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Development of unified college admission system for Philippine state universities and colleges: a data-driven approach to equity and access

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ABSTRACT

This paper presents the development and pilot evaluation of the unified college admission system (UCAS), a centralized and equity-oriented digital platform designed to streamline admissions across Philippine state universities and colleges (SUCs). Anchored on Republic Act No. 10931, UCAS functions as a unified application repository that standardizes admissions data, consolidates applicant records, and enables real-time monitoring of equity target students (ETS) to support fair and transparent access to higher education. The system integrates student-facing and administrative portals that facilitate application submission, institutional coordination, and equity-focused analytics. A pilot evaluation involving student applicants and administrators assessed usability, efficiency, and reliability, yielding consistently positive results across user groups. Findings indicate that UCAS is technically robust, user-centered, and suitable for multi-level admissions governance. Overall, the study demonstrates the potential of a centralized, data-driven admissions platform to complement tuition-free education policies by addressing inequities at the admissions stage.

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1. INTRODUCTION

Access to higher education in the Philippines has expanded considerably following the enactment of Republic Act No. 10931 in 2017, otherwise known as the Universal Access to Quality Tertiary Education Act. This law mandates free tuition and other school fees in state universities and colleges (SUCs), local universities and colleges (LUCs), and public technical-vocational institutions (TVIs), representing a significant policy intervention to widen participation in tertiary education [1]. While this reform has reduced direct financial barriers, persistent structural inequalities still limit access for most disadvantaged groups, known as equity target students (ETS). These inequalities impact not only entry into higher education but also continuing and completion.

Recent analyses by the second congressional commission on education indicate a marked decline in the share of tertiary education subsidy (TES) beneficiaries from the poorest households. Specifically, the proportion fell from 74.24% (204,234 students) in academic year (AY) 2018 to 30.74% (69,887 students) in AY 2022 [2], [3]. At the same time, the surge in enrolment following the implementation of RA 10931 has

compelled SUCs to tighten admission requirements, often citing constraints in facilities and staffing [4]. The highly selective admission mechanism, such as specific ranking formulas used by some instituions, make it harder for applicants from disadvantaged school backgrounds to gain access [5], [6]. As a result, ETS participation has become increasingly disproportionate. Moreover, despite the free tuition policy, low-income students are still heavily burdened by additional expenses such as entrance examination fees, laboratory, and miscellaneous [2]. These trends indicate that tuition-free education alone is insufficient to ensure equitable access without complementary reforms in admission systems and institutional processes.

To address these challenges, this study proposes the unified college admission system (UCAS), a centralized, data-driven, and equity-focused digital platform designed to streamline admissions processes across Philippine SUCs. UCAS aims to standardize application and admissions procedures, prioritize ETS participation, enhance transparency, and reduce administrative redundancy. Previous studies have shown that centralized admission systems can improve fairness and efficiency by reducing information gaps and institutional fragmentation [7], [8]. By integrating equity-sensitive data approaches, UCAS aims to implement access goals at the admission stage, where disparities often emerge.

Comparable systems have been implemented internationally with positive outcomes. In the United Kingdom, a national admissions platform enables applicants to submit multiple university applications through a single portal, allowing institutions to review and issue offers within a centralized framework [9]. Empirical studies on the UK UCAS show that it is effective in increasing participation, supporting disadvantaged students, and enhancing transparency in admission processes [10], [11]. Similarly, countries like Chile and China use centralized matching systems to maximize student-institution assignments and improve equitable outcomes [12]–[14]. These international experiences illustrate that centralized admissions systems are not only operationally viable but also aligned with broader equity and access goals, thereby providing a strong rationale for the development of a Philippine counterpart.

The need for UCAS is highlighted by the limitations of the current decentralized admissions structure in the Philippines. This system often results in high attrition rates, fragmented access, and underrepresentation of students from the lowest socioeconomic backgrounds. By using digital technologies and data integration, UCAS aims to streamline processes while addressing systemic gaps in admission opportunities. This aligns with the goals of the Universal Access to Quality Tertiary Education Act. Such technologies allow for data-driven decisions that aid both institutional planning and the inclusion of underprivileged students [6].

This study goes beyond practical application. It introduces a new, research-based framework by suggesting the first nationwide, equity-focused admissions platform designed for the Philippine SUC system. In contrast to the existing international frameworks, UCAS specifically integrates ETS identification and an equity monitoring mechanism in line with RA 10391's mandate to democratize access to higher education. The study shows that providing equal access involves more than just free tuition. It also requires changes to the admissions process, where many disadvantaged students are excluded before the financial aid mechanism becomes relevant.

