EdgeCon Proceedings

Automating Freshman Course Placement and Registration: A Case Study

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Abstract

This implementation report explores Rowan University's efforts to automate first-year course placement and registration. Historically, Freshman Instructional Guides (FIGS) at Rowan were manually executed, requiring significant time from Testing Services, University Advising, and the Registrar's Office to evaluate placement needs and assign students to courses. Given the 57% surge in first-time degree-seeking student enrollment over a decade, the manual processes became increasingly unsustainable. In response, a cross-departmental team developed a comprehensive automated process to integrate data from Banner (Student Information System), Google Sheets maintained by Advising, and other sources. This computerized process classifies students by program groupings, determines primary and secondary course placements, checks Banner for real-time availability and constraints, and completes bulk course registration for first-year students. The resulting system processed over 3500 incoming students, saving over 350 hours

annually, reduced the potential for human error, and enabled staff to shift focus from administrative work to strategic advising. This report outlines the implementation context, design architecture, technical integration, assessment methods, lessons learned, and practical implications for institutions with similar challenges.

Keywords: freshman registration, placement automation, student information system, academic advising, course planning, institutional efficiency

1. Introduction and Implementation Context

Rowan University, located in Glassboro, New Jersey, serves over 22,000 students across a diverse range of academic programs. With a 57% increase in first-time degree-seeking (FTDS) enrollment over the past decade, Rowan's traditional Freshman Instructional Guides (FIGS) process for onboarding new students became increasingly difficult to manage. This manual approach —interpreting placement scores, reviewing transfer credits, and assigning foundational courses such as math, chemistry, and English —was carried out collaboratively by Testing Services, University Advising, and the Registrar's Office. Similar bottlenecks have been observed at other institutions facing enrollment growth without scalable registration systems (Crosta, 2013).

In response, Rowan University implemented a technology-driven solution to automate freshman placement and registration. Automated registration tools have helped institutions reduce delays and streamline scheduling, especially when student volume and placement complexity increase (Lane & Lyle, 2020). This approach aligns with guided pathways models, which emphasize proactive, structured course enrollment as a driver of student momentum (Bailey, Jaggars, & Jenkins, 2015). Early course placement and sequence planning can also reduce credit loss and support degree completion (Klempin & Karp, 2015).

A cross-functional team developed the automation effort at Rowan from the Office of Institutional Research & Analytics (OIRA), Registrar, Business Intelligence, Software Development, Testing Services, and Advising. The team's goal was to create a scalable, rules-based system that enhanced placement accuracy and aligned with Rowan's broader mission to improve advising efficiency, expand course access, and support student success, an approach consistent with the principles outlined in Bailey et al. (2015) and Lane and Lyle (2020).

Similar automation initiatives have emerged across higher education as institutions confront the growing complexity of placement and registration. For example, Arizona State University and Georgia State University have implemented guided, data-driven onboarding models that integrate advising rules directly into registration workflows (Bailey & Mabel, 2022; EDUCAUSE, 2023). The University of Central Florida has also adopted an automated degree audit and registration framework that uses predictive analytics to preassign courses based on student pathways (Ellucian, 2023). These initiatives reflect a national shift toward digital transformation and process automation in student services (Tyton Partners, 2022; EDUCAUSE Horizon Report, 2024). They emphasize scalability, transparency, and equity through technology-enabled advising (NACADA, 2021; Bailey et al., 2023).

The approach outlined in this case study contributes to this growing body of practice by demonstrating how a university can use existing systems, such as Banner and advising-managed datasets, to achieve comparable efficiencies without relying on external vendors or large enterprise systems.

2. Background and Rationale

Before this automation effort, placement and registration were managed using static spreadsheets, manual comparisons of Banner data, and individual case reviews. Testing Services downloaded standardized test scores and transcript data and applied institutional placement rules via Excel-based workflows. Advisors then matched placement outcomes to appropriate course levels, carefully considering co-requisites and program-specific restrictions, student by student.

