

Conceptual Model for AI-Based Student Support Services to Enhance Undergraduate Retention Rates

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ABSTRACT: *This study investigates the application of Artificial Intelligence (AI) in enhancing student support services to promote undergraduate student retention in higher education. The research was conducted through a three-phase mixed-method approach: documentary analysis, model development, and expert evaluation. Phase 1 examined student service models from 20 universities—10 in Thailand and 10 internationally—focusing on six core domains: mental and physical health, financial aid, career guidance, student welfare, co-curricular engagement, and behavioral support. The analysis revealed a clear gap in AI integration, with international institutions demonstrating more advanced and systematic implementation than their Thai counterparts. In Phase 2, a conceptual model was developed, structured into three layers: (1) AI-based service systems, (2) short-term outcomes such as increased access and satisfaction, and (3) long-term outcomes including student retention and holistic development. The model integrates four key AI applications—chatbots, predictive analytics, recommendation systems, and sentiment analysis—across all six domains. These technologies enable real-time support, personalized guidance, and early intervention strategies tailored to student needs. Phase 3 involved expert evaluation through a focus group of administrators, faculty, and student representatives.*

Findings emphasized the need for ethical implementation, institutional readiness, and student-centered design. Recommendations include developing strategic frameworks for AI adoption, ensuring data ethics, piloting targeted applications, and fostering cross-functional collaboration. This research contributes a validated framework and practical guidance for leveraging AI in higher education. The findings underscore AI's potential to transform student services into inclusive, data-driven, and retention-focused systems that support student success throughout the academic lifecycle.

Keywords: Artificial Intelligence, Student Support Services, Retention, Higher Education

1. Introduction

Currently, undergraduate students face a range of challenges including academic difficulties, financial hardship, mental health vulnerabilities, and uncertainty regarding career paths. These factors collectively affect students' academic success, quality of life, and persistence in higher education (Kapil & Hadwin, 2026). Such issues not only pose barriers to learning but also impact the structural integrity of educational institutions. Without adequate support, students are more likely to withdraw prematurely or fail to achieve their academic goals.

The Student Affairs Division plays a critical role in supporting and enhancing student potential by providing counseling, promoting physical and mental well-being, and developing life skills. However, in many universities—particularly in Thailand—limited personnel and increasing workloads have resulted in services that are not sufficiently comprehensive, accessible, or responsive to the diverse and specific needs of students (Kapil & Hadwin, 2026).

These limitations are also linked to the United Nations’ Sustainable Development Goals (SDGs), especially Goal 4 (Quality Education) and Goal 3 (Good Health and Well-being), which emphasize equitable access to educational resources and student support services (United Nations, 2025). Without appropriate and timely support, students are at high risk of experiencing stress, isolation, and ultimately dropping out, which represents a significant loss at both the individual and systemic levels.

As a result, the application of Artificial Intelligence (AI) has emerged as a promising approach in the digital era, attracting considerable attention from universities worldwide. AI has the potential to enhance the effectiveness of student support systems across multiple dimensions, including personalization, real-time responsiveness, and unrestricted accessibility regardless of time or location (Ikram et al., 2026; Naayini, 2025; Wang et al., 2024).

In many countries, AI has been adopted in various formats, such as chatbots for initial counseling, behavioral analytics for early identification of at-risk students, and automated career guidance systems based on students’ interests and abilities (Castillo-Martínez et al., 2024; Farhood et al., 2025). Research on this topic is therefore essential for developing an appropriate model for implementing AI in student services. The goal is to promote sustainable undergraduate retention through intelligent, flexible, and student-centered support systems that address the complex needs of today’s learners.

2. Research Objectives

The objectives of this study are as follows:

2.1 To analyze student support service models through a comparative review of practices at Thai and international universities, and to explore the integration of Artificial Intelligence (AI) in these services.

2.2 To develop a conceptual model of AI-based student support services aimed at enhancing undergraduate retention rates.

2.3 To evaluate the proposed model and provide policy recommendations to support the institutional adoption of AI-enhanced student services.

3. Literature Review

3.1 Concept of Student Services

Student services refer to the systems and processes established by higher education institutions to support the holistic development of students beyond the academic domain. These services encompass a wide range of areas, including health and well-being, financial aid, career guidance, and student engagement, all of which contribute to students’ quality of life and academic success. Effective student services have been consistently associated with increased student engagement, persistence, and retention in higher education (Kuh et al., 2008; Tinto, 2012).

Over the past decade, student services have evolved from primarily administrative and operational functions toward a more holistic and developmental approach. This shift emphasizes the integration of physical, emotional, social, and intellectual development, recognizing that student success depends on both academic and non-academic support systems (Astin, 1984; Strayhorn, 2022). Contemporary global frameworks also highlight the importance of aligning student services with diverse student needs in complex and rapidly changing educational environments (UNESCO, 2023). Drawing on global perspectives and contemporary literature, student services in higher education can be conceptualized across six key dimensions:

1. **Mental and Physical Health Support** for students’ mental and physical well-being is fundamental to their ability to learn and adapt. Universities typically provide campus health services, psychological counseling, and wellness programs. These services contribute significantly to improved academic outcomes and reduced attrition (Hunt & Eisenberg, 2010; World Health Organization, 2022).

2. **Scholarships and Financial Aid** Financial support plays a critical role in student persistence. Scholarships, grants, and financial counseling help reduce economic barriers that may lead to dropout. Financial stress has been consistently linked to lower retention and academic success (Goldrick-Rab, 2016; Tinto, 2012; Bernal et al., 2024; LaSota et al., 2025).

3. **Career Guidance and Development** Career services are essential in preparing students for the transition to the workforce. Universities increasingly provide structured career support, including career counseling, internships, and employability skill development. These services are particularly important in dynamic labor markets and align with

research highlighting the role of career coaching and structured support in developing employability competences (van der Baan et al., 2024; Jackson et al., 2024).