This paper presents the rationale, system design, and potential impact of UCAS as a strategy to improve fairness and efficiency in Philippine higher education. Grounded in empirical data and stakeholder feedback from SUCs, students, parents, and institutional administrators, the study adds to the current policy discussions about making higher education access both inclusive and sustainable.

Objective of the study: the primary objective of this study is to develop the UCAS, a centralized and equity-oriented digital platform designed to streamline admission processes across SUCs in the Philippines. Specifically, the study aims to:

- Design a centralized, data-driven prototype of the UCAS that promotes transparency, efficiency, and equitable access to higher education.
- Evaluate the usability, efficiency, and reliability of UCAS through functionality testing involving users and system administrators.
- Identify policy implications associated with the implementation of a national unified admissions platform in relation to RA 10931 and ongoing higher education reforms.

2. RESEARCH METHOD

This paper is the second component study of the project titled "Empowering equity target students: enhancing access and success in state universities and colleges across regions I, VIII, and XII, Philippines" funded by CHED. The project was a collaborative work of a team of researchers from Samar State University (SSU), Don Mariano Marcos Memorial State University (DMMMSU), and University of Southern Mindanao (USM).

2.1. Research design

The study employed a design-based research approach (DBR) combined with elements of the system development life cycle (SDLC) to map out the whole process of the study. The SDLC helps to guide the conceptualization, development, and iterative refinement of the UCAS. While, DBR was used to collaboratively design solutions to real-world problems in SUCs by incorporating insights from focus group discussions and policy reports. This approach allowed the continuous refinement based on authentic feedback and contextual limitations.

Complementing DBR, the following phases of the SDLC framework was implemented:

a) Analysis phase: identification of gaps in the current SUC admission process, stakeholder consultation, policy reports, and review of ETS data trends.
b) Design phase: established technical requirements to meet the needs of the analysis phase. Designing the overall functionality and features of the system. Workflows, data schemas, and user-roles structures were developed.
c) Prototyping phase: construction of the UCAS platform using Vue 3 and Laravel. This phase identifies potential issues, bugs, and errors, ensuring that the entire system works according to its function.
d) Evaluation phase: conducted preliminary pilot testing and system evaluation with administrators and student-users. The usability, efficiency, and reliability of the system were evaluated using the system usability scale (SUS) and ISO 25010-based software quality evaluation checklist.

This combined approach aligns with the objective of the study in creating a practical and context-responsive digital solution. The development and design of the system are based on established practices in academic information systems. These practices focus on centralized databases, role-based access control, and secure data handling that help with data integrity and institutional efficiency [15]–[18]. Additionally, previous studies on college admission management platforms show that automation of workflow and centralized application processing improve service delivery and administrative coordination [19], [20].

2.2. Data

The personal and demographic data, academic records, and equity indicators of students from the gathered data in the first component study are stored in MySQL databases, such as school selection, family background, and last school attended. By grounding the UCAS design in empirical data, the system can be equity-driven, user-centered and evidence-based. Having this will ensure that it does not replicate the same systemic barriers it aims to eliminate. The data serves as a design blueprint as well as a diagnostic tool.

2.3. Client-server infrastructure

The system integrates three interconnected web applications, including landing page, student admission, and administrator account as shown in Figure 1. Each is built using Vue 3, a progressive JavaScript framework, to have an intuitive and responsive front-end experience. The Landing Page serves as a static information site. While the student admission and administrator account portals both linked to the Laravel 11 back end through secure APIs. These portals support student registration, application management, and administrative tasks in a central platform driven by data.

The system's back-end runs on a Linux Ubuntu 24.04 server with Apache2, PHP 8.3.6, and MySQL 8.0.42, which stores all user and admission data. By controlling network access and preventing unauthorized connections, a UFW firewall is integrated for security purposes. Because of this integrated configuration, UCAS is able to keep database services and user interfaces communicating seamlessly. It allows all Philippine SUCs to process admissions in an effective, transparent, and safe manner.

