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BANNER APPLICATION STUDENT PORTAL: ARCHITECTURE, INTEGRATION, AND INSTITUTIONAL BENEFITS IN HIGHER EDUCATION

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Abstract
Student Information Systems (SIS) have become an integral part of higher education organizations for effective student lifecycle management. The design, integration, business benefits, and cloud strategy of Ellucian Banner SIS will be presented in this particular article, especially in terms of its integration at Western Governors University (WGU). Ellucian Banner is an integrated ERP system for organizations in the higher education industry. This allows a unified digital experience for all academic activities, financial activities, and identity management. Service-Oriented Architecture (SOA), RESTful APIs, and middleware platforms of Ellucian Banner allow integration with other student information systems, learning management systems, customer relationship management systems, and financial management systems according to FERPA, GDPR, and ISO regulations. The business benefits of Banner include operational efficiency, cost optimization, and informed decision-making. Banner helps automate enrollment, financial aid, and transcript services, reducing operational costs. Banner helps digital transformation by enabling mobile learning, predictive analytics, and AI-powered advising, thus improving student experience and retention. Banner integrates well with other systems at WGU, such as admissions, LMS, identity management, financial aid, and analytics systems, thus solidifying its position as a system of record and strategic enabler of competency-based education. The article further explores the transition of SIS from on-premise infrastructure to Oracle Cloud Infrastructure by WGU. However, while using cloud infrastructure, it is important to plan properly, sanitize the data, and then monitor the performance. In all the technologies described above, the importance of Banner architecture and integration and cloud technology is evident in the role played by SIS technologies.

Keywords: Cloud Migration, Data Analytics, Digital Transformation, Enterprise Architecture, Student Information System

1. Introduction

The Banner Student Portal acts as a virtual gateway for students to access academic, financial, and administrative information in a timely manner. The Banner Application, created by Ellucian, is a complete Enterprise Resource Planning (ERP) system that many higher education institutions around the world use. The Banner Student Portal was created to increase the overall student experience. The system allows students to efficiently manage their academic journey from admission to graduation through a convenient, anywhere-anytime approach. The system improves efficiency for institutions through a single interface that allows students to access essential information. Ellucian Banner is a complete, web-based administrative software system that many higher education institutions utilize to process information for students, financial aid, and employees [1].

The Self-Service Banner (SSB) portal allows students to register for classes, view grades, manage financial aid, update personal information, and pay tuition in real-time. It provides centralized access to single, secure, web-based platforms for all students' academic and financial transactions. Key tasks include course registration, viewing academic history/transcripts, viewing class schedules, and checking degree evaluations. Students can view and accept financial aid packages, manage student

accounts, and pay tuition fees. It allows for updates to contact details, emergency contacts, and viewing of student records. It integrates with other university systems to ensure a seamless experience for faculty, staff, and students, such as posting grades and providing advisory services. The platform is compatible with Service-Oriented Architecture (SOA), RESTful APIs, and integration frameworks, which allow seamless integration with Learning Management Systems (LMS), Customer Relationship Management (CRM), identity management systems, and analytics tools [4]. This enables a digital campus ecosystem to be created, providing a seamless experience for users.

Aside from its specific role in administration, Banner is an enabler of transformation within an institution. According to Lamey et al., "Enterprise architecture frameworks in the context of HE institutions form the foundation of intelligent solutions that enable the integration of the institution with the ever-changing student expectations." Alammary's blockchain-based model, meanwhile, highlights the potential of SIS systems to move towards a more sustainable infrastructure for cross-institutional enrollments. These innovations place Banner not only as a solution but also as a means of digital transformation.

The new technologies are further enhancing the capabilities of SIS platforms. The technologies in knowledge graphs for use in the field of education enhance interoperability and decision-making capabilities through diverse data sets. Deep learning technologies are being used to predict academic performance. This allows SIS platforms to align with the goal of academic excellence. Smart technologies are also helping to increase agility within institutions. This allows for scalability and innovation in higher education. With all these developments, it can be seen that the Banner Student Portal is more than just a portal. It is a cornerstone of next-generation education delivery, aligning institutional operations with global digital transformation trends [2], [3].