4. **Student Discipline and Behavioral Support** Maintaining appropriate conduct and providing behavioral support contribute to a safe and inclusive learning environment. Institutional mechanisms such as codes of conduct and intervention systems promote responsibility and prevent misconduct (Bretag et al., 2019; Benson & Enström, 2023).

5. **Student Welfare and Campus Services** Student welfare services, including housing, transportation, and campus facilities, support students' daily lives and enhance their sense of belonging. A strong sense of belonging is a key predictor of student retention and success (Strayhorn, 2022).

6. **Student Engagement and Co-Curricular Activities** Participation in co-curricular activities supports identity development, life skills, and employability. Engagement beyond the classroom has been shown to significantly enhance learning outcomes and career readiness (Kuh, 2009; Bond et al., 2023; Jackson et al., 2024).

3.2 Artificial Intelligence in the Context of Education (AI in Education)

Artificial Intelligence (AI) has gained increasing attention in higher education, particularly in enhancing student support services. AI enables improved efficiency, accuracy, and personalization, allowing institutions to respond more effectively to diverse student needs (Ikram et al., 2026; Wang et al., 2024; UNESCO, 2023).

Four major AI applications have been identified in student support systems:

1. **AI Chatbots** provide real-time responses to student inquiries, improving accessibility and responsiveness beyond traditional office hours (Ikram et al., 2026; Naayini, 2025).

2. **Predictive Analytics** enable early identification of at-risk students by analyzing behavioral and academic data, allowing timely intervention (Farhood et al., 2025; Bond et al., 2023).

3. **Recommendation Systems** support personalized academic and career decision-making based on individual profiles (van der Baan et al., 2024).

4. **Sentiment Analysis** helps identify emotional and psychological states from textual data, supporting mental health services (Orabi et al., 2018).

These applications demonstrate the potential of AI to transform student services into data-driven, personalized, and proactive support systems.

3.3 Concept of Student Retention

Student retention refers to students' ability to persist and complete their academic programs within the expected timeframe. It is widely recognized as a key indicator of institutional effectiveness and educational quality (Tinto, 2012). Retention is influenced by both academic and social integration. Students who develop a sense of belonging and engage meaningfully with their institution are more likely to persist (Strayhorn, 2022). Psychological factors such as motivation, self-efficacy, and goal orientation also play a critical role (Bond et al., 2023).

Recent research highlights the importance of integrated support systems in promoting retention, particularly through early identification of at-risk students and timely intervention (Farhood et al., 2025; Ikram et al., 2026). The integration of AI further enhances institutional capacity to deliver personalized and proactive support, contributing to improved retention outcomes.

4. Research Methodology

4.1 Research Design

This study employs a mixed-method approach, integrating qualitative research with developmental research. The primary aim is to design and propose a model of undergraduate student support services utilizing Artificial Intelligence (AI) to enhance student retention in higher education in a more effective and sustainable manner. The research design is structured into three key phases:

Phase 1: Study and Analysis of Student Support Service Models

In this phase, the researcher examines student support service practices at both national and international levels. The methodology involves documentary analysis and data collection from the official websites of 20 selected universities, including:

10 Thai universities: Chiang Mai University (CMU), Chulalongkorn University (CU), Khon Kaen University (KKU), Prince of Songkla University (PSU), Ubon Ratchathani Rajabhat University (UBRU), Naresuan University (NU), Kasetsart University (KU), Valaya Alongkorn Rajabhat University (VRU), Suan Sunandha Rajabhat University (SSRU), and Rajamangala University of Technology Thanyaburi (RMUTT).

10 international universities: University of Toronto (Canada), National University of Singapore (Singapore), University of Melbourne (Australia), University of Tokyo (Japan), University of Oxford (UK), University of California, Berkeley (USA), University of British Columbia (Canada), University of Edinburgh (UK), Monash University (Australia), and University of Hong Kong (HKU).

The analysis focuses on six core service domains: mental and physical health, scholarships and financial aid, career counseling, discipline and behavioral support, student welfare, and co-curricular activities. The study also investigates how AI technologies are applied within these domains to enhance service delivery.

Phase 2: Development of a Conceptual Model for AI-Based Student Support Services to Enhance Undergraduate Retention Rates

This phase involves the development of a prototype model for student support services using AI. The conceptual model is constructed based on the findings from Phase 1, a comprehensive literature review, and semi-structured interviews with student affairs administrators, faculty members in AI or educational tech, and undergraduate students.

The semi-structured interviews in this phase are designed to capture a comprehensive range of institutional perspectives by categorizing participants according to the structure of higher education institutions as defined by the national qualifications framework (MHESI, 2026). This stratified approach ensures that the proposed AI-based student support model is sensitive to the unique operational contexts, student demographics, and missions of various institutional types in Thailand. The interview groups are categorized as follows:

1. CUPT (Traditional and Autonomous Universities): Representatives from 27–30 original state and autonomous universities, which manage the Thai University Central Admission System (TCAS).
2. RAJABHAT (Rajabhat University Council): Focused on local development and community-based higher education.
3. RMUT (Rajamangala University of Technology Council): Emphasizing vocational excellence, science, and technology.
4. APHEIT (Association of Private Higher Education Institutions of Thailand): Representing the private sector's perspective on student services and market-driven retention.

