Building a Successful Credit Mobility Platform

Lessons from CUNY Transfer Explorer

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ITHAKA S+R

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Introduction

Students now have more opportunities to earn college credit at more points in their educational journey than ever before.[1] But moving that earned credit into and between institutions of higher education so that the earned credit applies to a program of study has proven a persistent and stubborn challenge for many students. Studies have concluded that students who lose significant amounts of earned college credit when moving to a new institution have lower chances of graduation[2] and that students report transferring credits as one of their biggest barriers[3] in the transfer process. Despite this challenge being well documented and widely acknowledged by higher education institutions and systems, it has been difficult to overcome, and outcomes for transfer students have remained fairly static. A study from the Community College Research Center released earlier this year showed that only 16 percent of community college students transferred and completed a bachelor's degree within six years.[4]

Many systems and institutions have implemented credit mobility technology solutions to help overcome this barrier in the transfer process. These solutions have ranged greatly in purpose, data sources, and functionality with many being developed to support a particular state or region and a smaller set designed to support national transfer exploration. Institutions are both purchasing solutions from student information system providers and for-profit companies and building customized

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[1] Sarah Pingel, Chau-Fang Lin, and Martin Kurzweil, "Holistic Credit Mobility: Centering Learning in Credential Completion," *Ithaka S+R*, 16 November 2022, https://doi.org/10.18665/sr.317882.

[2] David B. Monaghan and Paul Attewell, "The Community College Route to the Bachelor's Degree," *Educational Evaluation and Policy Analysis* 37, no. 1 (2015): 70–91, https://www.jstor.org/stable/43773487.

[3] Alexandra Logue, Yoshiko Oka, David Wutchiett, Kerstin Gentsch, and Stephanie Abbeyquaye, "Possible Causes of Leaks in the Transfer Pipeline: Student Views at the 19 Colleges of The City University of New York," *Publications and Research*, 18 July 2022, https://academicworks.cuny.edu/gc_pubs/901.

[4] Tatiana Velasco, John Fink, Mariel Bedoya-Guevara, Davis Jenkins, and Tania LaViolet, "Tracking Transfer: Community College and Four-Year Institutional Effectiveness in Broadening Bachelor's Degree Attainment," *Community College Research Center (CCRC)*, 1 January 1970, https://ccrc.tc.columbia.edu/publications/Tracking-Transfer-Community-College-and-Four-Year-Institutional-Effectiveness-in-Broadening-Bachelors-Degree-Attainment.html.

solutions in-house to support their communities. Particular functional areas such as admissions, registrar, and academic advising all have nuanced needs for transfer technology, and solutions that support those unique needs are being adopted by institutions to aid recruitment or make a particular institution's credit transfer rules available via their website. This rapid proliferation of a variety of technology solutions points to the important role of supportive technology in credit mobility, as well as the difficulty in designing a solution that meets the needs of students and institutional stakeholders.

In September 2024 Ithaka S+R published *Transfer Credit Information at Your Fingertips: Preliminary Findings on Use and Implementation of CUNY Transfer Explorer,* a research brief that documents a supportive credit mobility system developed by the City University of New York (CUNY) and Ithaka S+R.[5] Launched in May 2020, CUNY Transfer Explorer (CUNY T-Rex) exposes course and credit-for-prior-learning (CPL) transfer rules as well as general education and major requirements for CUNY's 20 undergraduate colleges through a centralized website. Through CUNY T-Rex, users have access to accurate, real-time data on CUNY's 1.6 million transfer rules and can explore how courses and CPL experiences transfer and apply to programs of study. To date CUNY T-Rex has had over 240,000 unique users, averaging over 18,000 users per month in the most recent months, as reported by Google Analytics.

In the current report we analyze the enabling conditions and factors that led to CUNY T-Rex's successful development and growth. Understanding the context around the implementation of a successful resource, operating in a large system of higher education institutions, provides valuable insights into the essential elements of a credit mobility technology solution.