Function Area	Key Features	Impact on Students/Institutions
Academic Management	Course registration, viewing transcripts, checking degree evaluations	Streamlined enrollment and academic tracking
Financial Services	Tuition payment, financial aid acceptance, account management	Real-time financial transactions and transparency
Personal Information	Update contact details, emergency contacts, student records	Improved accuracy of institutional data
Faculty/Staff Integration	Posting grades, advisory services	Seamless collaboration between students and faculty
System Compatibility	SOA, RESTful APIs, integration with LMS, CRM, identity management, analytics	Creation of a unified digital campus ecosystem

Table 1. Core Functions of the Banner Student Portal [1]

2. Design, Business Value & Institutional Benefits.

2.1. Architecture & Design

Western Governors University (WGU) extensively uses the Banner tool to help student enrollment, curriculum, and staff operations. Built on a multi-tier, service-oriented architecture (SOA), the

Banner Student Portal leverages modern web technologies, RESTful APIs, and middleware integration to ensure seamless connectivity across academic, financial, identity management, and learning systems. It supports on-premises as well as cloud-based solutions, which means the institution's strategy is aligned with performance, security, and compliance. Such a system is efficient for the administrators as the student services are automated, and at the same time, the system is accurate, secure, and compliant with the rules regarding the data, as defined by FERPA, GDPR, SOC 2, ISO 27001, etc. Scalability and modernization are achieved with a cloud-ready and mobile-friendly approach.

The presentation layer is a web-based UI, which is constructed using responsive frameworks for desktop and mobile access, supporting single sign-on (SSO) with SAML, OAuth2, or CAS through integration with identity providers in institutions. The application and services layer supports Banner web modules and RESTful APIs, which support Ellucian Experience Platform (EEP) for portal aggregation. The integration and middleware layer uses Enterprise Service Bus (ESB), iPaaS solutions like MuleSoft, and Boomi, which support real-time and batch-based integration with LMS platforms like Canvas and Blackboard, CRM applications, financial systems, and third-party SaaS applications [5]. Banner also supports advanced infrastructure features like Real Application Clusters, Data Guard, and automatic backup and recovery. Data access is controlled through role-based security, and integration with enterprise IAM solutions like Active Directory, Azure Active Directory, and Okta supports strong identity management solutions. MFA and encryption protocols like TLS 1.2+ protect data in transit and at rest. These components collectively demonstrate how modern SIS platforms reflect scalability, interoperability, and compliance, which are key aspects of enterprise architecture in higher education institutions [2].

Layer	Technologies/Protocols Used	Purpose/Outcome
Presentation Layer	Responsive frameworks, SSO (SAML, OAuth2, CAS)	Secure, mobile-friendly access for students and staff
Application & Services	Banner web modules, RESTful APIs, Ellucian Experience	Modular services and portal aggregation
Integration & Middleware	ESB, iPaaS (MuleSoft, Boomi), LMS/CRM/Financial systems	Real-time and batch integration across platforms
Infrastructure Features	Real Application Clusters, Data Guard, backup/recovery	High availability and resilience
Security & Identity	Role-based access, IAM (Active Directory, Okta), MFA, TLS	Strong compliance with FERPA, GDPR, SOC 2, ISO 27001

Table 2. Architecture Layers of Banner Student Portal [2]

2.2. Student Portal Business Value

The portal creates a lot of value with regard to strategy, operation, and finance for higher education organizations. For instance, it helps in the modernization of academic activities. With regard to operation, it helps in the efficiency of operation by facilitating the smooth operation of activities such as registration, financial aid, and transcript services. This helps in minimizing errors and workload [1]. From a strategic point of view, the role of Banner is in supporting the data-driven decision-

making process through the incorporation of analytics and reporting tools that produce insights regarding the performance of the students within an organization [2].
This is in line with the overall strategy for digital transformation within the institution, where the role of intelligent integrated solutions is in the enhancement of the agility and scalability of the institution. The use of blockchain-based models is a case in point regarding the opportunities for the development of sustainable SIS platforms, especially with regard to cross-institution enrollments [3]. The portal can similarly play a role in promoting student success and retention through the provision of personalized services and predictive analytics. For example, deep learning approaches to SIS data have shown considerable promise for forecasting student performance and taking proactive actions [7]. Knowledge graph applications can similarly add value by improving interoperability and facilitating more advanced decision-making with diverse educational datasets [6]. Financially, Banner supports institutions in achieving sustainability by optimizing resource utilization and reducing duplication of services. The open data interfaces, as discussed in the secondary educational environment, emphasize the potential for greater efficiency and transparency with standardized data exchange. Therefore, the above advantages place Banner not only as a system for conducting transactions but also as a means for achieving excellence, regulatory compliance, and innovation [8].