Furthermore, the development of the conceptual model is informed by the strategic directives issued by the Ministry of Higher Education, Science, Research and Innovation (MHESI, 2025). These interviews specifically address how Artificial Intelligence (AI) can operationalize current national policies aimed at enhancing undergraduate retention, including:

1. The "Happy and Productive Learners" Policy: A 2024–2025 MHESI mandate focusing on reducing educational inequality and increasing graduation rates through flexible support systems.
 2. The National Credit Bank System: A digital initiative designed to allow students facing personal or financial hardships to pause their studies and return without losing academic progress, thereby mitigating long-term attrition.
 3. AI for Higher Education Framework: National guidelines established in 2024 to standardize AI applications in student services, such as utilizing predictive analytics to identify at-risk students before they withdraw (MHESI, 2025).
- By synthesizing these multi-group perspectives with national policy frameworks, this phase aims to produce an AI-driven support model that is both technologically robust and institutionally viable within the Thai higher education landscape.

To ensure the robustness of the conceptual model, the semi-structured interviews in Phase 2 are conducted with a diverse range of stakeholders. The sampling strategy and specific objectives for each participant group are detailed below:

Interview Design and Participant Stratification

The qualitative data collection follows a purposive sampling approach to capture institutional, technical, and user-centric insights across the four university clusters-CUPT, RAJABHAT, RMUT, and APHEIT.

Group 1: Student Affairs Administrators

The first group consists of eight senior administrators, including Vice Presidents for Student Affairs, Assistant VPs, or Directors of Student Development Divisions. Two representatives are selected from each of the four university clusters to ensure comparative depth. The primary goal of these interviews is to conduct an environmental scan of current service conditions and identify institutional limitations (Kapil & Hadwin, 2026). By engaging in this group, the research aims to uncover the specific operational challenges unique to each university type, such as differences in resource allocation and student demographics.

Group 2: Faculty Experts in AI and Educational Technology

A purposive sample of five subject matter experts specializing in Artificial Intelligence and Educational Technology is engaged to provide technical insights. The objective is to identify emerging trends, state-of-the-art applications, and feasibility recommendations for integrating AI into student support systems (Ikram et al., 2026; Naayini, 2025). These experts contribute essential guidance on how machine learning models can be adapted to suit the sensitive nature of student data while maintaining ethical and technical standards in higher education.

Group 3: Undergraduate Students

To capture the user perspective, 16 undergraduate students are selected through purposive sampling (four students per university cluster). These interviews focus on the User Experience (UX) of current student services, specifically evaluating service procedures, response times, and accessibility barriers. Furthermore, the inquiry explores student expectations and readiness for AI-mediated services, such as 24/7 chatbot assistance and personalized career or academic recommendations (Ikram et al., 2026; Naayini, 2025). Understanding these needs is critical for ensuring that the developed model is student-centered and addresses real-world pain points in the digital era. Researcher's Methodological Alignment

1. Sampling: The total sample size is stratified to provide data triangulation, combining administrative policy (Group 1), technical feasibility (Group 2), and user demand (Group 3).
2. Cluster Analysis: By using the CUPT/RAJABHAT/RMUT/APHEIT framework, this research acknowledges that "one size does not fit all" in the Thai higher education system.
3. AI Context: The focus on "response times" and "accessibility" directly links to the capabilities of AI (e.g., real-time responsiveness) discussed in Phase 1.

The collected data are analyzed using content analysis, which leads to the design of a conceptual model illustrating the application of AI in promoting student retention in higher education

Qualitative Data Analysis (QDA) Framework

The qualitative analysis for this study utilizes a systematic approach to transform descriptive interview data into the structural components of an AI-based support model. The process is divided into four critical stages:

1. Data Preparation and Transcription

Upon completion of the semi-structured interviews with all 29 participants, the audio recordings are subjected to verbatim transcription. This ensures that the nuances of participant perspectives-ranging from administrative concerns to student pain points-are preserved. The transcripts are then systematically organized by stakeholder group to facilitate a structured comparative analysis in the subsequent stages.

2. Content Analysis and Coding Process

The core analytical engine of this phase follows the thematic analysis framework established by Braun and Clarke (2024). This involves a two-tier coding process:

Initial Coding: The primary researcher reviews the transcripts to identify recurrent keywords and phrases related to Retention Barriers (e.g., "delayed response times," "financial stress," "academic isolation") and AI Potential (e.g., "automated workflows," "24/7 accessibility").

Thematic Categorization: These codes are subsequently mapped onto the six dimensions of student services-including mental health, financial aid, and career guidance-to determine exactly where and how AI interventions can best support student persistence.

3. Data Triangulation and Synthesis

To ensure the rigor and validity of the findings, the study employs data triangulation. By intersecting the perspectives of the three distinct groups, the researcher identifies points of convergence and divergence:

Policy Perspective (Administrators): Focuses on institutional constraints, budgetary limitations, and national mandates like the "Happy and Productive Learners" policy (MHESI, 2025).

Technical Perspective (Experts): Evaluates the feasibility of specific algorithms, data security protocols, and machine learning architectures

User Perspective (Students): Highlights real-world accessibility needs and the desire for frictionless, personalized digital support.

4. Final Synthesis for the Retention Model

The final stage involves synthesizing the triangulated findings into a cohesive AI-Based Student Support Model. This model does not merely propose technical solutions but offers a student-centered framework that addresses documented user pain points while remaining within the technical and ethical boundaries identified by experts. The goal is to produce a scalable and institutionally viable model that promotes sustainable undergraduate retention through intelligent support systems.

Phase 3: Evaluation and Policy Recommendations

In the final phase, the proposed model is presented and evaluated through a focus group comprising key stakeholders, policy experts.

The objective of this phase is to gather expert feedback to refine the model and ensure its alignment with the real-world context of higher education institutions. The findings are used to inform policy recommendations for the institutional adoption of AI-enhanced student services.

This research thus integrates knowledge synthesis, service innovation design, and strategic evaluation, emphasizing the systematic application of AI technologies to enhance student success and retention.

