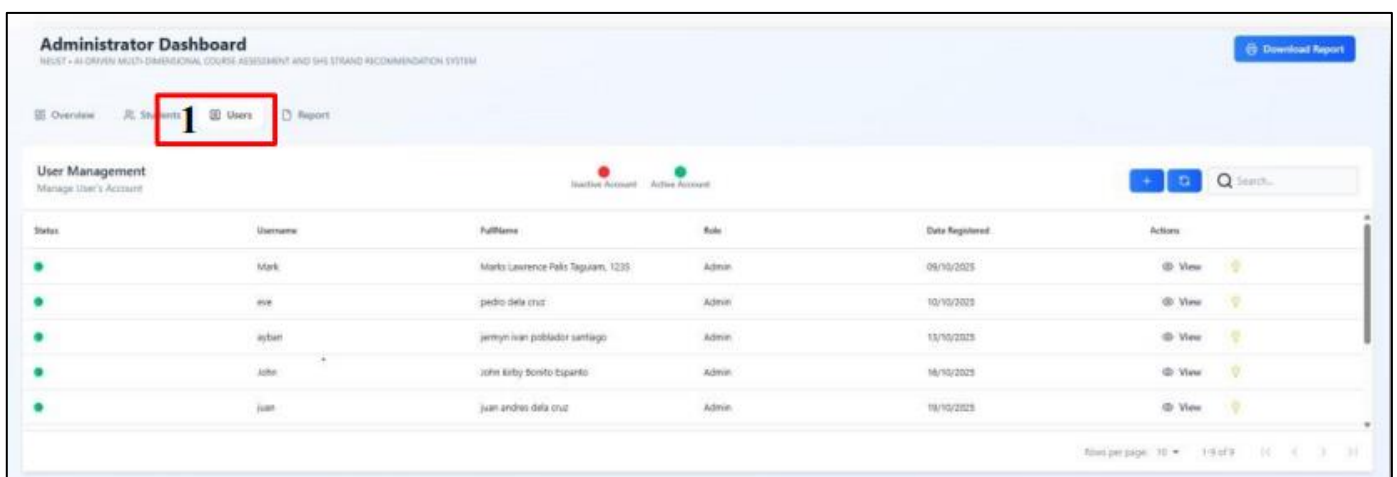
Step 4. Click Save.



The image shows a sign-in form with a university logo at the top. The form has two input fields: 'Username' and 'Password'. Below the password field is a 'Forgot password?' link. At the bottom of the form is a 'Sign in' button, which is highlighted with a red rectangle.

Step 1. Once registered, enter username and password then click Sign In.

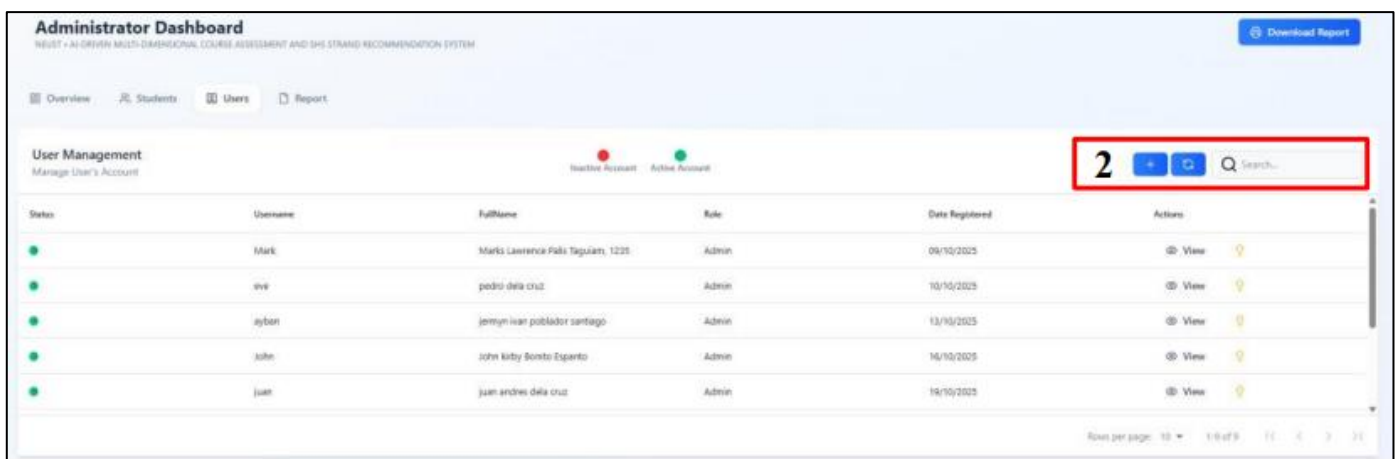
➤ Create User (Admin User)



The image shows the 'Administrator Dashboard' with the 'Users' tab selected. The 'Users' tab is highlighted with a red rectangle and a red '1'. Below the tab, there is a 'User Management' section with a table of users. The table has columns for Status, Username, FullName, Role, Date Registered, and Actions. The table contains five rows of user data.