To gain a more thorough understanding of these factors, we conducted 31 interviews with stakeholders from the CUNY Central Office, the Ithaka S+R and CUNY personnel who formed the core team of the grant-funded Articulation of Credit Transfer (ACT) project that developed and managed CUNY T-Rex, and stakeholders from four CUNY Colleges: Hostos

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[5] Pooja Patel, Madeline Joy Trimble, "Transfer Credit Information at Your Fingertips: Preliminary Findings on Use and Implementation of CUNY Transfer Explorer," *Ithaka S+R,* 10 September 2024, https://sr.ithaka.org/publications/transfer-credit-information-at-your-fingertips/.

Community College, Lehman College, Queensborough Community College, and Queens College. We also collected relevant documents from interview participants, including e-mail records and grant documentation. This research was complemented by an internal business analysis of CUNY T-Rex, review of relevant CUNY policies, and concurrently conducted quantitative analysis.[6] Our results provide insight into CUNY T-Rex's origins and development, documenting the tool's early growth and eventual adoption and implementation across CUNY, the influence of user experience (UX) and user interface (UI) methodologies in software development, the contributions of the ACT Community of Practice (CoP) to new functionality development, and the enabling conditions across CUNY that supported the development and rapid growth of CUNY T-Rex. Our research results include five key elements that supported CUNY T-Rex's development and implementation:

➔ **Flexible start-up funding and project management support**
Generous philanthropic funding, flexibility in how that funding was used, and external project management support were major contributors to CUNY T-Rex's development and success. Creating such a tool would not have been feasible with only institutional funds, or with more restrictions on the use of grant funds.

➔ **System-wide transfer policies and centralized data**
Established system policies such as CUNY's Pathways general education core and requiring every transfer course to have at least an elective credit equivalency created a unique data environment with few internal gaps. Additionally, having all institutions' equivalency and program requirement data in CUNY's centrally accessible source systems, Ellucian DegreeWorks, and CUNYfirst (PeopleSoft), in a largely uniform, clean, and consistent manner, created a robust data infrastructure.

➔ **Freedom to innovate and enthusiastic champions**
CUNY Central's flexible approach to the technical development of CUNY T-Rex in the early stages empowered and provided independence for the team to explore creative solutions for

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[6] Pooja Patel, Madeline Joy Trimble, "Transfer Credit Information at Your Fingertips: Preliminary Findings on Use and Implementation of CUNY Transfer Explorer," *Ithaka S+R*, 10 September 2024, https://sr.ithaka.org/publications/transfer-credit-information-at-your-fingertips/.

enhancing the site's functionality and prioritizing user needs. The success of the tool also relied heavily on the expertise of individual champions who could bridge the gap between technical and functional aspects of the project.

➜ **User centered design and development**
The CUNY T-Rex team consistently applied a user-centered approach to design and development, with extensive user-experience testing focused on students and advisors as the primary audiences. This design approach contributed to the site's appeal to users—who find navigation intuitive—and the rapid growth in usage.

➜ **Administration support for training, scaling, and sustainability**
When the site gained user traction, CUNY Central's endorsement, promotion, and financial and operational support became crucial to its ongoing success. CUNY Central's Ambassador Network and train-the-trainer model have enabled widespread and consistent approaches to use of CUNY T-Rex throughout the system. The CUNY system's financial and operational support for the development team—still based at Lehman College—and coordination of development priorities will ensure the site's continued alignment with CUNY's strategic plans.

CUNY Transfer Explorer

CUNY T-Rex is a publicly accessible credit transfer platform that allows any user the ability to compare how their existing or planned courses will transfer and apply across CUNY campuses. Officially launched in May of 2020, the seeds of CUNY T-Rex were planted in 2017 by Christopher Vickery, then a computer science faculty member at Queens College. Vickery had developed an application that showed existing course equivalencies to assist Queens College faculty with transfer equivalency reviews. The potential of this prototype was recognized by Christopher Buonocore, then University Director of Course and Transfer Information, Lexa Logue, Research Professor and former Executive Vice-Chancellor at CUNY, and Martin Kurzweil, of Ithaka S+R. They believed the Queens

College application could be a viable tool to improve the information available to students and advisors making transfer plans, and to motivate institutional administrators through data transparency to maintain data quality and offer more generous credit articulation.