4.2 Population and Sample

1. Population

The target population includes individuals and stakeholders involved in student support services at higher education institutions, specifically: 1) Student affairs officers and administrators at public universities 2) Faculty members and specialists in digital and AI technologies in education 3) Undergraduate students who have accessed student services and 4) Policymakers or experts in higher education governance

2. Sample

The sample is selected through purposive sampling, based on the participants' expertise and direct experience in student services or educational technology.

Table1. The Sample Research Group

Sample Group	Number	Purpose of Data Collection
Student affairs administrators	8	To analyze current service conditions and limitations
Faculty members in AI or educational tech	5	To provide technical insight and application recommendations
Undergraduate students	15	To provide user perspectives on service accessibility and needs
Policy experts or experts in higher education governance	5	To assess and critique the proposed service model

4.3 Research Instruments

This study employs both qualitative and developmental research instruments. Key tools include:

1. Document Analysis Form – Used to collect data from the official websites and documents of 20 universities to identify types of student services and AI applications.
2. Semi-Structured Interview Guide – Developed to explore the experiences, needs, and perspectives of student affairs administrators, academic experts, and students regarding AI in student services.
3. Focus Group Discussion Guide - A semi-structured guide outlining key discussion themes, including the appropriateness, feasibility, ethical considerations, and contextual relevance of the proposed model. The guide also includes prompts to elicit feedback on potential policy implications and implementation strategies.

4.4 Data Collection

Data were collected in three phases:

1. Document analysis from 20 selected universities (10 in Thailand, 10 international);
2. In-depth interviews with purposively selected administrators, faculty, and students, using audio recordings and notes;
3. A focus group workshop to present the prototype model to experts for feedback.

5. Research Findings

5.1 Findings from Phase 1: Analysis of Student Support Service Models

The objective of Phase 1 was to examine undergraduate student support service models in both Thai and international higher education institutions. Data were collected and analyzed from the official websites and documents of 20 leading universities (10 in Thailand and 10 abroad) using documentary analysis. The focus was on identifying service models across six key domains: mental and physical health, scholarships and financial aid, career guidance, student discipline, welfare services, and co-curricular development. The analysis also aimed to identify trends in the integration of artificial intelligence (AI) within student services.

1) Student Service Models: Six Core Domains

The findings indicate that student services can be categorized into the following six domains:

Table2. Six Core Domains of Student Service

Service Area	Common Practices Identified	Thai Universities (n=10)	International Universities (n=10)	Analysis Result
1. Career Guidance	Career Centers, Job Fairs, Resume Clinics, Mock Interviews	10/10	10/10	Widely established; international universities integrate AI-based career matching systems more systematically.
2. Scholarships & Financial Aid	Online scholarship platforms, merit-based and need-based aid, private sector funding sources	10/10	10/10	Equally available; AI-enabled financial advisory tools more prominent internationally.
3. Mental & Physical Health	On-campus clinics, counseling services, mental health assessments	10/10	10/10	Core service; international institutions use AI for early detection and monitoring.
4. Student Welfare	Dormitories, accident insurance, transportation services, student canteens	10/10	10/10	Standard support structures with minimal variation.
5. Student Development Activities	Clubs, volunteer programs, and co-curricular skill-building initiatives	10/10	10/10	Strong engagement; international universities apply data-driven recommendation systems.
6. Discipline & Behavior	Incident reporting systems, risk behavior workshops, student conduct centers	8/10	10/10	Less consistent in Thai universities; international institutions use systematic monitoring systems.

Note. Data were collected through documentary analysis of official university websites from 20 higher education institutions (10 Thai and 10 international universities). The table presents a comparative synthesis of six core domains of student services and highlights the differences in the extent of Artificial Intelligence (AI) integration across institutional contexts.

2) Trends in AI-Driven Student Services

Analysis reveals that international universities demonstrate more advanced and systematic integration of AI in student service systems. Examples include:

Table3. Trends in AI-Driven Student Services

AI Technology	Service Type
AI Chatbots	General inquiries, scholarship information, course registration (National University of Singapore, 2026; Monash University, 2026; University of Hong Kong, 2026)
Predictive Analytics	Early alert systems, at-risk student prediction (University of Toronto, 2026; University of British Columbia, 2026)
Career Recommendation Systems	Career pathway suggestions based on skills and interests (University of California Berkeley, 2026; University of Oxford, 2026)
Mental Health AI Tools	Mental health screening, behavioral monitoring systems (University of Melbourne, 2026; University of Hong Kong, 2026)

In contrast, most Thai universities are still in the early stages of AI adoption. Some institutions, such as Chulalongkorn University (2024) and Kasetsart University (2024), have begun implementing chatbots and online platforms. However, advanced AI applications, such as personalized analytics or predictive support systems, remain limited. These findings align with recent literature (Ikram et al., 2026; Naayini, 2025; Castillo-Martínez et al., 2024), which highlights the potential of AI to improve service responsiveness, support personalized learning, and enhance student retention through data-driven insights (Farhood et al., 2025).

3) Key Insights

The findings reveal a significant disparity between Thai and international universities in terms of AI integration within student support services, underscoring a critical opportunity for strategic advancement in the Thai higher education sector. Effective student services are increasingly dependent on the dual foundation of comprehensive service provision and personalized, data-driven interventions. To address current gaps and promote sustainable student success, future service models should prioritize the integration of artificial intelligence within a holistic development framework—ensuring not only technological efficiency but also responsiveness to the diverse, evolving needs of learners.

5.2 Findings from Phase 2: Development of a Conceptual Model for AI-Based Student Support Services to Enhance Undergraduate Retention Rates

In the second phase of the study, the researcher developed a Conceptual Model and designed a prototype model of AI-based student support services aimed at enhancing undergraduate retention rates. This model was informed by findings from Phase 1, a comprehensive literature review, and in-depth interviews with student affairs administrators, faculty members in AI or educational tech, and undergraduate students.