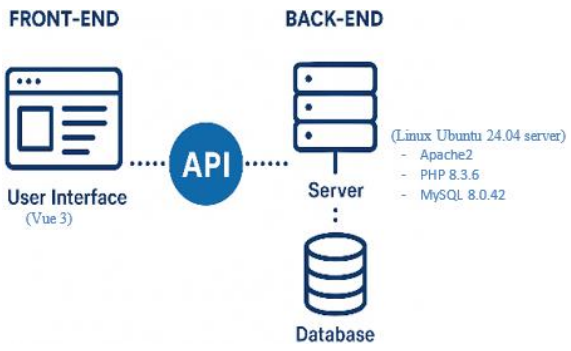


Figure 1. Front-end and back-end interconnectivity

3. RESULTS AND DISCUSSION

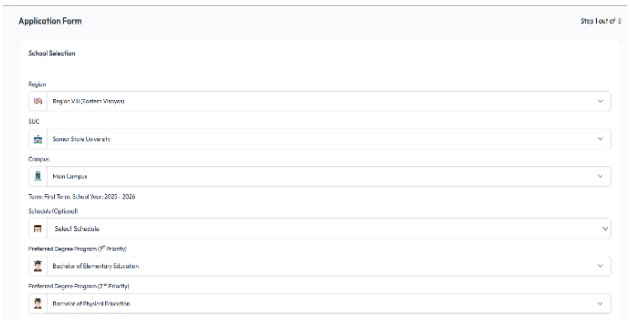
The UCAS is made up of two portals, the student account portal and the administrator account portal. The student account portal allows applicants to complete admission forms, select schools and programs, and indicate their ETS categories, while the admin account portal provides real-time dashboards and analytics for monitoring applications, institutional performance, and equity compliance. UCAS integrates multiple management features to simplify and consolidate the admission process of state universities and colleges. These include the following features:

3.1. Management information system

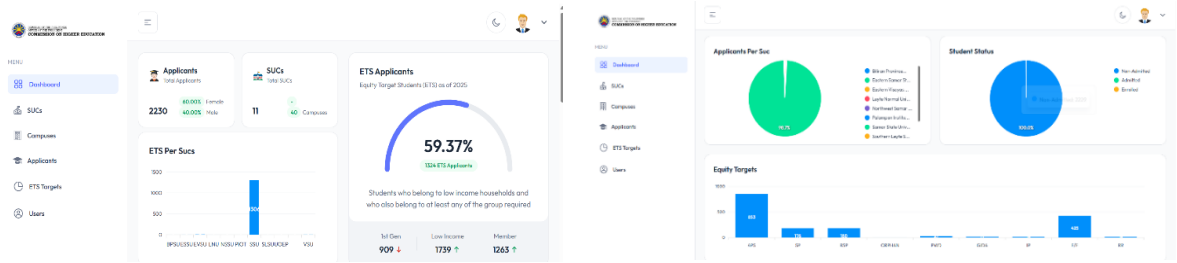
3.1.1. Landing page

Figure 2 presents the landing page for the student-user and administrator. When a student-user first accesses UCAS, the first page that will be loaded is the landing page, as shown in Figure 2(a). The said page will allow the student-user to complete the application form needed for college admission. The information in the student account portal includes school selection, student category, personal information, equity target indicators, family background, and educational background. The school selection information will ask the student to choose which school and program they want to apply to. They are given an option to select their first, second, and third priority programs. In the student category, student needs to select if they are new or old students. They will also be asked to input their basic information about their personal, family background, and educational background. Most importantly, students are required to select which ETS indicators apply to them. The ETS categories are first-generation college student, 4Ps beneficiary, solo parent, child of a solo parent, orphan, person with disability (PWD), living in a geographically isolated and disadvantaged area (GIDA), member of the indigenous people (IP), belongs to a family of farmers/fisherfolk, and belongs to a family of rebel returnees.

On the other hand, the administrator account landing page is shown in Figure 2(b) presents a centralized visual summary of key admission data for SUCs. It is a real-time dashboard that shows applicant count, equity breakdowns, and student status through graphs and charts, enabling easy data interpretation. The key indicators display total applicants, the number of SUCs and campuses, gender distribution, and percentage of ETS from low-income and priority groups. Interactive charts visualize applicant distribution per SUC, student enrollment status, equity targets, and departmental breakdowns. Pie and bar charts show comparative data such as the number of campuses and departments across SUCs. Overall, the Administrator Account landing page helps administrators effectively manage institutional performance, ensure equitable targets, and monitor admissions. At present, the system does not support the offer-making process. This does not evaluate applicants based on criteria, rank candidates, and issue and notify admission offers. Thus, the system is an application repository.