At its peak, this process consumed over 350 combined staff hours annually and was vulnerable to delays, inconsistencies, and human error. With freshman enrollment surpassing 3500 students in fall 2024, this manual effort became very time-consuming and error-prone. Errors such as incorrect placement or unnecessary testing could impact student satisfaction and progression.

Recognizing the growth and risk involved in error-prone manual assignments, Rowan sought a centralized, scalable solution aligned with its goals for student success, digital infrastructure, and institutional agility. The project brought together multiple functional and technical units to develop a sustainable automation framework that would modernize and streamline freshman registration.

3. Implementation Approach

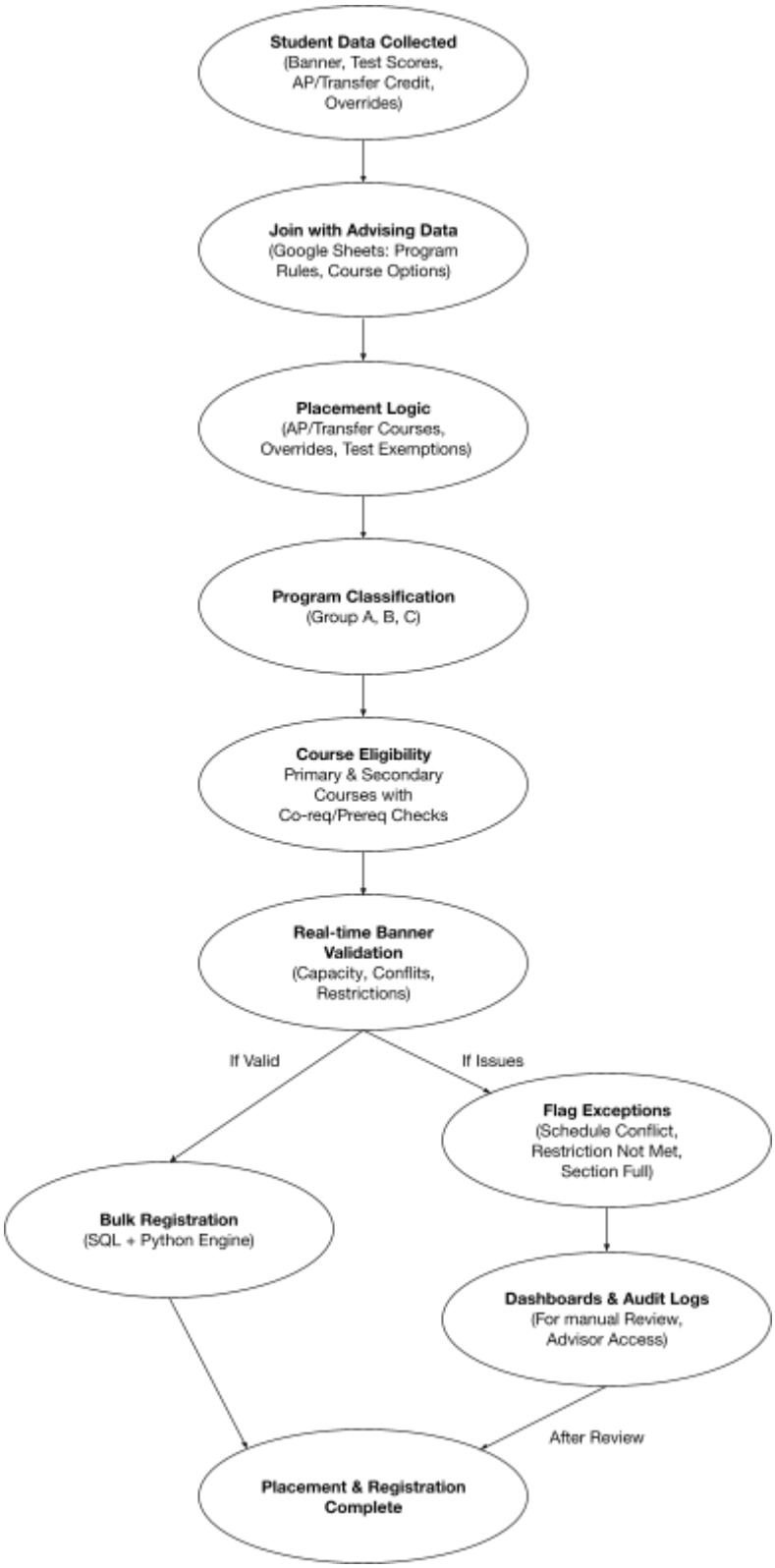
The implementation followed a structured yet agile development framework as shown in Figure 1 and Figure 2. Initial planning began in Spring 2021, with a pilot rollout in Fall 2021 and iterative improvements through 2025.