The qualitative data collected from interviews and document analysis were transcribed and examined using content analysis to identify key themes related to student needs, the role of AI, and the characteristics of effective student support systems. The thematic findings include:

Table 1 The thematic findings

Key Theme	student affairs administrators	faculty members in AI or educational tech	undergraduate students	Convergent Insight
1. The need for 24/7 accessibility to student services	Acknowledge that human personnel are constrained by office hours and high workloads, leading to service gaps. They view AI as a "force multiplier" to maintain institutional presence.	Confirm that Large Language Models (LLMs) and automated pipelines can handle up to 80% of routine inquiries with zero latency.	Report significant stress when unable to access scholarship or registration information during late-night study sessions.	As noted by Ikram et al. (2026) suggest that 24/7 accessibility is no longer a luxury but a fundamental requirement for student inclination towards

Key Theme	student affairs administrators	faculty members in AI or educational tech	undergraduate students	Convergent Insight
				institutional learning tools.
2. Expectations for accurate and personalized guidance	Emphasize that personalization is the key to "Holistic Development" and institutional commitment	Advise that Recommendation Systems can now process individual competencies and interests to suggest high-relevance career paths.	Express a strong desire for advice that "knows who they are"-moving away from generic "one-size-fits-all" academic counseling.	Personalized AI pathways help students align academic decisions with labor market needs, reducing the "uncertainty" that leads to attrition (van der Baan et al., 2024).
3. The Importance of an Early Alert System for At-Risk Students	Admit that current manual identification often happens too late (e.g., after a student has already failed a midterm).	Propose the use of Predictive Analytics to monitor subtle behavioral shifts—such as reduced LMS engagement or negative sentiment in digital feedback.	Suggest that they would appreciate a "gentle nudge" or a proactive check-in from the system when their performance slips.	Aligning with Farhood et al. (2025), early identification through machine learning is critical for delivering tailored interventions before a student reaches the point of withdrawal.
4. The Need for Interdepartmental Data Integration	Highlight that data "silos" (where Finance, Registrar, and Counseling) prevent a comprehensive view of the student.	State that AI efficiency is entirely dependent on "Data Lakes" and API-based integration across campus departments.	Frustrated by having to repeatedly provide the same personal and financial information to different university offices.	A unified data framework is essential for the "structural integrity" of the support system, as argued by Farhood et al. (2025).
5. Concerns about Data Privacy and Ethical Implications	Focus on legal compliance with the Thai PDPA and the risk of algorithmic bias affecting institutional reputation.	Advocate for a "Human-in-the-loop" design, where AI suggests actions but human advisors make the final high-stakes decisions.	Worry about being "watched" or judged by an algorithm, particularly regarding mental health or behavioral data.	Trust is the foundation of AI adoption; institutions must establish transparent ethical protocols to ensure student data is used for "support" rather

Key Theme	student affairs administrators	faculty members in AI or educational tech	undergraduate students	Convergent Insight
				than "surveillance" (Ikram et al., 2026).

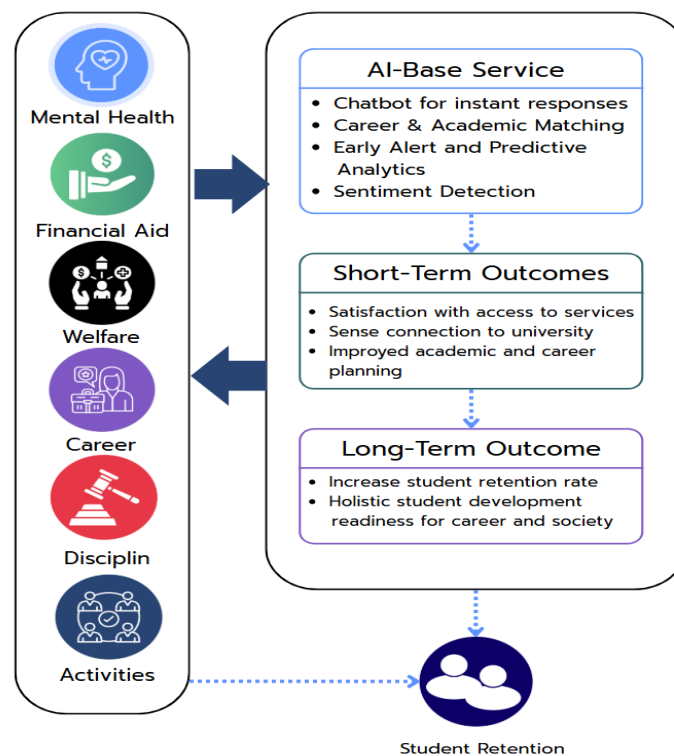
The interviews reveal a clear Triangulation of Necessity: student affairs administrators provide the Policy Framework, faculty members in AI or educational tech provide the Technical Feasibility, and undergraduate students provide the User Demand. Together, these themes form the core requirements for the Conceptual Model in Phase 2, shifting the university's role from a reactive service provider to a proactive, AI-enhanced support partner.

These findings informed the design of an AI-based student support services to enhance undergraduate retention rates, which integrates essential dimensions of development and support to ensure continuity in students' educational journeys. The model emphasizes responsiveness, personalization, and technological alignment with holistic student development goals.

Based on the synthesis of documentary data and in-depth interviews conducted during Phases 1 and 2 of the research, a conceptual model for AI-based student support services to enhance undergraduate retention rates was developed. The model is structured into three main layers:

- 1) Service System Layer – representing the core AI technologies and tools employed in the provision of student services;
- 2) Short-Term Outcomes – capturing the immediate impacts on students' experiences, such as accessibility, satisfaction, and engagement;
- 3) Long-Term Outcomes – focusing on sustainable effects, including improved student retention, holistic development, and readiness for the workforce and society.