Status	Username	FullName	Role	Date Registered	Actions
Active	Mark	Mark Lawrence Palko Taguian, 1235	Admin	09/10/2025	View
Active	ave	pedro dela cruz	Admin	10/10/2025	View
Active	aybar	jermyn ivan poblador santiago	Admin	13/10/2025	View
Active	john	john kirby Bonito Espanto	Admin	16/10/2025	View
Active	juan	juan andres dela cruz	Admin	19/10/2025	View

Step 1. On the Administrator Dashboard, click the Users tab.



The image shows the 'Administrator Dashboard' with the 'Users' tab selected. The 'Add' button (a blue circle with a plus sign) is highlighted with a red rectangle and a red '2'. Below the button, there is a 'User Management' section with a table of users. The table has columns for Status, Username, FullName, Role, Date Registered, and Actions. The table contains five rows of user data.

Status	Username	FullName	Role	Date Registered	Actions
Active	Mark	Mark Lawrence Palko Taguian, 1235	Admin	09/10/2025	View
Active	ave	pedro dela cruz	Admin	10/10/2025	View
Active	aybar	jermyn ivan poblador santiago	Admin	13/10/2025	View
Active	john	john kirby Bonito Espanto	Admin	16/10/2025	View
Active	juan	juan andres dela cruz	Admin	19/10/2025	View

Step 2. Click the Add icon to proceed.