Figure 1

Overall Flow of FIGS Process

Figure 2

FIGS Process Details



4. Technical Implementation Details

The system's architecture comprised multiple modular Extract, Transform & Load (ETL) jobs orchestrated to process student placement and registration in stages. At the core of the system was an ETL pipeline built using Veera Construct, Rowan's enterprise data integration platform. As illustrated in Appendix 1, the pipeline extracted student data from Banner, including test scores, transfer credits, program codes, and demographic information, and joined it with external sources, such as advising-maintained Google Sheets.

The logic engine, built in Veera Construct, applied over 30 program and score-specific placement rules. It assigned students to program groups (A–E), evaluated exemption eligibility, and selected course groupings based on predefined advising templates. This included logic for dual placement, developmental coursework, and exceptions.

The final stage in the pipeline passed course assignments to a bulk registration engine. This component dynamically queried Banner to verify section availability, identify restrictions such as cohort attributes or major restrictions, and confirm no time conflicts existed. If all placement and eligibility conditions were satisfied, the student was automatically enrolled. Records with conflicts were flagged for advisor follow-up.

The system supports incremental refreshes and nightly runs, enabling rapid incorporation of new data. Audit logs track rule application, registration status, and exception categories.

5. Evaluation Methods and Metrics

To ensure the system performed as expected, a series of detailed test cases was developed prior to rollout. These cases covered a wide variety of student profiles, including EOF students, COMP (composition) placements, and those needing specialized 101 sections.

Business Intelligence and Advising validated the system by comparing expected outcomes against automated results. Dashboards and audit reports (Appendices 2 and 3) enabled advisors to confirm placement accuracy and provide real-time feedback.

The Registrar's Office verified that automated enrollments complied with course restrictions, section attributes, and capacity constraints. Any anomalies were reviewed collaboratively and addressed through refinements.

6. Results and Outcomes

The most immediate benefit of the implementation was a substantial reduction in manual workload across multiple departments. Testing Services reported saving over 150 hours per year; University Advising reclaimed approximately 100 hours; and the Registrar's Office saved around 100 hours previously devoted to reviewing placement data and matching students to appropriate courses. These savings enabled staff to redirect their efforts toward proactive advising, academic coaching, and strategic planning.

Beyond operational efficiency, the system demonstrated high accuracy in placement determinations, significantly reducing manual errors. Advisors expressed greater confidence in the results, and the transparent, rule-based decision logic allowed them to understand and explain placement outcomes with clarity. This enhanced trust in the system and improved the overall advising experience.

A key academic benefit of accurate placement is its role in supporting timely degree progression. When first-year students are placed directly into the correct foundational courses, they are more likely to complete key prerequisites early. This enables them to access higher-level major courses in the appropriate semesters, reducing the risk of delays in program completion. Incorrect placements —either too advanced or too remedial —can lead to wasted semesters, unnecessary credits, or gaps in academic momentum.