This multi-layered framework reflects a student-centered approach, integrating technology with developmental goals to ensure responsive, efficient, and future-oriented service delivery. A conceptual model for AI-Based student support services to enhance undergraduate retention rates can be shown in Figure 1 as below;



Figures 1. A Conceptual Model for AI-Based Student Support Services to Enhance Undergraduate Retention Rates

The Conceptual Model illustrates that the integration of Artificial Intelligence (AI) into student support systems in higher education can be structured as a three-layered model, comprising: (1) the AI-based service layer, (2) the short-term outcomes layer, and (3) the long-term outcomes layer. Each layer is interconnected and collectively aims to enhance the overall goal of improving student retention. This model emphasizes the strategic role of AI in facilitating more efficient, personalized, and student-centered services, which in turn support academic continuity, well-being, and holistic development throughout the student lifecycle.

1) AI-Based Services

Four primary AI applications are currently enhancing student service models: AI chatbots, predictive analytics, recommendation systems, and sentiment analysis.

1.1) AI Chatbots serve as virtual front-line assistants capable of responding instantly to inquiries regarding financial aid, course enrollment, career guidance, and welfare services. These systems are particularly beneficial for extending service availability beyond regular office hours, enhancing accessibility and service responsiveness.

1.2) Predictive Analytics utilize behavioral and academic data to identify students at risk of dropping out. This allows universities to implement early interventions, particularly in areas such as mental health monitoring, academic performance tracking, and behavioral discipline.

1.3) Recommendation Systems analyze individual student profiles—including academic history, interests, and competencies—to suggest tailored learning pathways, co-curricular activities, and future careers. This supports not only academic and career development but also fosters student engagement.

1.4) Sentiment Analysis enables institutions to evaluate students' emotional well-being through text-based interactions and digital behaviors. Insights from such tools are crucial in mental health services, allowing early detection of psychological distress and timely support.

2) AI-Enabled Student Support Services Across Six Key Domains

The findings of this study reveal that Artificial Intelligence (AI) can be effectively applied across six primary domains of student support services in higher education. These AI applications contribute significantly to enhancing service responsiveness, personalization, and proactive intervention, all of which influence student retention both directly and indirectly.

2.1) Career Guidance

AI Technologies: Career Matching Systems and AI Chatbots

Service Design: AI systems suggest career paths based on students' interests and profiles and provide automated mock interview support.

Outcome: Students gain clearer career direction, leading to a stronger sense of purpose and reduced attrition caused by career uncertainty.

2.2) Scholarship and Financial Aid

AI Technologies: AI Chatbots and Automated Matching Systems

Service Design: The system matches eligible students with appropriate scholarships and provides 24/7 responses to inquiries about financial support.

Outcome: Reduces financial stress and facilitates uninterrupted academic progression, thereby contributing positively to student retention.

2.3) Mental and Physical Health

AI Technologies: Sentiment Analysis and Early Alert Systems

Service Design: AI analyzes language and behavioral patterns on digital platforms (e.g., LMS) to detect early signs of emotional distress, prompting timely referrals to counselors or mental health professionals.

Outcome: Enables early-stage mental health intervention, reducing the risk of emotional crises and potential student dropout.

2.4) Student Welfare

AI Technologies: Chatbots for Benefits and Service Information

Service Design: AI provides easy access to information on dormitories, health insurance, transportation, and other welfare services.

Outcome: Enhances students' awareness and access to entitlements, reducing feelings of isolation and improving their sense of institutional support.

2.5) Co-Curricular Activities and Student Development

AI Technologies: Activity Recommendation Engines

Service Design: Based on behavioral data, the system recommends clubs, volunteer projects, or co-curricular opportunities that align with student interests and developmental goals.

Outcome: Encourages student participation and self-actualization, increasing engagement with the university community.

2.6) Discipline and Behavioral Risk Management

AI Technologies: Predictive Analytics and Behavioral Dashboards

Service Design: AI identifies students who may be at risk of behavioral misconduct through data analytics, enabling preventive counseling and timely intervention.

Outcome: Enhances campus safety and supports a culture of responsibility, fostering stronger ties between students and their learning environment.

3) Short-Term Outcomes: Enhanced Student Engagement and Preparedness

The short-term outcomes represent the immediate and measurable effects experienced by students following their interaction with AI-powered support systems. These outcomes are critical indicators of the system's effectiveness in meeting students' day-to-day needs and laying the foundation for long-term academic success and retention. The key short-term outcomes include:

3.1) Increased Satisfaction and Confidence in Accessing Services

AI technologies—such as chatbots and automated information systems—enable 24/7 access to a range of support services, from financial aid inquiries to course enrollment assistance. This on-demand responsiveness significantly improves the user experience by reducing waiting times and removing barriers to information. As a result, students report greater satisfaction with institutional services and enhanced self-efficacy in navigating university systems.

3.2) Improved Ability to Plan Academic and Career Paths

Through the use of AI-driven recommendation systems and career matching platforms, students receive personalized suggestions aligned with their interests, academic records, and market trends. These tools help students clarify their educational goals and make informed decisions about courses, majors, and career directions. This clarity contributes to reduced academic indecision, which is a common precursor to dropout, especially in the early years of study.

3.3) Stronger Sense of Belonging and Institutional Support

When students perceive those services are responsive, relevant, and tailored to their individual needs, they are more likely to feel connected to the institution. AI systems that identify and respond to emotional cues (e.g., via sentiment analysis) or flag at-risk behavior for early intervention reinforce the notion that the university cares about students' well-being. This strengthens students' psychological attachment to the campus community—an important predictor of persistence and retention, especially among first-generation or marginalized students.