3

Administrative User

User Credentials Basic Information Address and Contacts

Username

Password

Nick Name

Role

--Select--

Administrative User

User Credentials Basic Information Address and Contacts

First Name Middle Name

Last Name Extension Name

Gender

--Select--

Birth Date Birth Place

dd -- yyyy

Administrative User

User Credentials Basic Information Address and Contacts

Region

--Select--

Province

--Select--

City

--Select--

Barangay Street

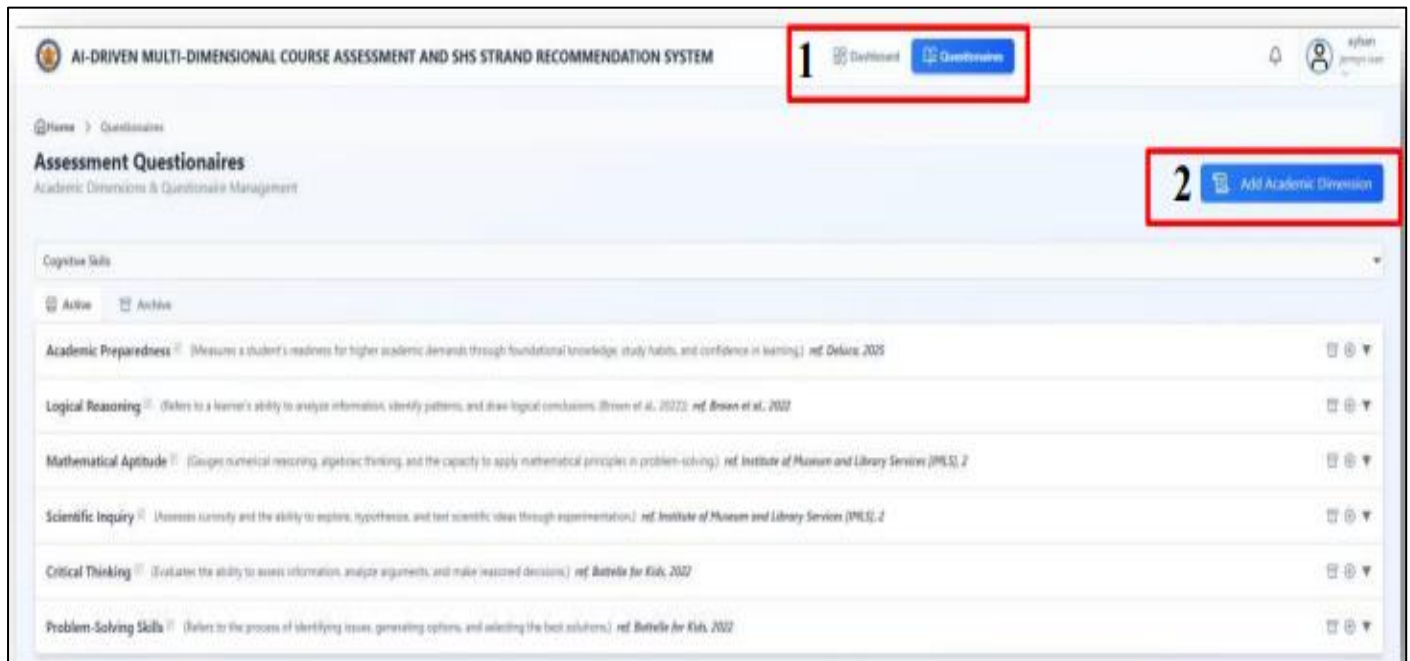
--Select--

Email Contact No.

4

Save Cancel

Step 3. Fill up the information, navigate the tabs using the left/right arrows.
Step 4. Click Save.

➤ *Manage Dimension*

Step 1. On the Administrator Dashboard, click the Questionnaire tab.

Step 2. Click Add Academic Dimension

Step 3. Select Cluster.

Step 4. Fill in details.

Step 5. Click Save.

➤ *Manage Questionnaire (Main)*

Assessment Questionnaires
Academic Dimensions & Questionnaire Management

Cognitive Skills

Active | Archive

Academic Preparedness ⓘ (Measures a student's readiness for higher academic demands through foundational knowledge, study habits, and confidence in learning.) ref: DeLoux, 2025	
Logical Reasoning ⓘ (Refers to a learner's ability to analyze information, identify patterns, and draw logical conclusions.) (Brown et al., 2022) ref: Brown et al., 2022	
Mathematical Aptitude ⓘ (Gauges numerical reasoning, algebraic thinking, and the capacity to apply mathematical principles in problem-solving.) ref: Institute of Museum and Library Services (IMLS), 2	
Scientific Inquiry ⓘ (Assesses curiosity and the ability to explore, hypothesize, and test scientific ideas through experimentation.) ref: Institute of Museum and Library Services (IMLS), 2	
Critical Thinking ⓘ (Evaluates the ability to assess information, analyze arguments, and make reasoned decisions.) ref: Battelle for Kids, 2022	
Problem-Solving Skills ⓘ (Refers to the process of identifying issues, generating options, and selecting the best solution(s).) ref: Battelle for Kids, 2022	

Step 1. Select the Dimension, then click the Add icon.

Add Questionnaire

Questionnaire

Question

2

Score Range	Interpretation	Evaluation
5	Outstanding	
4	Strong	
3	Moderate	
2	Needs Development	
1	Weakness	