With support from the Heckscher Foundation for Children, a New York City-based philanthropic organization, Ithaka S+R in 2019 established the Articulation of Credit Transfer (ACT) project at CUNY.[7] The ACT project eventually consisted of three major, entirely grant-funded components: the conversion of Chris Vickery's prototype into a public website (which would eventually become CUNY T-Rex), development of the DegreeWorks Archive to capture student degree audit information changes over time, and a transfer credit ACT Community of Practice (CoP) consisting of representatives from several CUNY community and bachelor's degree granting colleges.

The ACT team engaged an engineer and data architect at Lehman College to work outside regular hours, under the direct supervision of Buonocore and with guidance and input from Vickery, Logue, and Kurzweil, to develop the first iteration of CUNY T-Rex. That first version went online in May of 2020 and allowed users to explore CUNY-to-CUNY course equivalencies and CUNY catalog information[8]. Through the efforts of the ACT project team and CoP members, usage of CUNY T-Rex grew rapidly over the following year.

With this evidence of demand, the ACT team continued to secure philanthropic funding to enhance the CUNY T-Rex site.[9] Additional support from the Heckscher Foundation, the Petrie Foundation, Ascendium Education Group, and the Ichigo Foundation supported the development and release of 12 new CUNY T-Rex functionalities between 2022 and 2024.[10] CUNY Central realized the potential for CUNY T-Rex to become a

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[7] Alexandra Logue and Martin Kurzweil, "Improving Articulation of Transfer Credit at CUNY," *Ithaka S+R*, 18 July 2019, https://sr.ithaka.org/blog/improving-articulation-of-transfer-credit-at-cuny/.

[8] Alexandra Logue, Martin Kurzweil, and Cindy Le, "A New Resource to Help CUNY Students Transfer Smarter," *Ithaka S+R*, 5 June 2020, https://sr.ithaka.org/blog/a-new-resource-to-help-cuny-students-transfer-smarter/.

[9] Alexandra Logue, Martin Kurzweil, and Cindy Le, "Ithaka S+R to Expand Transfer Improvement Efforts With CUNY," *Ithaka S+R*, 15 December 2020, https://sr.ithaka.org/blog/ithaka-sr-to-expand-transfer-improvement-efforts-with-cuny/.

[10] See Appendix A and B for a detailed timeline and description of each functionality.

system-wide tool that could advance university-wide goals to improve transfer. In 2022 CUNY Central allocated funds to Lehman College to cover the modest infrastructure maintenance costs of CUNY T-Rex, and also secured a grant from Robin Hood to promote the site broadly within CUNY.

As a credit mobility technology solution, CUNY T-Rex stands out for its comprehensive suite of functionalities and user-friendly design. CUNY T-Rex aims to provide users with, not only the ability to view course equivalencies, but also tools to understand how their transferred credits apply to major requirements at CUNY colleges, as well as equivalencies for non-CUNY courses, training, and exams. This type of transparency enables students to understand alignment of transfer credits to their intended major in order to make more informed decisions. The site also provides public-facing Transfer Leaderboards that allow students and institutions to compare transfer statistics across colleges and better understand transfer at CUNY, and administrative tools behind a login for faculty and staff to review student transfer plans and update course equivalencies. To learn more about user behavior on CUNY T-Rex and which specific features are most widely used, see the first research brief[11] in this series which provides an in-depth analysis of stakeholder usage patterns.

Factors Contributing to the Success of CUNY Transfer Explorer

Several key factors have contributed to the success of CUNY T-Rex. These include the existence of supportive system transfer policies that were already in place prior to the development of CUNY T-Rex; a combination of enthusiastic champions, with the right types of expertise, who played important roles in developing, supporting, and scaling CUNY T-Rex; sufficient funding in place to support development, implementation, and

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[11] Pooja Patel and Madeline Trimble, "Transfer Credit Information at Your Fingertips: Preliminary Findings on Use and Implementation of CUNY Transfer Explorer," *Ithaka S+R*, 10 September 2024, https://doi.org/10.18665/sr.321284.

scaling; the central availability of complete, consistent, system-wide data on course equivalencies and program requirements; UX/UI testing to ensure a user-centric design, and the ability of the development team to adapt quickly without bureaucratic hurdles in early phases of development.