The automation also improved academic departments' curriculum planning capabilities. By aggregating and applying placement logic earlier in the enrollment cycle, departments could better forecast course demand, especially for high-enrollment or sequential courses. Preliminary registration rosters became available weeks in advance, giving academic schedulers more time to open additional sections, identify bottlenecks, and reduce last-minute changes that disrupt student schedules.

This system not only streamlined internal processes but also created conditions for stronger student outcomes. Accurate, early placement into the right courses puts students on a more straightforward academic path from the outset, helping them stay on track, avoid course sequencing delays, and ultimately graduate on time.

7. Challenges and Solutions

One of the key challenges during implementation was handling inconsistencies in student data, particularly when test scores conflicted with transfer credit or when students changed majors mid-process. The team addressed this by introducing nightly refresh logic and creating exception alerts.

Another challenge was building trust in the automated decisions. To address this, the project team hosted walkthroughs, opened the logic to advisor review, and provided override mechanisms. Over time, stakeholders expressed increased confidence in the system's outputs.

There were also technical hurdles with the Banner integration. These included aligning registration logic with Banner's enforcement of section restrictions and student eligibility flags. To overcome this, the team developed custom queries that adhered to institutional data definitions and ensured the automation respected Banner's structure for course prerequisites, cohort rules, and attribute-based permissions. Ongoing collaboration with the Registrar's Office helped verify that the registration logic honored existing workflows and that any exceptions were addressed early in the process.

8. Lessons Learned and Best Practices

Several key lessons emerged. First, stakeholder engagement throughout the process ensured higher adoption and better alignment with institutional needs. Second, transparent rule documentation facilitated trust and ongoing maintenance. Third, designing the system to be flexible and easily updated by non-technical users improved sustainability. Training new staff using the dashboards proved to be more efficient than onboarding them to spreadsheet-based methods. The implementation reaffirmed the value of automating repeatable, rule-driven processes and demonstrated that institutional data systems can be leveraged creatively to support student success. Fourth, cross-functional governance is essential. Establishing a standing "Placement Automation Team" with representation from Advising, Testing Services, and IT ensured ongoing rule accuracy and quick resolution of exceptions—another important lesson involved managing unanticipated data issues that emerged during implementation.

Early iterations revealed that even minor inconsistencies, such as missing or delayed updates to cohort codes, major-based section restrictions, or attribute tags in Banner, could prevent eligible students from being automatically placed or registered. Ensuring that these data elements were entered accurately and on schedule proved critical to the system's success. The project team learned to coordinate closely with the Registrar's scheduling timeline and to include validation checks that flag missing or outdated restriction codes before each automation run. Establishing clear data governance practices and accountability for these updates was essential for sustaining reliability and scalability.

9. Sustainability and Future Development

Recent developments in higher education technology highlight the growing role of artificial intelligence and process automation in supporting student onboarding and advising. Institutions are increasingly using AI-driven logic to interpret placement criteria, generate course recommendations, and automate registration decisions (Bailey & Mabel, 2022; EDUCAUSE, 2023). These trends demonstrate how the next generation of placement systems

will combine data governance, analytics, and intelligent automation to enhance equity, transparency, and scalability across academic operations.

The current system at Rowan is sustained through shared ownership across OIRA, Business Intelligence, Software Development, University Advising, and Testing Services. Placement rules are reviewed annually and adjusted to reflect updated policies or curricular changes. The architecture remains flexible and supports scalable updates without requiring complete redevelopment.

Looking forward, the next significant evolution involves integrating generative AI to simplify and scale rule deployment. Instead of manually configuring placement logic in ETL workflows, users can provide a structured document containing rules, such as exemption criteria or course eligibility conditions, which the AI will interpret and apply dynamically. This will reduce maintenance overhead, accelerate onboarding for new programs, and provide greater transparency.

Additional enhancements under consideration include real-time scheduling conflict detection, integration with academic advising tools, and a student-facing chatbot that explains placement outcomes and offers tailored support resources. These tools aim to improve the student experience further and align placement with evolving institutional strategies. Annual evaluations will continue to guide improvements and ensure that the system remains responsive to academic needs and stakeholder feedback.