3

4

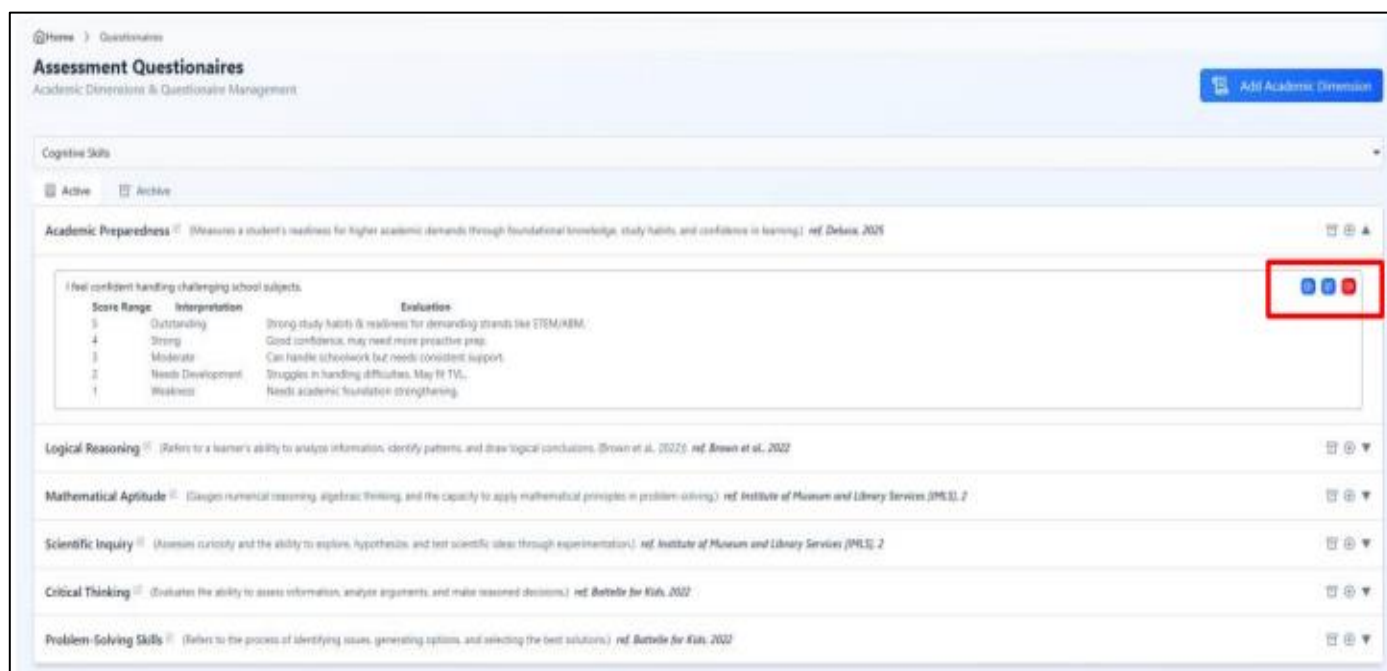
Save Cancel

Step 2. Fill in the question.

Step 3. Add evaluation details for each score range.

Step 4. Click Save.