Sufficient Funding and Project Management Support

Multiple stakeholders pointed to philanthropic funding as essential to the success of CUNY T-Rex. Grant funding supported website development and maintenance, project management and oversight, subgrants to CUNY colleges, and promotion and training of the tool. Without substantial foundation support, website development may have had to be outsourced, risking the tool's overall development. Asked about factors that were critical to the tool's success, one founder said, "Obviously the funding… Imagine [our developer] wasn't there and we had to outsource the developer…maybe this whole thing would have just fell, you know."

Additionally, the very first foundation grant from the Heckscher Foundation that supported CUNY T-Rex's development was not actually specific to CUNY T-Rex, but rather supported a more general exploration of transfer at CUNY. The ACT group had flexibility in pursuing different avenues of solutions that could be applied to CUNY. Due to the openness in how the ACT team approached the problem, unrestricted funding was critical to identifying the most appropriate solution. As one of T-Rex's founders described, "…[w]e also identified [an] application that had been developed by Chris Vickery, which showed course equivalencies that were in the system and as part of the follow-up work with support from the Heckscher Foundation, we decided to turn the Vickery app into…a publicly accessible website that would show all of that information and that was kind of the origin for CUNY Transfer Explorer." The findings underscored the need for a tool like CUNY T-Rex to solve the transfer challenges that had been identified. This open-ended funding provided fertile ground for innovation that allowed CUNY T-Rex to subsequently thrive.

Strong project management support was also critical to CUNY T-Rex's development and success. Stakeholders from the CUNY T-Rex development team at Lehman College as well as CUNY Central reported

appreciating the project management support provided by an external organization such as Ithaka S+R. This support included overall project management and technical project management support in defining features, facilitating development sprints, monitoring progress, and troubleshooting. Having additional resources and expertise mitigated some of the challenges of limited resources within CUNY. Additionally, the benefits of collaboration with external experts provided fresh perspectives, and contributed to a more structured development process, ensuring timely bug fixes, user feedback integration, and regular feature releases.

Robust, Accessible System Data and Supportive System Transfer Policies

An important condition within the CUNY system is CUNY's systemwide enterprise software in which all relevant data are centrally accessible and in a consistent format. This structure has resulted in the population of the underlying data systems, CUNYfirst and DegreeWorks, with relatively clean, consistent information about course equivalencies, general education requirements, and degree program requirements across all CUNY colleges. Relevant stakeholders with the appropriate permissions at each CUNY college can access this information not just for their own college, but for any college within the system.

Stakeholders generally agreed that the availability of detailed course equivalencies, program requirements, and student information has been instrumental in CUNY T-Rex's effectiveness. One of CUNY T-Rex's founding members noted: "...we were incredibly fortunate to work on CUNY Transfer Explorer with a really comprehensive and well-organized set of data that was there because of a lot of great policy and really hard work that came before...No other system has data that is so well organized and so complete."

A member of T-Rex's development team at Lehman College explained how these consistent, centralized, accessible data provided the foundation upon which CUNY T-Rex could be built as a system-wide tool from its earliest iterations: "...Campus people have access to a full set of university data. You know, so I was able to...write these things up for Chris [Vickery], and Chris was able to share them back to us, like, with no institution restriction in terms of the data I could receive. [I]f I was limited to only

access to Lehman data from the very beginning, this wouldn't work."

The availability of clean and consistent system-wide data was made necessary by, and in turn helped further develop, system transfer policies. First, the CUNY Pathways General Education policy[12] ensures students who transfer within the system can earn credit for General Education components even if particular courses within that component don't have a specific course equivalency on their own. A second requirement ensures that every CUNY course transfers with at least elective credit to every other CUNY college.

Establishing the buy-in for the Pathways initiative in the 2010s was hard-fought, as described in detail in the book *Pathways to Reform: Credits and Conflict at The City University of New York*.[13] However, the process resulted in seamless transfer of general education credits across colleges within the system. As one system-level stakeholder described, "We did a CUNY-wide Pathways general education program… It took a lot of muscle and board resolutions to create a CUNY-wide transfer policy for general education courses so that it just guaranteed that 30 credits of Gen Ed would transfer from everywhere. Once you got credit [then] it didn't matter where you went in CUNY. All those 30 credits were going to transfer and count for Gen Ed."