10. Conclusion

This paper demonstrates how Rowan transformed a manual, error-prone first-year course placement and registration process into an automated, data-driven system. The automation of Rowan's FIGS process has successfully transformed a high-volume, labor-intensive operation into a scalable, transparent, and accurate system. The result is a 350-hour reduction in staff time annually, improved placement accuracy, and enhanced capacity for student-centered advising. To quantify time savings, each participating office documented the average time required for key tasks during the 2020 cycle, including placement rule application, manual course matching, and registration verification. These baselines were compared against the automated process using the same number of students in 2020. The cumulative difference across Testing Services, Advising, and the Registrar's Office yielded an estimated 350 hours of annual time savings. This calculation was validated through staff time logs and system-generated processing metrics.

By embedding automation into a previously manual process, Rowan University improved operational efficiency and reinforced its commitment to student success. The collaboration across institutional units and the adaptability of the technical framework underscore the importance of investing in sustainable, data-driven process redesign. The initiative serves as a

replicable model for institutions seeking to modernize registration and placement processes using their existing student information systems.

Acknowledgements

The authors would like to acknowledge the staff at Rowan University, including Dr. Rory McElwee, Vice President for Student Affairs; Amy Ruymann, Assistant Vice President for Academic Support, Advising, and Analytics; Christopher Fields, Assistant Registrar of Enrollment Reporting & Compliance; Linda Drexel, University Registrar; Christopher Taylor, Assistant Director for Student Success Technology and Data Analytics; Isaac Strozyk, Business Intelligence Analyst; and Himadriben Patel, Senior Business Application Developer, for their contributions and collaboration in the development and implementation of the bulk registration process.