➤ Adding Sub-level Question

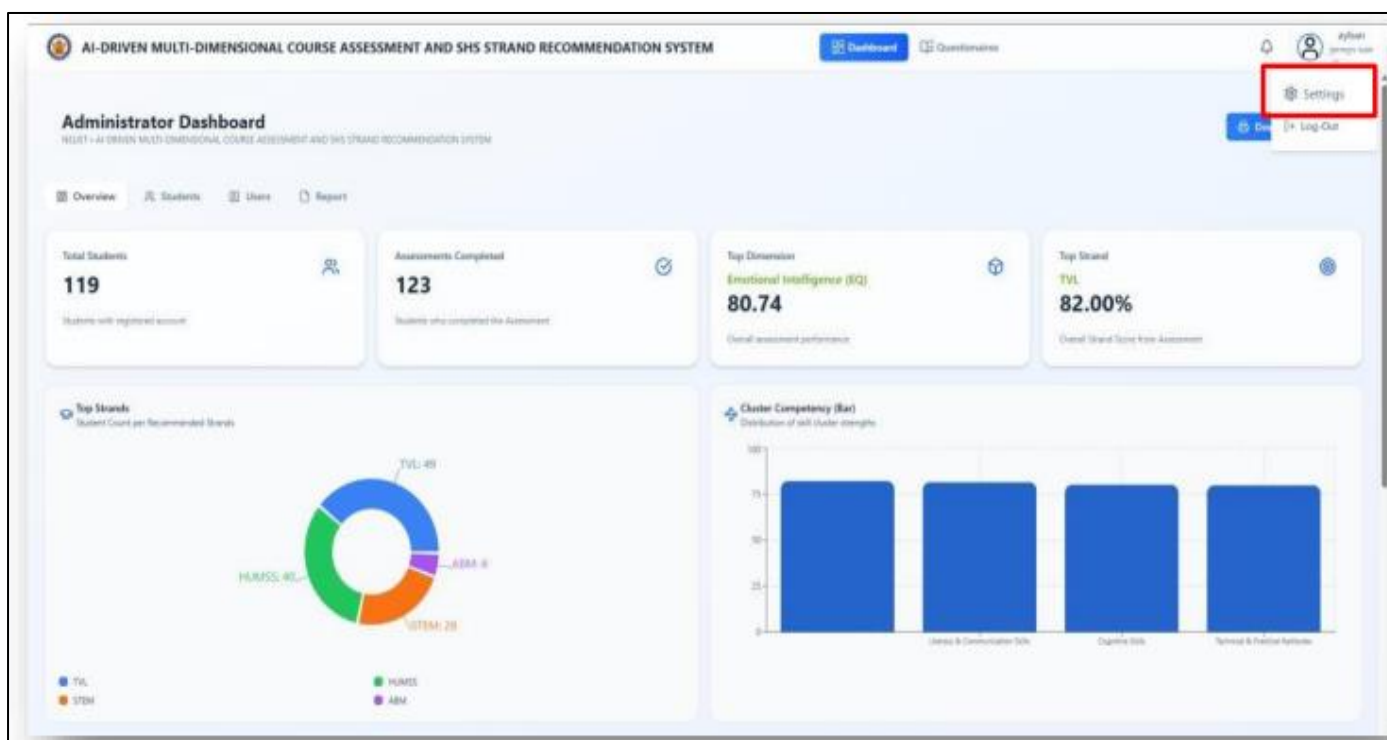


Step 1. Click the Add icon.

Note. Follow the steps indicated in adding for the main question.

➤ Settings Management

Managing Clusters



Step 1. On the top-right corner, click the profile and click Settings.



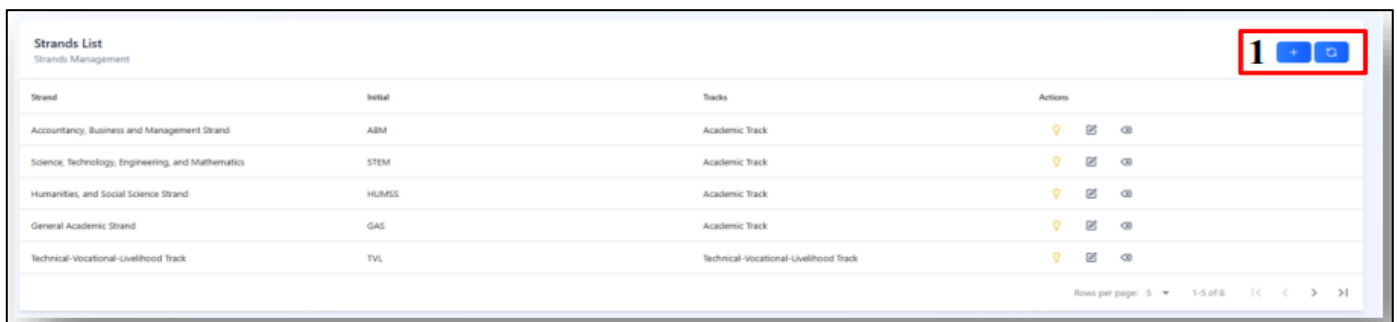
Step 2. On the Cluster List, click the Add icon.

Step 3. Fill in details, then click Save.



Note: A – to set Cluster Active/Inactive, B – to edit Cluster, C – to delete Cluster.

➤ Managing Strands



Step 1. On the Strand List, click the Add icon.

Add Strands

Strands

Initial:

Track:

Competency	ABM	STEM	HUMSS	GAS	TVL	Actions
Cognitive Skills	0.30	0.40	0.20	0.25	0.20	Edit
Literacy & Communication Skills	0.20	0.15	0.40	0.30	0.15	Edit
Personality & Interest Indicators	0.30	0.25	0.30	0.30	0.25	Edit
Technical & Practical Aptitudes	0.20	0.20	0.10	0.15	0.40	Edit

Rows per page: 10 1-4 of 4

Step 2. Fill in details.
Step 3. Select Track.
Step 4. Click Save.

Strand	Initial	Tracks	Actions
Accountancy, Business and Management Strand	ABM	Academic Track	A B C
Science, Technology, Engineering, and Mathematics	STEM	Academic Track	A B C
Humanities, and Social Science Strand	HUMSS	Academic Track	A B C
General Academic Strand	GAS	Academic Track	A B C
Technical-Vocational-Livelihood Track	TVL	Technical-Vocational-Livelihood Track	A B C

1-5 of 5

Note: A – to set Strand Active/Inactive, B – to edit Strand, C – to delete Strand.

➤ Managing Weights

Competency	ABM	STEM	HUMSS	GAS	TVL	Actions
Cognitive Skills	0.30	0.40	0.20	0.25	0.20	Edit
Literacy & Communication Skills	0.20	0.15	0.40	0.30	0.15	Edit
Personality & Interest Indicators	0.30	0.25	0.30	0.30	0.25	Edit
Technical & Practical Aptitudes	0.20	0.20	0.10	0.15	0.40	Edit

Rows per page: 10 1-4 of 4

Step 1. Click Edit button to set parallel weight distribution.