(a)



(b)

Figure 2. The landing page of the (a) student account and (b) UCAS administrator account

3.1.2. Administrator log-in page

The login page is the first page that loads when an administrator logs in to the system. The system will not allow access to the user if they are not listed as an administrator. As shown in Figure 3, to be given access to this account, an administrator must add a user (new administrator) by completing the add user page. In this page, information such as name, email, password, status, and role of the new administrator will be prompted. The roles consist of region admin, SUC admin, and campus admin, where each role relates to a specific level of access and responsibility within the system. This guarantees appropriate data management, accountability, and collaboration among various levels of administration.

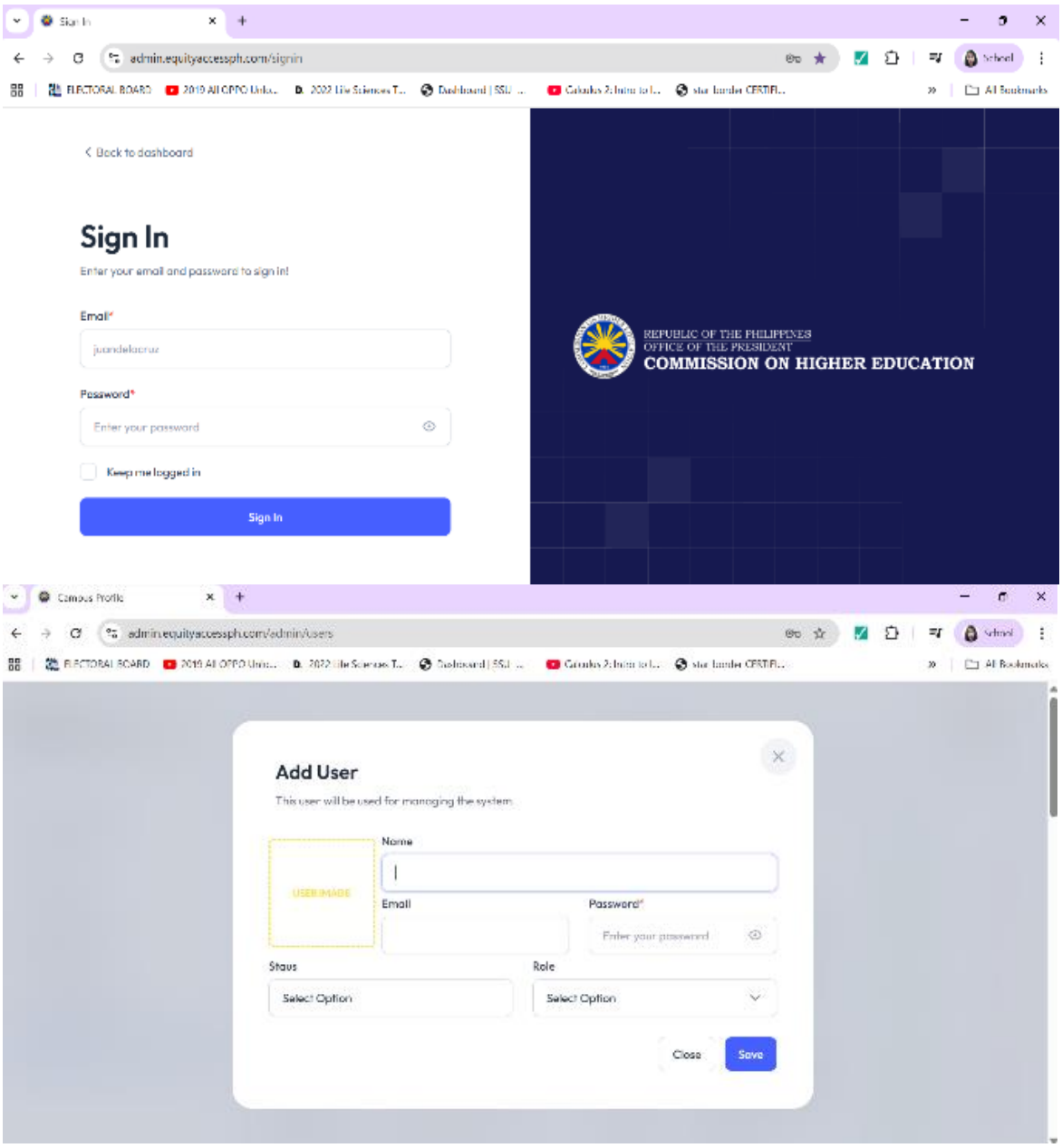


Figure 3. Administrator log-in page and add user account page of UCAS

a) Region admin: this role is responsible for monitoring regional admission statistics, ensuring compliance with equity targets, and generating consolidated reports for the commission on higher education (CHED). The region admin oversees all SUCs and campuses within a specific region.
b) SUC admin: this role manages all campuses under a particular SUC. This manages application files, confirms eligibility, and plans the institution's admissions procedures.