The changes in data capture and structure needed to implement the Pathways general education policy created a more comprehensive network of course relationships that also, much later, supported the development of CUNY T-Rex. As the same stakeholder further explained, "…the CUNYfirst system [had to be] flexible enough to take courses that weren't equivalent but give them … a requirement designation that would allow them to transfer … according to learning outcomes."

The second relevant policy was that every CUNY course must transfer with at least elective credit.[14] Prior to Pathways, there were some CUNY

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[12] To learn more about the Pathways policy visit: "Pathways," The City University of New York (CUNY), https://www.cuny.edu/about/administration/offices/undergraduate-studies/pathways/.

[13] Alexandra Logue, *Pathways to Reform: Credits and Conflict at The City University of New York*, Princeton University Press, 2018.

[14] To learn more about CUNY's transfer policy see the CUNY Manual of General Policy, policy 1.29:
https://policy.cuny.edu/policyimport/manual_of_general_policy/article_i_academic_policy,_programs_and_research/policy_1.29_transfers_-_other/document.pdf

courses that could disappear from a student's transcript if the student transferred within CUNY. With Pathways, there were no courses at one CUNY college that wouldn't receive at least some recognition at another CUNY college; they would at least receive elective credit, if not general education credit or a specific course-to-course equivalency that could count toward particular degree requirements at a transfer destination. This ensures, as one stakeholder put it, "that when it came time to build T-Rex, there was a rule for every [course]…"

Independence and Ability to Adapt in Early Phases and Engagement with Relevant Content Experts

CUNY T-Rex's development was atypical in many respects. It did not initially result from a particular strategic initiative at the Central Office, nor did it follow a standard software development process. Instead, it involved as a somewhat grassroots effort that iterated upon Chris Vickery's earlier application to solve a college-specific need that had been identified.

As described by interviewees, the relatively informal nature of the tool's early development came with both benefits and drawbacks: importantly, it meant the tool could be iterated flexibly and rapidly without bureaucratic delays, but it also meant that certain aspects of the tool were not planned for scale from the beginning, and some personnel faced competing obligations given that it was not their full-time job to develop CUNY T-Rex.

Those involved with founding CUNY T-Rex reflected positively on how quickly they could make changes to the tool in its early development without needing to ask anyone for permission. One stakeholder described that in its initial phases, "it didn't have a lot of scrutiny from [leadership]… we could just work on it and you know, change it very quickly and test different things out and modify it in … response to what we were hearing from users in a very iterative way." Another stakeholder described the benefits of that flexibility while also acknowledging the ways in which, with the benefit of hindsight, things could have been approached differently: "…I mean, we kind of did all this so much on the fly in the beginning… Like, this used to be kind of a rinky dink little project that really, really blew up into something really cool and great with lots of support and involvement…Some of it maybe could have been documented better.…"

While the grassroots nature of the project sped up the development process in certain respects, it also posed a challenge at times because there was no one dedicated to the tool on a full-time basis, meaning competing obligations sometimes came into play. The CUNY T-Rex development team consisted of full-time Lehman employees, which meant that any grant-funded work that was done to develop CUNY T-Rex had to be done outside of normal working hours. As one development stakeholder explained, "…a lot of our work has been outside of normal 9 to 5 hours, because this project is outside of our normal 9 to 5 jobs. So I wonder if [we] did have somebody dedicated full time during normal business hours to accomplish this stuff, could they have done it faster, could they have done it better? So, I think that was definitely a challenge and continues to be a challenge."

Having relevant content experts was also vital to the success of CUNY T-Rex. Stakeholders involved in its development frequently cited the pivotal roles of specific individuals. The core ACT team, composed of individuals with diverse expertise and extensive institutional and funder networks, played a crucial role in the development and successful implementation of CUNY T-Rex. In particular, we heard that it was extremely helpful to involve stakeholders who had both technical expertise around underlying data systems as well as a deep understanding of the big picture of the transfer policy context—a recommendation that stakeholders have offered to other states or systems considering developing similar tools. As one stakeholder involved in the founding of CUNY T-Rex put it, "[O]ther states need someone who could sit on both sides of the fence… like a functional and a technical person that has enough of both to be able to speak to both sides. But you also need [a] person like Elkin [a web application specialist] who has the development expertise to be able to collaboratively work with [that person], to turn [that vision] from everyone else into reality."