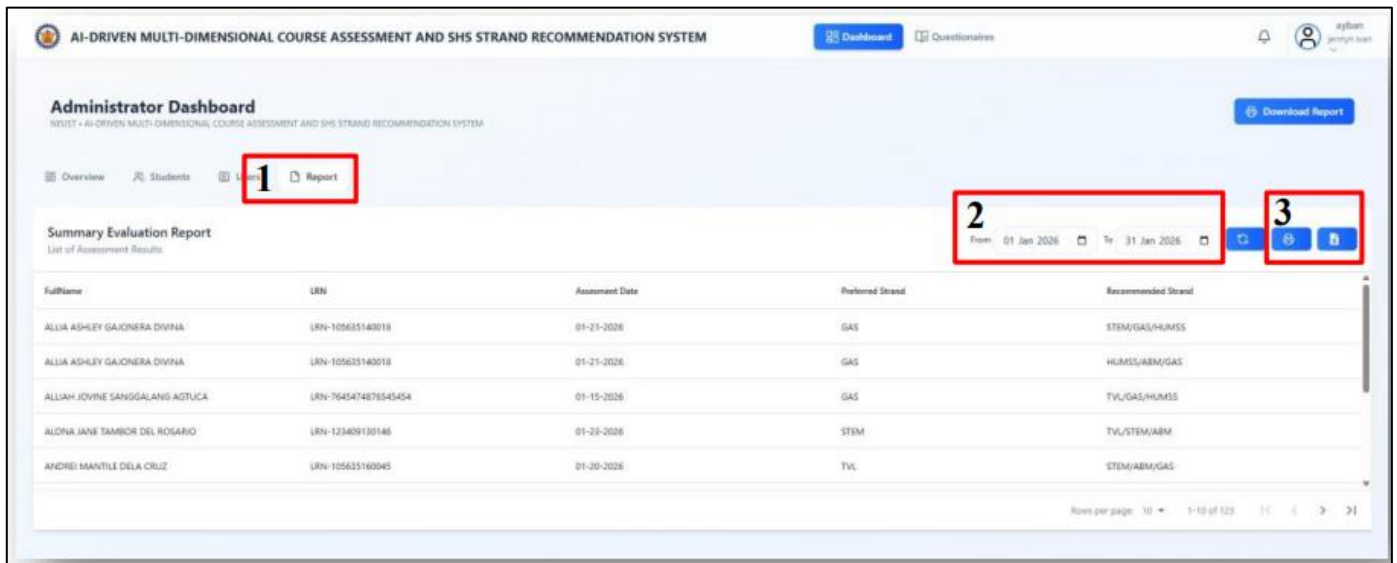
Competency	ABM	STEM	HUMSS	GAS	TVL	Actions
Cognitive Skills	0.3	0.4	0.2	0.25	0.2	Save Cancel
Literacy & Communication Skills	0.20	0.15	0.40	0.30	0.15	Edit
Personality & Interest Indicators	0.30	0.25	0.30	0.30	0.25	Edit
Technical & Practical Aptitudes	0.20	0.20	0.10	0.15	0.40	Edit

Rows per page: 10 1-4 of 4

Step 2. Set weights per cluster selected, then click Save.

Note: Created Clusters are symmetrical to Weights Distribution.

➤ *Manage Report*



Administrator Dashboard

Summary Evaluation Report

Full Name	URN	Assessment Date	Preferred Strand	Recommended Strand
ALLIA ASHLEY GAIONERA DIVINA	URN-105635140018	01-21-2026	GAS	STEM/GAS/HUMSS
ALLIA ASHLEY GAIONERA DIVINA	URN-105635140018	01-21-2026	GAS	HUMSS/ABM/GAS
ALLIAH JOVINE SANGALANG ASTUCA	URN-7645474878545454	01-15-2026	GAS	TVL/GAS/HUMSS
ALONA JANE TAMBOR DEL ROSARIO	URN-123409130146	01-23-2026	STEM	TVL/STEM/ABM
ANDREI MANTILE DELA CRUZ	URN-105635160045	01-20-2026	TVL	STEM/ABM/GAS