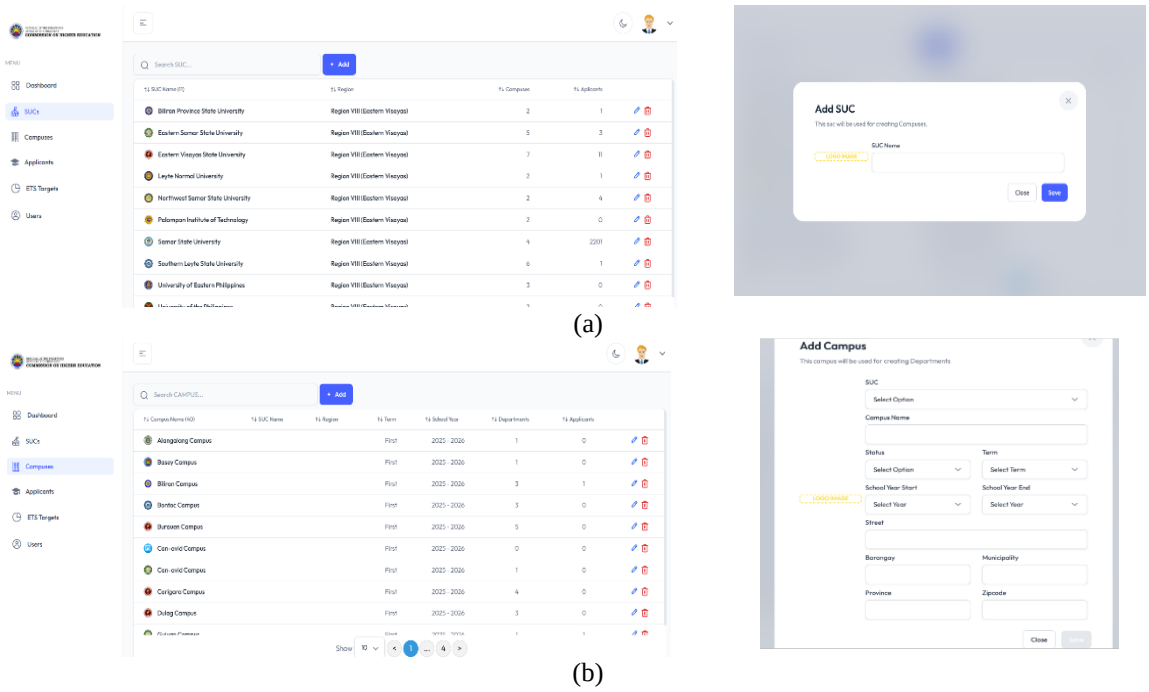
c) Campus admin: this role functions at the most localized level. This manages applications, scheduling, and student information specific to a single campus.

The system's administrator login procedures ensure secure authentication and role-based access control. When a user logs in, their credentials are securely transmitted to the Laravel 11 back end. From there, credentials are checked against encrypted records in MySQL database. Once verified, the system issues a session or token and grants permissions based on the user's role. HTTPs encryption and activity logging support this process, which keeps data secure, private, and accountable across the UCAS platform.

3.1.3. SUC and campus information page

The SUC and campus information page allows the user to see the list of SUCs and campuses in the system. The user can also modify, remove, and add a particular SUC and campus as shown in Figure 4. This component of the system is crucial to the system's ability to administer it effectively and keep institutional data current. Specifically, Figure 4(a) shows the SUC information page, and Figure 4(b) shows the campus information age.

The SUC and campus information page is essential for maintaining proper linkage between applicants and their chosen schools and campuses, generating reliable reports, and supporting transparent coordination across the regional, SUC, and campus levels. Consequently, this provides the administrative flexibility needed to adapt to institutional changes and uphold the integrity of the admission database.