Dimension	Examples of Value Creation	Institutional Benefit
Operational Efficiency	Automation of registration, transcripts, financial aid	Reduced workload, minimized errors
Strategic Decision-Making	Analytics, reporting tools, forecasting, retention planning	Evidence-based institutional strategies
Digital Transformation	API backbone, mobile learning, AI advising, blockchain	Competitive differentiation and innovation
Student Success	Personalized services, predictive analytics	Higher retention and satisfaction
Financial Sustainability	Resource optimization, reduced duplication, open data	Transparency and long-term viability

Table 3. Strategic Business Value of Banner [3]

2.2.1 Operational Efficiency and Cost Optimization

Moreover, the automation of various academic activities such as course registration, transcript processing, fee payment, and financial aid management could assist in the reduction of manual intervention and operation expenses. The use of Banner has helped various higher learning institutions automate various academic activities, which has helped reduce manual intervention and increase the number of services rendered.

2.2.2 Data-Driven Decision Making

Banner helps this process by providing real-time analytics, dashboards, and reporting tools that could be used to assist higher education institutions in strategic decision-making. Advanced data insights could be used to assist higher education institutions in forecasting, retention, financial planning, academic performance, etc.

2.2.3 Digital Transformation and Innovation Enablement

Through its API-based approach, Banner facilitates digital transformation for the higher education industry. It is a digital backbone for the campus environment. Institutions can rapidly deploy digital innovation services, including mobile learning, predictive analytics, artificial intelligence-based academic advising, etc. Such digital innovation services foster digital maturity for the higher education industry, which becomes a competitive differentiator [3]. Blockchain infrastructures are a good example of the potential for SIS platforms to evolve toward sustainable, secure, and scalable digital infrastructures [3]. Banner's integration of AI and predictive analytics supports innovation that impacts student success and institutional competitiveness [7].

2.2.4 Enhanced Student Experience and Retention

A seamless digital experience helps in achieving a high student satisfaction rate. This, in turn, enhances student retention. Students receive a digital experience, which is available 24/7. This helps in providing real-time academic insights to students.

2.3. Portal Benefits

2.3.1 Academic Excellence and Student Success

Seamless digital experience improves student retention. A digital experience is provided to the students, who can access it 24/7. This enables real-time academic insights to be provided to the students [7]. Personalized academic paths with the support of knowledge graphs and AI-based advising improve retention rates [10]. By providing a 24/7 academic experience, Banner meets the expectations of students for flexibility and accessibility.

2.3.2 Governance, Compliance, and Risk Management

The compliance framework and audit tools assist in enhancing governance, regulatory compliance, and risk management in an organization. Timely submission of reports to accrediting bodies and government agencies will be achieved through automated reporting [2]. Banner's adherence to FERPA, GDPR, and ISO standards ensures institutions meet global compliance requirements [4].

2.3.3 Institutional Agility and Scalability

Banner's cloud-based solution will enable an organization to benefit from agile scalability in terms of student enrollment management, registration season management, and institutional growth without requiring infrastructure investments [3]. Smart digital technologies further support scalability by enabling flexible deployment models [8].

2.3.4 Collaboration and Stakeholder Engagement

Banner will enable students, faculty, administrators, and academic advisors to collaborate on a single platform [6]. Knowledge graph-based systems can also increase collaboration through connecting stakeholders to data environments, thus promoting transparency and engagement [6].

2.3.5 Financial Sustainability and ROI

Banner's financial sustainability is based on a strong return on investment (ROI), which is achieved through reduced operational costs, improved student enrollment and retention, optimized staffing models, faster service delivery cycles, improved regulatory compliance, and reduced risks for non-compliance with regulations [9]. Open data interfaces also prove the value of standardized data exchange for improved financial sustainability [9].