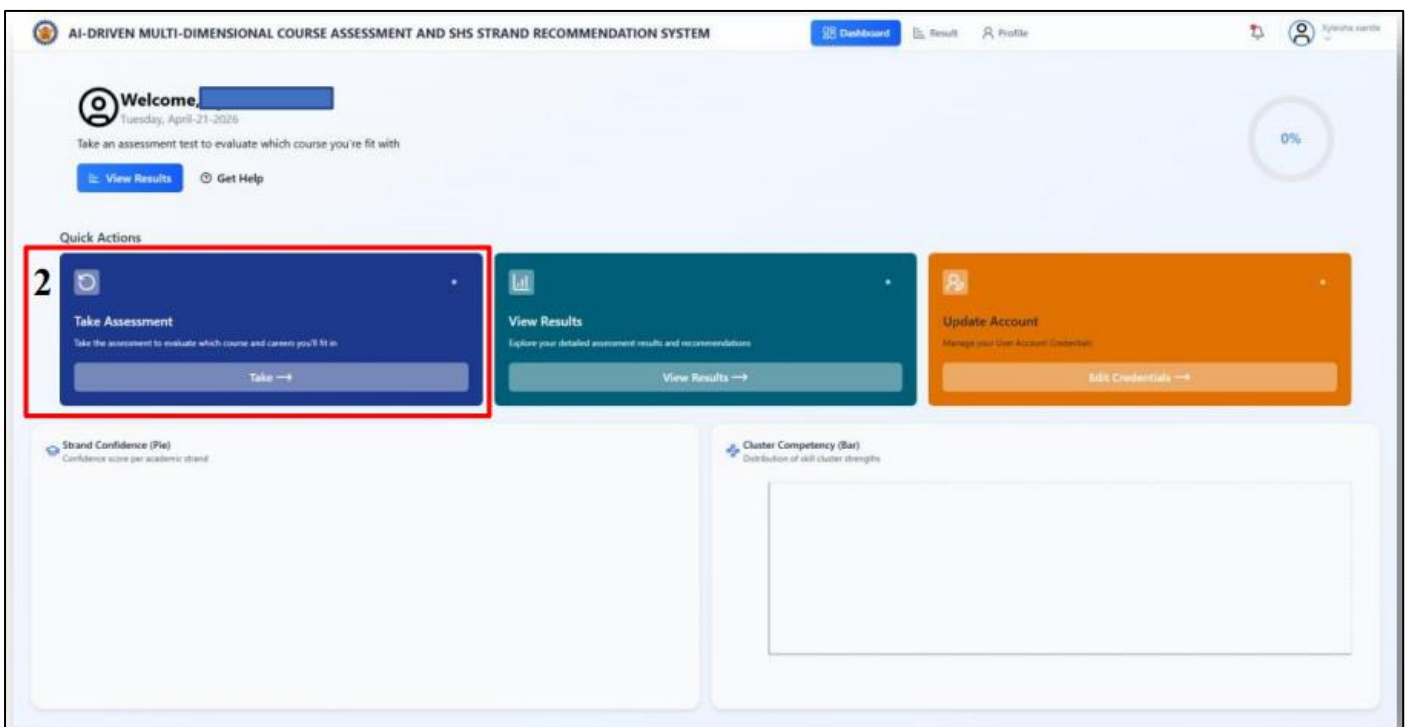
Step 1. On the Administrator Dashboard, click the Report tab.

Step 2. Set Date (From – To)

Step 3. Once date coverage is set, select either print in PDF or export data in Excel.

➤ *Student Assessment*

Step 1. Log-in.



Welcome

Quick Actions

2 Take Assessment

Take the assessment to evaluate which course and career you're fit in

Take →

View Results

Explore your detailed assessment results and recommendations

View Results →

Update Account

Manage your User Account Credentials

Edit Credentials →

Step 2. On dashboard, click Take Assessment.

Assessment Form

Current: Academic Preparedness 50.00% Save Exit

Assessment Overview

Progress: 1.67%

1 Completed 59 Remaining

Time Left: 15 min

Assessment Dimensions

- Academic Preparedness 2 questions
- Skills Alignment 2 questions
- Logical Reasoning 2 questions
- Mathematical Aptitude 2 questions
- Scientific Inquiry 2 questions

3 I feel confident handling challenging school subjects.

- ☒ Strong study habits & readiness for demanding strands like STEM/ABM. Outstanding
- ☐ Good confidence, may need more proactive prep. Strong
- ☐ Can handle schoolwork but needs consistent support. Moderate
- ☐ Struggles in handling difficulties. May fit TVL. Needs Development
- ☐ Needs academic foundation strengthening. Weakness

Auto-Save

4 Next >

Step 3. Select answer.