(a)

(b)

Figure 4. Particular SUC and campus (a) SUC information page and (b) campus information page of UCAS

3.1.4. The equity target students information page

The ETS information page provides a detailed overview of ETS and their category based on government criteria. It features a data-driven dashboard that summarizes total applicants, the number and percentage of ETS, as well as the gender distribution among these groups. These data statistics were displayed through visual tools, through a bar graph and a percentage indicator.

In addition, this information page also displays a dynamic applicant table. Information about the individual ETS can be found here, particularly their names, DepEd LRN, and eligibility under different equity indicators. Users can filter, sort, and export data for reporting or validation as shown in Figure 5. The interface is clean and organized, allowing administrators to quickly identify students from marginalized or underrepresented groups. Another feature of the system is being able to generate a report containing information about the student-applicant. Figure 6 is a sample of exported data of ETS in a document format. Overall, this page supports UCAS's goal of promoting fair access to higher education by providing clear insights into how admission applicants relate to national equity targets.

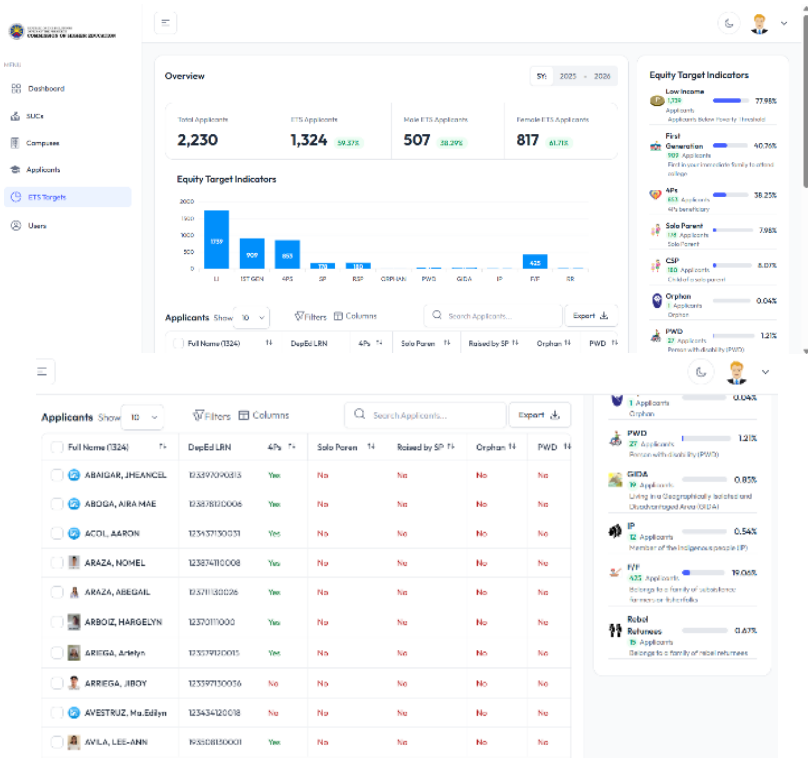


Figure 5. ETS information page of UCAS

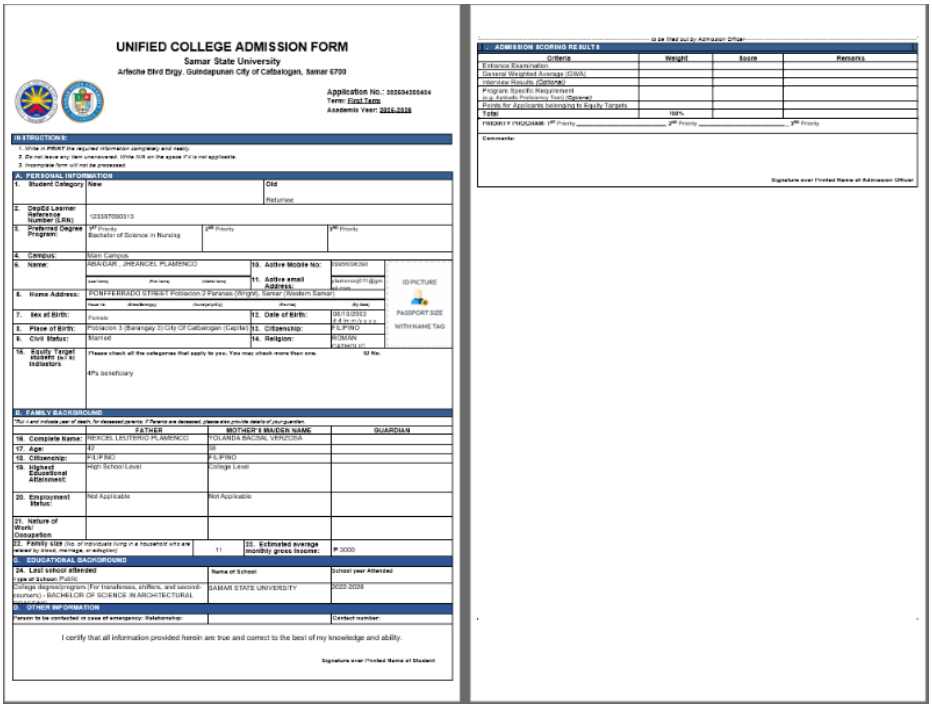


Figure 6. Sample exported data of ETS in a document format

3.2. System evaluation

The UCAS underwent a system evaluation to assess its usability, efficiency, and reliability through pilot testing involving both student users and administrators. A total of 200 incoming students from SSU participated in the evaluation. Additionally, 20 administrators from Samar SSU, DMMMSU, and the USM

took part in the testing. The administrator group included project members, student welfare and development services (SWDS) personnel, and IT experts.

In this study, usability refers to how simple and easy it is to navigate the system and complete tasks. Efficiency evaluates system responsiveness and workflow streamlining. Reliability refers to the stability of the system, accuracy of its data, and how consistently available it is.

Both general students and ETS demonstrate consistently positive evaluations across all dimensions as shown in Table 1. Overall mean scores ranged from 4.21 to 4.36, all interpreted as agree. Based on the result, the usability received the highest rating (M=4.36), which suggests that the system is intuitive and easy to use with established usability standards [21], [22]. Meanwhile, efficiency was also rated highly (M=4.34), indicating effective streamlining of application processes. Although slightly lower, the reliability score (M=4.25) still reflects strong confidence in system stability and accuracy. The minimal differences between General Students and ETS suggest that UCAS provide an equitable user experience.