4) Long-Term Outcomes: Sustainable Impact on Student Success and Institutional Goals

The long-term outcomes of implementing AI-powered student support systems extend beyond immediate service satisfaction and begin to influence enduring educational, personal, and professional trajectories. These outcomes are the result of sustained, effective interventions that support students throughout their academic journey and prepare them for life after graduation. Key long-term outcomes include:

4.1) Higher Rates of Student Retention

The primary goal of AI-enabled student services is to reduce attrition by proactively identifying and addressing issues that commonly lead to dropout—such as academic struggle, financial hardship, emotional distress, or lack of direction. When AI systems successfully support students in navigating these challenges through early alerts, personalized guidance, and 24/7 accessibility, institutions observe higher rates of student retention. Retention is not only a measure of student success but also a reflection of institutional effectiveness, financial stability, and reputation in the higher education landscape.

4.2) Holistic Student Development (Academic, Emotional, Social)

AI tools can support whole-person development, aligning with the concept of holistic education that encompasses academic achievement, emotional intelligence, and social engagement. For example:

Academic: Recommendation engines promote appropriate course selection and learning strategies.

Emotional: Sentiment analysis and mental health alerts enable timely psychological support.

Social: Activity-matching systems help students connect with communities and co-curricular opportunities.

This integrated development approach empowers students to grow into well-rounded individuals, capable of adapting to the complexities of both academic life and broader society.

4.3) Enhanced Readiness for Careers and Societal Engagement

AI-supported services contribute to career readiness by providing tailored career planning, internship guidance, and skill development opportunities. Mock interviews, resume assessments, and labor market alignment tools prepare students for transitions into the workforce. Simultaneously, by participating in meaningful campus life and receiving support in their personal development, students build competencies such as communication, leadership, and civic responsibility.

This leads to graduates who are not only academically qualified but also socially and professionally equipped to contribute productively to their communities and industries-aligning higher education outcomes with the broader goals of lifelong learning and societal well-being.

5) Outcomes Linked to Retention: How AI Integration Supports Student Persistence

The integration of Artificial Intelligence (AI) across the six core domains of student services-career guidance, financial aid, mental and physical health, welfare, student activities, and discipline-has shown to produce both immediate and enduring effects that directly contribute to student retention. This outcome is especially critical in higher education, where student persistence is a key indicator of institutional success, student well-being, and educational equity.

5.1) Short-Term Outcomes Supporting Retention

5.1.1) Enhanced Accessibility and Responsiveness

AI-powered systems such as chatbots and virtual advisors allow students to receive immediate assistance at any time of day, significantly improving the accessibility of support services. This continuous availability reduces frustration, delays, and feelings of neglect-factors that often discourage students from continuing their studies.

5.1.2) Personalized and Relevant Guidance

By analyzing individual data, AI can provide tailored recommendations regarding academic planning, scholarship opportunities, career pathways, or wellness resources. This level of personalization ensures that students receive the right support at the right time, increasing their confidence and motivation to remain enrolled.

5.1.3) Early Identification of Risk

Through predictive analytics and behavioral monitoring, institutions can proactively identify students at risk of academic failure, mental health decline, or disengagement. Early alerts allow for timely interventions, preventing issues from escalating into dropout decisions.

5.2) Long-Term Outcomes Reinforcing Retention

5.2.1) Development of a Stronger Student-Institution Relationship

Students who feel supported, understood, and valued are more likely to remain committed to their institution. AI's ability to provide continuous and context-aware support builds trust and a sense of belonging-key psychological drivers of retention.

5.2.2) Improved Academic and Career Trajectories

When students receive well-informed guidance, they are more likely to make purposeful choices about their studies and careers. This reduces program-switching and academic delay, both of which are linked to dropout risk.

5.2.3) Holistic Growth and Resilience

AI tools that support emotional, social, and academic dimensions help students build the resilience and skills needed to overcome challenges throughout their academic journey. This whole-person development fosters long-term engagement and success.

In totality, the short-term outcomes (e.g., improved access, satisfaction, and guidance) act as enablers, while the long-term outcomes (e.g., institutional trust, academic progression, and holistic growth) serve as sustaining forces of retention. AI's role in linking services across domains ensures that students experience an integrated and supportive ecosystem, where barriers are reduced and success is nurtured systematically.

Thus, the strategic application of AI in student services is not just a technological upgrade-it's a critical tool in building a more inclusive, responsive, and retention-driven higher education system.

5.3 Findings from Phase 3: Evaluation and Policy Recommendations

In the final phase of this study, the AI-based student support service model-developed through prior stages of literature review, documentary analysis, and expert interviews-was subjected to critical evaluation through a focus group process. This focus group comprised three key stakeholder groups: (1) student affairs administrators, (2) faculty members with expertise in AI or educational technology, and (3) undergraduate student representatives. The inclusion of these diverse perspectives was designed to ensure that the proposed model is contextually relevant, technically feasible, and educationally meaningful.

1) The discussions for Evaluation

The discussions revealed several core insights:

1.1) High Acceptance of AI Integration

Stakeholders agreed that AI has significant potential to complement and extend existing student services. There was strong support for its use in improving access, personalization, and early intervention—particularly in high-need areas such as career counseling, mental health monitoring, and financial aid navigation.

1.2) Emphasis on Ethical and Inclusive Implementation

Participants consistently highlighted the importance of data privacy, algorithmic transparency, and fairness, especially when AI is used for predictive analytics or mental health assessments. Recommendations included the establishment of clear ethical guidelines and mechanisms for student consent.

1.3) Institutional Readiness and Capacity Building

Administrators and faculty expressed the need for institutional investment in infrastructure, staff training, and cross-functional coordination to support effective deployment of AI tools. The model was seen as aspirational yet achievable with phased implementation and stakeholder alignment.