Step 4. Click Next to proceed to the next question.

Note: Progress will be automatically saved at 50%.

Assessment Form

Current: Well-Being & Stress Management 100.00% Save Exit

Assessment Overview

Progress: 100.00%

60 Completed 0 Remaining

Time Left: 15 min

Assessment Dimensions

- Academic Preparedness 2 questions
- Skills Alignment 2 questions
- Logical Reasoning 2 questions
- Mathematical Aptitude 2 questions
- Scientific Inquiry 2 questions

Do you also use positive strategies (like time management or mindfulness) to stay healthy during stressful times?

- ☒ Manages stress very well, always balances life, consistently applies healthy strategies. Outstanding
- ☐ Usually balanced, uses healthy coping most of the time. Strong
- ☐ Sometimes balanced, uses strategies inconsistently. Moderate
- ☐ Often stressed, weak coping strategies. Needs Development
- ☐ Always stressed, unhealthy or no coping, imbalance across areas. Weakness

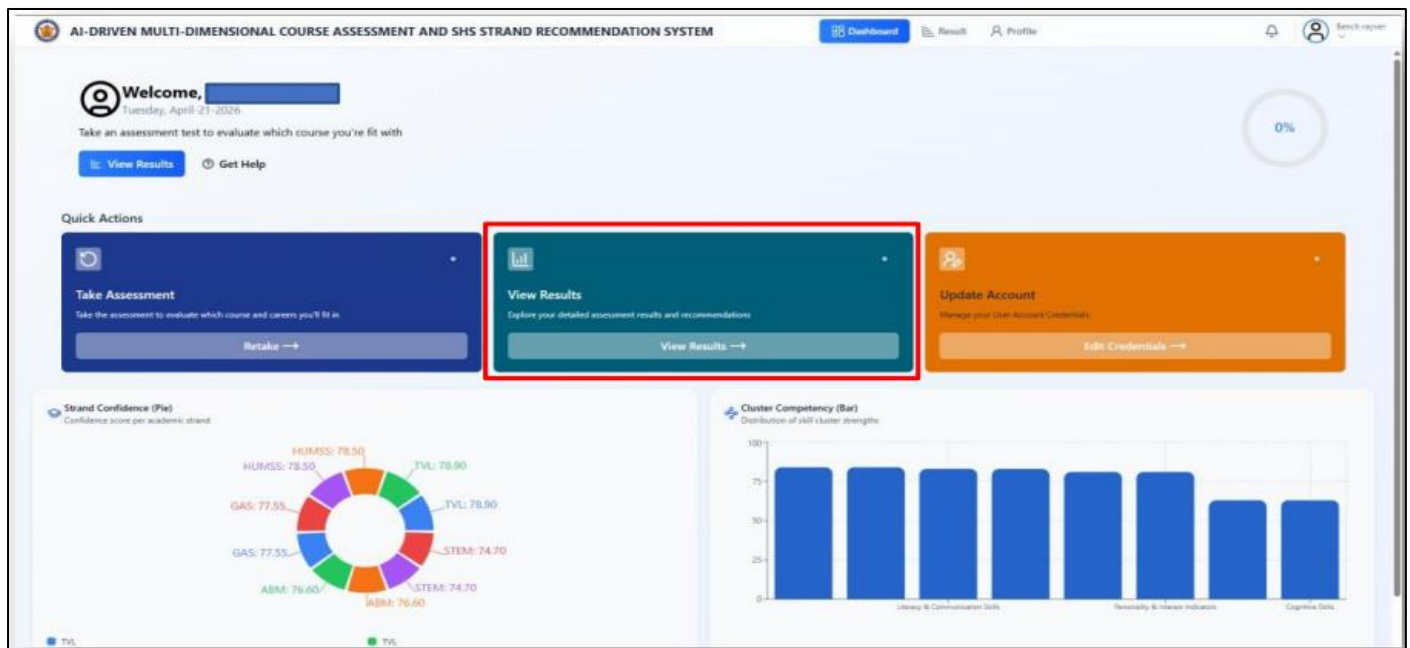
Previous Auto-Save

Step 5. Click Save to proceed to AI analysis.

Note: Once submitted for AI analysis, do not close or interrupt process. Evaluation report will be sent to the registered email address specified in the student's profile.

➤ View Student Assessment

Step 1. Log-in.



Step 2. Click View Results.