Table 1. Descriptive statistics on usability, efficiency, and reliability by student-user group

	Group	N	Mean	SD	SE	CV	Interpretation
Usability	General students	113	4.37	0.524	0.049	0.12	A
	ETS	87	4.35	0.539	0.058	0.124	A
	Overall	**200**	**4.36**	**0.53**	-	-	**A**
Effieciency	General students	113	4.33	0.59	0.056	0.137	A
	ETS	87	4.36	0.55	0.058	0.125	A
	Overall	**200**	**4.34**	**0.57**	-	-	**A**
Reliability	General students	113	4.21	0.61	0.058	0.145	A
	ETS	87	4.30	0.60	0.064	0.138	A
	Overall	**200**	**4.25**	**0.61**	-	-	**A**

Interpretation:
4.51-5.00 - strongly agree (SA)
3.51-4.50 - agree (A)
2.51-3.50 - neutral (N)
1.51-2.50 - disagree (D)
1.00-1.50 - strongly disagree (SD)

The evaluation of administrators presented in Table 2 further validates the findings of student-user group results. Usability also received a high rating (M=4.52), interpreted as strongly agree. This indicates that the administrative interface supports management tasks [21], [23]. Efficiency (M=4.37) shows perceived improvements in workflow automation and reduced manual workload. While comparatively lower, the reliability rating (M=4.18) still demonstrates administrator confidence in system dependability and data integrity.

Table 2. Descriptive statistics on usability, efficiency, and reliability by administrator group

	N	Mean	SD	Interpretation
Usability	20	4.52	0.474	SA
Efficiency	20	4.37	0.482	A
Reliability	20	4.18	0.42	A
Overall	**20**	**4.36**	**0.38**	**A**

Interpretation:
4.51-5.00 - strongly agree (SA)
3.51-4.50 - agree (A)
2.51-3.50 - neutral (N)
1.51-2.50 - disagree (D)
1.00-1.50 - strongly disagree (SD)

Overall, the positive evaluations from both students and administrators highlight that UCAS functions effectively as a user-facing admissions platform and an institutional management system. The system's capacity to support centralized decision-making and standardized reporting aligns with the equity and access objectives of Republic Act No. 10931, extending beyond tuition subsidies toward digitally enabled admissions reform.

Finally, Table 3 presents users' willingness to recommend UCAS. Results show strong support across both groups, with 95% of administrators and 85% of students indicating that they would recommend the system. The low proportion of negative responses further underscores broad confidence in UCAS's functionality, usability, and institutional value.