One frequently mentioned champion was Chris Buonocore. As the business owner of CUNY T-Rex, he interfaced with a wide variety of stakeholders, including the ACT team and Ithaka S+R; the development team at Lehman College responsible for designing, programming, and refining CUNY T-Rex; the CUNY Central Office; and T-Rex ambassadors stationed at colleges throughout the CUNY system who typically served as both heavy end-users of the tool in their own right and trainers of other faculty and staff. Interfacing with such a diverse group of stakeholders enabled Chris Buonocore to serve as a connector between different aspects of the project. A CUNY system-level stakeholder praised, "A lot of

these systems people, they know what they're talking about, but they talk in registrar systems acronyms. You feel like they're trying to make you confused. Whereas Chris Buonocore could just talk to you in a straightforward way and explain why this was not transferring or what was stopping this or how to read CUNYfirst and so forth."

Integration of UX/UI Methods and Applying a User-Centric Approach to the Development of CUNY T-Rex

The integration of user experience (UX) and user interface (UI) design and testing in the development of CUNY T-Rex has been crucial to ensuring a user-centric tool. Feedback on feature development, navigation, etc. was obtained through two primary ways: informal feedback from the ACT CoP and formal feedback through user experience testing.

Members of the CoP have often been the first people to see in-development features and to offer their insights, based on their expertise and real-world experience.[15] Discussions and feedback amongst CoP members have led to the development of new features and enhancements to existing ones. For example, following suggestions regarding the Transfer Plans functionality,[16] students can now edit their plans instead of having to create a new one each time their plans change. In another example regarding new feature development, community of practice members sought a way to identify which courses were frequently transferring, and what the result of that transfer was. In response to this request, the Frequently Transferred Courses feature was developed to help stakeholders learn the frequency of courses that transferred to and from CUNY colleges and identify courses that could benefit from stronger equivalencies. This collaborative approach, involving input from users and developers, highlights the tool's adaptability and responsiveness to user needs. Beyond feature preview and feedback, the CoP also serves as a

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[15] Rocio Rayo, Tracy Newton, Pooja Patel, and Emily Tichenor, "CUNY Transfer Practice Community Turns Collaboration Into Action," *Inside Higher Ed*, 6 June 2024, https://www.insidehighered.com/opinion/blogs/beyond-transfer/2024/06/06/cuny-transfer-practice-community-turns-collaboration.

[16] See Appendix B for a description of the Transfer Plans functionality.

space for transfer experts to discuss policy gaps revealed through the use of CUNY T-Rex.

Formal user experience testing has also been a crucial component in shaping CUNY T-Rex into a user-centric tool. Although informal feedback was incorporated from the outset, a more structured approach of user experience testing began in Fall 2022. Between September 2022 and May 2023, ITHAKA JSTOR Labs UX/UI designers conducted five rounds of user testing research with 21 students and 34 academic advisors at six CUNY colleges. Four community colleges and three bachelor's degree granting colleges, all members of the CoP, participated in the recruitment and testing of participants. This approach has provided a more systematic way to gather, prioritize, and implement feedback from various stakeholders. This practice of user experience testing has highlighted the importance of user-centered design and led to a deeper understanding of T-Rex resource needs and opportunities for improvement.

Through these sessions, several key improvements have been made:

- **Functionality:** Bugs and errors related to search results, alphabetization, and dropdown menus have been resolved.

- **Usability:** The user experience has been enhanced by optimizing screen ordering, site language, design consistency, icon placement, and the flow of entering courses, exams, and training.

- **Accessibility:** The platform has been made more accessible to users with disabilities through Web Content Accessibility Guidelines compliance and heuristic evaluation. Accessibility audits have been conducted for every feature added to CUNY T-Rex.

- **Clarity:** Misunderstandings related to site instructions and language have been addressed by removing unclear terms and jargon.

- **Information Architecture:** Redesign of the homepage, bottom navigation, Help Center, and Leaderboard pages have directly resulted from user feedback and testing.