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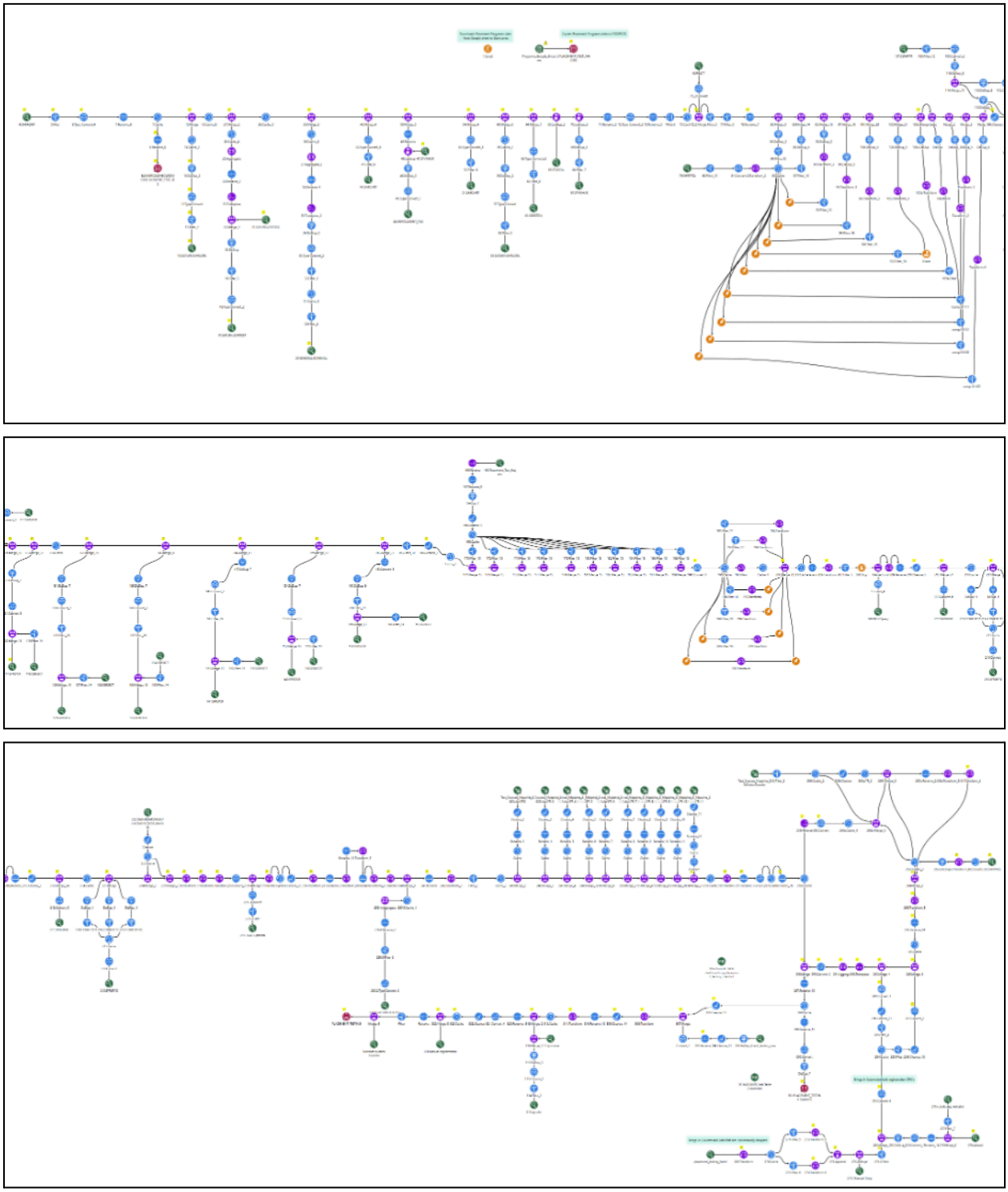
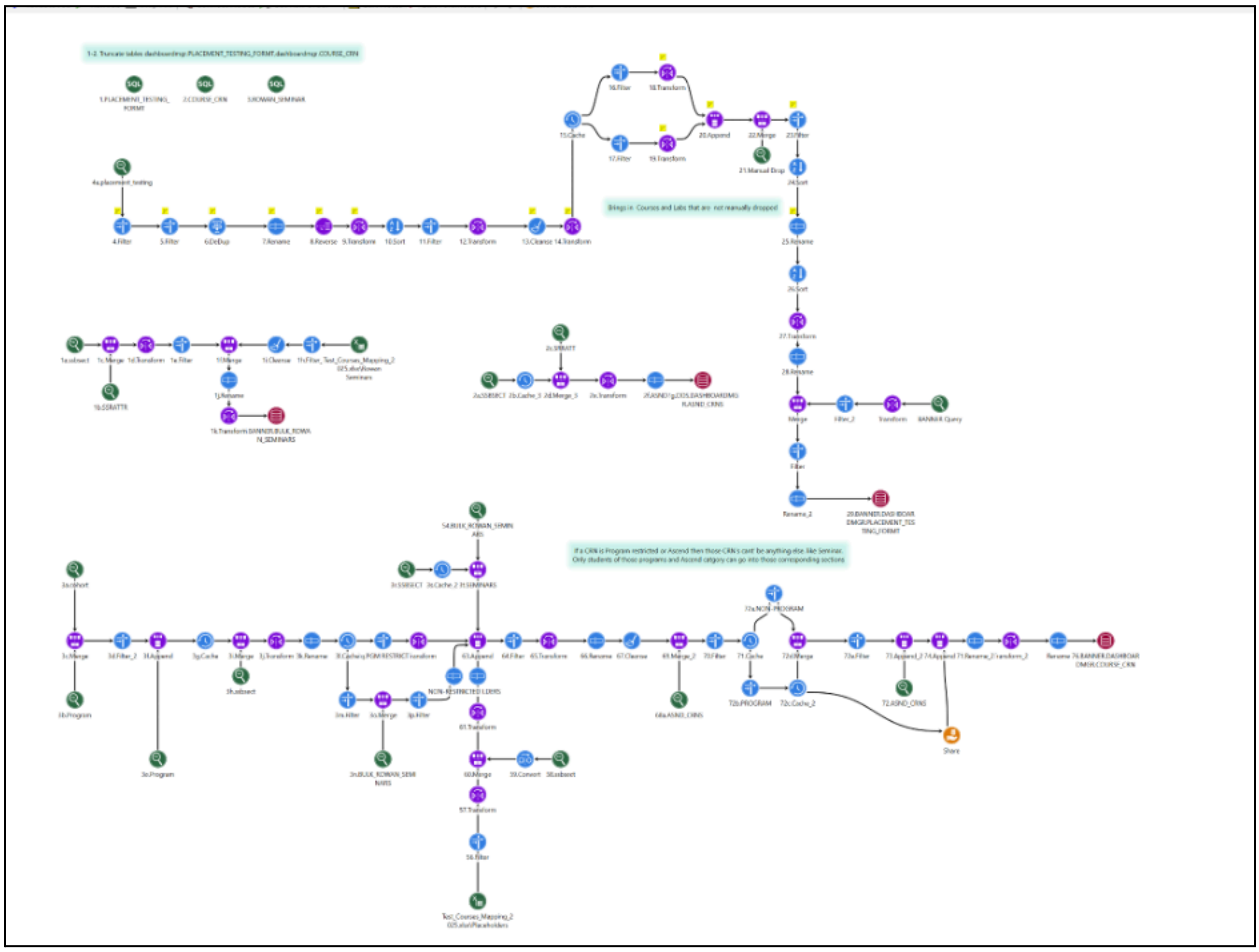
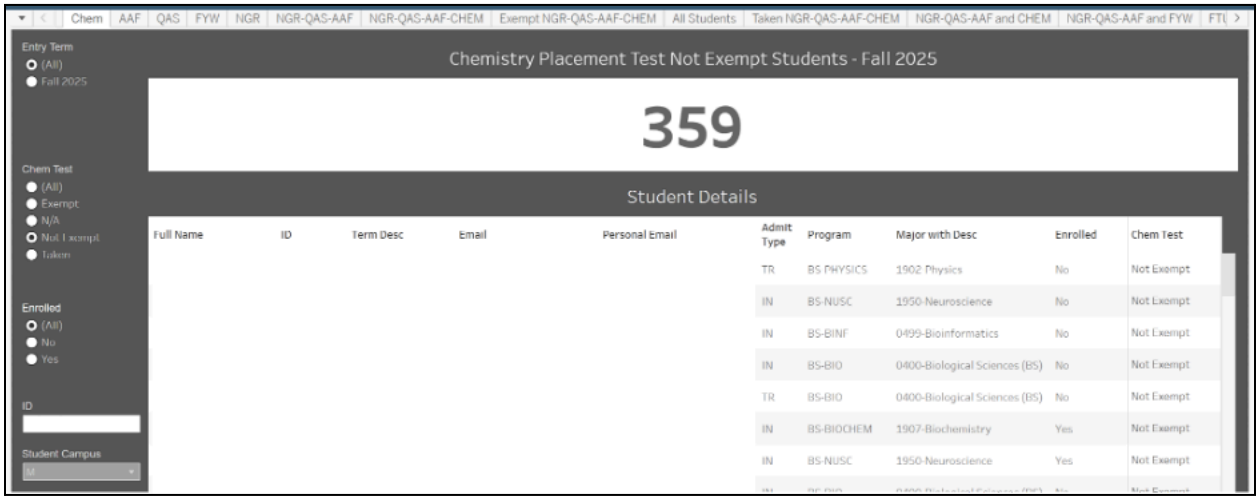
Appendices

Appendix 1: Veera Construct Job for Course Assignments





Appendix 2: Placement Testing Dashboard



Appendix 3: Bulk Registration Report