3. WGU Integration with Banner

Western Governors University (WGU) has a highly integrated cloud-first digital student environment with Ellucian Banner as the core Student Information System (SIS) for student lifecycle management, academic records, financial activities, and identity orchestration. The presence of operational maintenance notifications and system downtime notifications verifies that WGU's student portal and academic systems are tightly integrated with Banner, which is an indication that

Banner is the system of record for student information, academic records, and financial activities. WGU has integrated Banner with the MyWGU application using Single Sign-On (SSO) protocols such as SAML 2.0 and OAuth 2.0 with Azure Active Directory and other IAM solutions. Through this application, students log in to my.wgu.edu to access their academic services. If problems occur in login, students will be required to create a permanent student account. The portal will be used to view information such as mentors, course registration, term progress, competency units, and program completion. The students will be able to view course content such as videos and textbooks. They will also be able to enroll in courses. Additionally, links to IT services, financial aid, and other student services are provided. Banner helps in automation of course provisioning, faculty assignment, and term structures. The students can add or drop courses and even withdraw from courses whenever they want. This helps reduce tickets to the help desk and improves student compliance with enrollment rules [5].

3.2. Key Integration Areas Between WGU and Banner

3.2.1 Admissions & Enrollment Management Integration

Banner integrates with the CRM system and the admissions management system. The system is able to automate the student application system, admission confirmation, and program assignments. Such integration allows for near-real-time updates, which enable students to move from the application to course enrollment with minimal manual intervention. Such automation is in line with the principles for designing enterprise architectures for higher education institutions [2]

3.2.2 Learning Management System (LMS) Integration

WGU's LMS is highly integrated with Banner to ensure synchronization of student enrollment information, course registration, academic progress, test scores, and graduation status. It is a two-way integration that facilitates the maintenance of academic records, real-time student information, and grading. It is compatible with the competency-based education (CBE) method used by the WGU, which is based on the acquisition of competencies rather than semester credit hours. Research on the student portal has shown that the integrations enhance operational efficiencies and student engagement [5].

3.2.3 Identity Management & Single Sign-On (SSO)

Banner integrates with WGU's enterprise identity systems to offer SSO, role-based access control, and MFA. This creates a safe platform for academic activities even as it offers a seamless login experience for students, faculty, and staff. The integration of Banner with IAM systems such as Active Directory and Okta (Page 1 of 2) enhances identity orchestration and improves standard conformance globally [4].

3.2.4 Financial Aid & Student Accounts Integration

Banner integrates with the financial system for managing tuition billing, payment processing, financial aid disbursement, scholarships, grants, and refunds. Integration with the financial system is essential for generating correct financial reports in real-time. Research on the importance of the role of enterprise architecture in higher education institutions indicates the importance of integrated financial management for sustainability [2].

3.2.5 Data Analytics & Institutional Reporting

Banner provides data to cloud-based analytics systems, facilitating enrollment forecasting, student retention analysis, academic performance monitoring, as well as compliance and operation KPI monitoring. This facilitates WGU management with data-driven decision-making capabilities. Knowledge graph-based technologies improve the interoperability and accuracy of reports through the integration of multiple data sources [6]. Smart digital technologies offer continuous improvements to analytics, allowing institutions to respond to ever-changing student needs through

flexibility [8].

4. Cloud Migration Strategy for Student Information System (SIS)

Western Governors University (WGU) successfully migrated its Student Information System from on-premise infrastructure to Oracle Cloud Infrastructure (OCI). The migration life cycle began with a thorough assessment and planning phase. This phase involved a thorough audit of the legacy infrastructure to determine the components that could be migrated. The long-term objectives were well defined to ensure scalability, security, and a superior end-user experience. Data sanitization was also a top priority to ensure the removal or cleaning of old data, which helped reduce costs and complexity. The security of the system was a topmost priority, with end-to-end encryption used during the migration and post-migration phases to ensure the security of student and institutional data [2].

The benefits of using a unified cloud platform are numerous. For instance, cloud applications offer unlimited scalability. This allows institutions to increase resources as required without any physical limitations. Additionally, vendors are always adding new features to cloud applications. For example, mobile computing extensions, artificial intelligence, and machine learning capabilities are all added features. Unlike traditional on-premise systems, where institutions have to undertake significant upgrades to ensure that they are using the latest version, cloud applications are automatically updated with new features and security improvements by the SaaS provider [3]. Security is another advantage of cloud computing. SaaS applications in cloud data centers are far more secure than in-house applications due to strict compliance implementations. This helps the institution comply with regulatory requirements such as FERPA, GDPR, SOC 2, and ISO 27001. This is a critical requirement for student information security [4]. However, it is critical for the university to understand the shared responsibility of cloud security, which includes access control, encryption, and logging [8].