CUNY Central's Adoption of CUNY T-Rex as a System-wide Resource

CUNY T-Rex has emerged as a powerful catalyst for change within CUNY, improving information transparency within the transfer student experience and informing strategic decision-making. As the tool gained more traction and evidence of positive impact, CUNY Central began to take a more active role in it, along with the campus-president-led CUNY Transfer Steering Committee, which recommended CUNY T-Rex as a key resource to move CUNY's agenda on transfer forward. To help cover modest infrastructure maintenance costs of CUNY T-Rex, CUNY Central allocated funds to Lehman College in early 2022 and also helped establish the T-Rex Ambassador Network with grant funding from Robin Hood connected to the Academic Momentum 2.0 campaign.[17] The Ambassador Network consists of advisors, faculty, and staff who serve as T-Rex representatives and are trained on the various functionalities of CUNY T-Rex. As local champions responsible for promoting and training additional stakeholders at their institutions, the Ambassadors' use of the train-the-trainer model has provided a viable infrastructure for expanding and scaling the use and adoption of the tool across departments within each college. Ambassadors have also not only been responsible for training, but have been seen as "T-Rex experts," helping implement the Transfer Equivalency Review workflow amongst faculty and other relevant stakeholders.

> "I think it sort of gives some definition to some of the problems and a degree of clarity that wasn't there. I think that it's hard to argue with something that you can see with your eyes that was invisible before and you couldn't see it."

Furthermore, CUNY T-Rex generates valuable data that informs strategic decision making. CUNY can now use CUNY T-Rex to identify areas for improvement, advocate for resources dedicated to transfer success, and track progress towards its transfer goals. This shift towards better evidence-based decision making fosters a more equitable and supportive environment for students. Beyond its practical applications, CUNY T-Rex

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[17] "Academic Momentum," The City University of New York, accessed 4 December 2024, https://www.cuny.edu/academics/current-initiatives/academic-momentum/.

has also played a crucial role in sparking conversations around transfer challenges. By providing a tangible tool that addresses these issues, T-Rex has helped to shift the focus from abstract concerns to concrete solutions. One stakeholder at CUNY Central emphasized: "I think it sort of gives some definition to some of the problems and a degree of clarity that wasn't there. I think that it's hard to argue with something that you can see with your eyes that was invisible before and you couldn't see it." This increased visibility has been instrumental in raising awareness of transfer barriers and driving institutional change aimed at smoother student transitions.

As CUNY looks to integrate CUNY T-Rex more deeply into its operational processes and embed the use of the tool across campuses and departments, conversations with several stakeholders emphasized CUNY T-Rex's immense potential for further innovation. The tool, as some pointed out, has the ability to evolve into a comprehensive platform for students, faculty, and staff to navigate course offerings across the entire CUNY system. By leveraging technology, CUNY T-Rex can simplify the understanding of how credits apply, not only to individual courses, but also to different majors. Recent enhancements include the ability to map courses to major requirements, providing students with a clearer understanding of which community college courses transfer and which requirements remain to be fulfilled. Also, CUNY T-Rex's Transfer Leaderboards are particularly useful for both students and administrators looking to understand transfer student outcomes and college performance metrics.

To further support students, CUNY T-Rex has recently launched some program-specific portals for the high-demand fields of nursing, engineering, and business, offering insights into program requirements to help students plan their academic paths. Additionally, the new CUNY T-Rex High School to CUNY site assists students and their families in understanding how College Now (dual enrollment credit), as well as AP and CLEP exams, can transfer and apply across CUNY campuses. This bridge between high school and college empowers students to make informed decisions about their academic futures. To facilitate seamless advising, CUNY T-Rex's Transfer Plans feature has now been integrated into the EAB Navigate 360 system. This enables CUNY community college students to have earlier and more detailed conversations about transfer with their advisors, resulting in better-planned transfer strategies, as does the new High School to CUNY site.