Table 3. UCAS recommendation rates by user group

User group	% Yes	% Undecided	% No
Administrators	95	5	0
Students	85	9.5	5.5

3.3. National implementation and post-deployment evaluation

If national implementation becomes feasible, UCAS will be rolled out through a phased and policy-aligned approach. This will ensure institutional readiness, technical stability, and sustainability. To test the system's interoperability and operational workflows, an initial pilot deployment in selected SUCs across the country will be conducted. Capacity building, governance alignment, and system refinement before the nationwide rollout will follow this initial deployment. Post-deployment evaluation will employ both qualitative stakeholder feedback and quantitative system metrics to assess system performance, equity outcomes, and institutional impact. This enables continuous improvement and evidence-based policy refinement.

3.4. Theoretical and policy implications

The findings from the development and evaluation of UCAS reveal significant theoretical and policy implications for improving equity and access in higher education in the Philippines. Theoretically, UCAS demonstrates how digital systems can support fair policy design by reducing structural barriers and standardizing processes that often disadvantage students from low-income and marginalized groups [24]. Through transparent admission processes and centralized data integration, the system operationalizes long-standing frameworks on social justice, fairness, and opportunity distribution in educational policy.

From a policy viewpoint, UCAS supports and extends the goal of Republic Act 10931 by addressing inequalities that arise before tuition subsidy allocation, especially the barriers to access during the admissions stage [25]. By providing a unified college admission platform, UCAS allows government agencies such as CHED, UNIFAST, and EDCOM II to access reliable, real-time data on the demographics of applicants, participation in ETS, and institutional admission patterns. This data is crucial for targeted intervention and evidence-based policy reform [2]. International studies also indicate that centralized admissions systems lessen information gaps, enhance transparency, and promote fair placement outcomes. This supports UCAS's potential as a national equity tool [13], [12]. Moreover, a unified system reduces fragmentation across SUCs, strengthens accountability, and encourages fairness by making institutional practices match national equity goals. Together, these points suggest that UCAS is not just a technical upgrade but also a vital policy tool for promoting equal access to higher education in the Philippines.

4. CONCLUSION

This study presents the development and pilot evaluation of the UCAS, a centralized and equity-oriented digital admissions platform for Philippine SUCs. Designed as a unified application repository, UCAS standardizes admissions data, consolidates applicant records, and enables real-time monitoring of ETS. Based on Republic Act No. 10931 and in accordance with global best practices in centralized admissions, the system promotes transparency, efficiency, and institutional accountability through data-driven analytics and secure multi-level access. Positive usability, efficiency, and reliability ratings from both student-users and administrators demonstrate UCAS's technical robustness and governance value. With national implementation, UCAS can support fair and evidence-based access to higher education. Continuous system enhancement and alignment with CHED policies are recommended to sustain its long-term equity impact.

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FUNDING INFORMATION

This study was funded by the CHED through its institutional support for research and innovation initiatives. The funding institution provided assistance in gathering through surveys and focus group discussions (FGD) and consolidation of admission-related data that is essential in the development of the system, making sure that the platform is grounded on accurate and representative information. CHED covered support on the development, including software development tools and server infrastructure. Additionally, they assisted the research team in the implementation and evaluation of the system.

AUTHOR CONTRIBUTIONS STATEMENT

This study was a collaborative work conducted by six researchers who significantly contributed to the completion of the project. All the researchers participated in the conceptualization, design, and development of the system.

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C : **C**onceptualization
M : **M**ethodology
So : **So**ftware
Va : **Va**lidation
Fo : **Fo**rmal analysis
I : **I**nvestigation
R : **R**esources
D : **D**ata Curation
O : Writing - **O**riginal Draft
E : Writing - Review & **E**diting
Vi : **Vi**sualization
Su : **Su**pervision
P : **P**roject administration
Fu : **Fu**nding acquisition

CONFLICT OF INTEREST STATEMENT

The authors state no conflict of interest. It is declared that no known competing financial and personal relationships that could have appeared to influence the work reported in this paper.

DATA AVAILABILITY

The data that support the results of this study are available from the corresponding author upon reasonable request. The empirical data used in the design and development of the system including admission records and institutional information are also available from the participating state universities upon request. These datasets are not publicly accessible due to privacy and confidentiality restrictions. However, the system developed in this study can be accessed through its online portals: the Student Account Portal at https://admission.equityaccessph.com and the Administrator Account Portal at https://admin.equityaccessph.com.

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