Cost optimization is a major driver of cloud migration. By reducing capital expenditure on physical infrastructure, institutions shift to an operational expenditure model. This allows for predictable budgeting and resource allocation. Nevertheless, the constant costs of data transfer, storage, and computation need to be analyzed to avoid any surprises. Cost analysis is highly recommended before migration for sustainability [9]. Performance factors are also important considerations. Latency in the network and internet connectivity might affect the performance of the application. Bandwidth is also important for the smooth running of the application [5]. Scalability is one of the most valuable features of cloud hosting. Institutions can quickly scale resources up or down in response to enrollment fluctuations, registration peaks, or new program launches. This elasticity is beneficial for agility and growth without any further hardware investment [3]. Middleware technologies such as an enterprise service bus or iPaaS enable integration with LMS, CRM, and financial applications in an interoperable manner for SIS platforms in the cloud environment [5].

The security issue in higher education is a complex issue. The institutions face the challenge of providing robust security for their data, on the one hand, and the culture of openness and collaboration, on the other. This is a complex issue when considering the hosting aspect. The providers have to ensure that they provide security for the institutions, considering the culture of openness and collaboration. In addition, the institutions use various providers who offer different services, which are integrated with the SIS platforms. Therefore, the migration plan has to consider the providers to ensure a smooth migration. A successful migration strategy will ensure that there are no instances of downtime, loss of data, and minimal impacts on the users. A detailed testing strategy has to be followed to ensure that the correct functioning of the application is ensured.

Emerging technologies further enhance cloud migration outcomes. Knowledge graph-based approaches improve interoperability and data consistency, while smart digital technologies provide iterative improvements in scalability and performance [6], [8]. These innovations position cloud-based SIS platforms as strategic enablers of institutional transformation, supporting both operational efficiency and student success.

Migration Phase	Key Activities	Outcomes/Benefits
Assessment & Planning	Audit of legacy infrastructure, define long-term goals	Clear roadmap for scalability, security, UX
Data Preparation	Data sanitization, removal of outdated records	Reduced costs and complexity
Security Implementation	End-to-end encryption, compliance with FERPA/GDPR/ISO	Protection of student and institutional data
Performance Considerations	Bandwidth, latency, middleware integration	Smooth application performance and interoperability
Strategic Benefits	Scalability, cost optimization, automatic updates	Institutional agility, sustainability, and student success

Table 4. Cloud Migration Strategy at WGU [5]

Conclusion

Banner Student Portal is a secure, scalable, and extensible IT solution that assists higher education institutions in delivering high-performance student services with enterprise reliability, security, and compliance. Banner Student Portal is a strategic solution for digital transformation within a higher education institution because of its modularity, integration, and cloud readiness. Banner Student Portal integrates academic, financial, and administrative services, enabling a higher education institution to achieve operational efficiency, agility, and optimization. The portal can be used for providing operational support for student services management, which includes admission, enrollment, academic services, financial services, and compliance. Its modular platform is used for seamless integration with learning management systems, identity systems, and analytics environments, providing real-time services for decision-making. The institutions will benefit from enhanced student engagement, operational effectiveness, system dependability, and regulatory compliance, all of which are essential for organizations of scale. The platform will also allow universities to provide student-centric learning experiences that are flexible and accessible, thereby improving student retention and academic performance. The creation of a cloud migration strategy will further enhance the Student Information System to become a digital foundation for next-generation education delivery.A cloud-based SIS platform will offer scalability, financial viability, and institutional agility, along with student performance excellence. By harnessing cloud technology, educational institutions will be able to achieve academic excellence, relevance, and leadership in a digital world of higher learning. Its modular platform is used for seamless integration with learning management systems, identity systems, and analytics environments, providing real-time services for decision-making. The institutions will benefit from enhanced student engagement, operational effectiveness, system dependability, and regulatory compliance, all of which are essential for

organizations of scale. The platform will also help universities provide student-centric learning experiences that are flexible and accessible, thus improving student retention and academic performance. The creation of a cloud migration strategy will also help enhance the Student Information System to become a digital foundation for the delivery of next-generation education.A cloud-based SIS platform will offer scalability, financial viability, and institutional agility, along with student performance excellence. By harnessing cloud technology, educational institutions will be able to achieve academic excellence, relevance, and leadership in a digital world of higher learning.

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