1.4) Student-Centered Customization

Student representatives emphasized the value of AI systems that are adaptive to diverse student needs, including support for marginalized and first-generation learners. They advocated for transparency in how AI-generated recommendations are produced and how students can engage with or override them.

2) Policy Implications and Recommendations

2.1) Based on the feedback and validation process, the study proposes the following recommendations for higher education institutions:

2.2) Develop a Strategic Framework for AI adoption that aligns with institutional goals for retention, inclusion, and student well-being.

2.3) Establish ethical protocols for AI usage in student services, including consent, data governance, and bias mitigation.

2.4) Pilot AI tools in targeted service areas (e.g., career services, early alert systems) to build internal capacity and evaluate outcomes before scaling.

2.5) Foster cross-disciplinary collaboration between IT, academic, and student affairs departments to ensure holistic design and sustainability.

6. Discussion

The findings from Phase 1, as summarized in Table 2, indicate that all six core domains of student services—career guidance, scholarships and financial aid, mental and physical health, student welfare, co-curricular development, and discipline and behavioral support—are consistently implemented across both Thai and international universities. This reflects a shared institutional commitment to holistic student development, which aligns with established frameworks in higher education emphasizing the integration of academic and non-academic support systems (Kuh et al., 2008; Tinto, 2012; Strayhorn, 2022).

However, the comparative analysis reveals that the key distinction does not lie in the availability of services, but rather in the level of technological integration, particularly the use of Artificial Intelligence (AI). While international universities demonstrate systematic and advanced adoption of AI technologies—such as predictive analytics, recommendation systems, and sentiment analysis—Thai universities remain largely in the early stages of implementation, with AI primarily limited to basic applications such as chatbots and online service platforms. This disparity highlights a critical gap in digital transformation within student affairs and underscores the need for strategic development in AI-enabled service systems.

These findings are consistent with recent studies suggesting that AI can enhance the effectiveness of student support services by enabling real-time responsiveness, personalized guidance, and early identification of at-risk students (Ikram et al., 2026; Naayini, 2025; Castillo-Martínez et al., 2024; Farhood et al., 2025). In particular, AI-driven systems allow institutions to shift from reactive service provision to proactive intervention strategies, which are essential for improving student retention.

Building on these insights, Phase 2 of the study proposed a conceptual model that integrates AI technologies across the six service domains within a three-layered framework: (1) AI-based service systems, (2) short-term outcomes, and (3) long-term outcomes. The model reflects a student-centered approach in which AI functions as an enabling infrastructure that enhances accessibility, supports personalized decision-making, and facilitates timely intervention. The identified themes—such as the need for 24/7 accessibility, personalized guidance, early alert systems, and

integrated data infrastructure—further reinforce the role of AI as a critical mechanism for addressing complex student needs.

Furthermore, the evaluation in Phase 3 confirms that stakeholders recognize both the potential and the challenges of AI integration. While AI is widely perceived as a valuable tool for enhancing service efficiency and responsiveness, concerns regarding data privacy, ethical governance, and institutional readiness remain significant. These findings align with broader discussions on responsible AI adoption, emphasizing the importance of transparency, fairness, and human oversight in AI-driven decision-making processes (Farhood et al., 2025; Strayhorn, 2022).

Based on the synthesis of empirical findings and stakeholder perspectives, this study suggests that the successful integration of AI into student support services requires not only technological investment but also organizational transformation. Universities must develop clear strategic frameworks, establish ethical guidelines, and promote cross-functional collaboration to ensure that AI applications are effectively aligned with student development goals. In this regard, AI should be viewed not merely as a technological enhancement, but as a strategic tool for building inclusive, responsive, and retention-oriented higher education systems.

Overall, this study contributes to the growing body of knowledge on AI in education by providing a structured and validated model for integrating AI into student services. More importantly, it highlights that the future of student support lies not only in expanding service provision, but in enhancing the intelligence, adaptability, and responsiveness of those services through the strategic use of AI.

7. Conclusion

This study explored how artificial intelligence (AI) can enhance student support services in higher education to improve undergraduate retention. Using a three-phase research design-documentary analysis, model development, and expert validation-the study examined services from 20 Thai and international universities and identified six core service domains: career guidance, financial aid, mental and physical health, welfare, student development, and discipline. A key finding was the disparity in AI adoption, with international universities integrating AI more systematically than Thai institutions.

A conceptual model was developed in Phase 2, featuring three layers: AI-based services, short-term outcomes (e.g., accessibility, satisfaction), and long-term outcomes (e.g., retention, holistic development). AI tools such as chatbots, predictive analytics, recommendation systems, and sentiment analysis were shown to improve service responsiveness and student engagement. In Phase 3, stakeholders validated the model, highlighting its feasibility and emphasizing ethical concerns, inclusivity, and institutional readiness. The study concludes that AI can significantly transform student services when designed with student needs in mind. It offers a validated model and policy recommendations for universities aiming to adopt AI strategically, thereby supporting student success, equity, and long-term retention. The findings of this study contribute to both theoretical and practical understandings of how AI can be integrated into student support systems in higher education. The proposed model demonstrates that AI tools are not merely technological add-ons but are integral to designing inclusive, responsive, and retention-oriented services. In the short term, AI enhances service accessibility, decision-making, and student engagement. In the long term, it supports retention, holistic development, and readiness for post-graduation transitions. This aligns with the broader goals of Sustainable Development Goal 4 (Quality Education) and Goal 3 (Good Health and Well-being) (United Nations, 2025). Thus, the integration of AI into student affairs should be viewed as a strategic imperative-one that requires careful design, ethical oversight, and commitment to equity.

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