Such developments not only enhance transfer pathways but also foster a more interconnected and collaborative learning environment. As one stakeholder puts it: "I just want it to be a system where you can explore all options throughout CUNY. I mean and so, that would be my dream goal is to get it to be the tool that allows students, faculty, staff to explore the curriculum throughout the system." CUNY Transfer Explorer has proven to be a transformative tool for CUNY, demonstrating the power of technology to improve student outcomes and inform strategic planning. Over the years, the tool has become essential to CUNY's efforts around transfer and many across the university system see it as part of the enterprise system—as a whole university solution rather than for individual colleges. CUNY T-Rex serves as a model for how institutions can leverage data-driven approaches and collaborative partnerships to create a more equitable and supportive learning environment for all students.

> CUNY Transfer Explorer has proven to be a transformative tool for CUNY, demonstrating the power of technology to improve student outcomes and inform strategic planning.

Looking Forward

CUNY T-Rex has now become a cornerstone of CUNY's strategic plan, which identifies transfer as a key priority. The emergence of the tool not only aligns with CUNY's strategic focus on access and opportunity for underserved students, but also has "helped CUNY set its transfer goals," as one stakeholder noted. The tool directly supports the university's goal of streamlining the transfer process and maximizing credit acceptance. Many college administrators have acknowledged that it's now easier to see which courses are being transferred as an elective, enabling them to make a more concentrated effort in changing those equivalencies to specific, useful courses and having informed conversations with their departments.

In the long term, stakeholders described an evolved CUNY T-Rex where data gathered from transfer plans can create personalized degree maps to

visually represent a student's progress, highlighting completed courses, remaining requirements, and potential transfer pathways, to provide a clearer understanding of the student's academic trajectory. This would empower students to make informed decisions about their coursework and future plans. Others envisioned CUNY T-Rex becoming a sort of evaluation tool that helps validate agreements that may become outdated overtime. A system like CUNY T-Rex, which is connected to real-time data, could address this issue by allowing users to validate their articulation agreements against current course information. This would ensure that students and advisors have accurate and up-to-date information about transferability.

As with any nascent technology, there are opportunities for continuous improvement as CUNY T-Rex transitions from start-up to a scaled system-wide credit mobility resource. Ensuring data integrity and accuracy, allocating sufficient capacity and resources, implementing robust monitoring and evaluation processes, and clearly defining responsibilities and ownership will be essential to the tool's continued growth and utility for users. CUNY has begun to address many of these factors. CUNY Central has dedicated funding for the ongoing support and staffing needs of CUNY T-Rex. They have also recognized the essential need to shift focus towards maintenance, ongoing development, and continuous evaluation. Furthermore, they have made strides toward further integrating the tool into system-wide processes, activities, and strategic initiatives. For example, CUNY ASAP, a large University-wide completion program, has integrated T-Rex into the program's student engagement benchmarks.

But, at the end of the day, the data presented in CUNY T-Rex are only as good as its underlying source systems, creating the need to ensure ways to continuously monitor and maintain the accuracy of the underlying data, especially DegreeWorks scribing consistency across the colleges. The "data nirvana" at CUNY, as Chris Vickery described it,[18] highlights the challenges and complexities of data management and architecture. Effective transfer tools require investment in robust data infrastructure systems to handle large amounts of data and ensure its accuracy and reliability. This emphasizes the need for careful planning and investment in data infrastructure, and the need to ensure that stakeholders are

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[18] Christopher Vickery, "Data Nirvana: Using Great Information to Help Transfer Students," *Beyond Transfer blog, Inside Higher Ed*, 22 March 2023, https://www.insidehighered.com/blogs/beyond-transfer/data-nirvana.

continuously working together to maintain accurate information in CUNY's underlying systems like DegreeWorks and CUNYfirst.

Conclusion

CUNY T-Rex's success lies in its availability of comprehensive and accessible data on course equivalencies and program requirements across the CUNY system. This centralized data infrastructure, coupled with supportive system-wide transfer policies, has streamlined the transfer process and provided students with greater clarity and certainty. Additionally, the grassroots origins of CUNY T-Rex allowed the tool to flourish at a quicker pace than it would have through traditional strategic planning and software development. This informal approach, while accelerating development and fostering innovation, also presented challenges such as resource constraints and a lack of long-term planning. The success of the project was also heavily reliant on the expertise of relevant stakeholders who had strong system-level and institutional-level knowledge, technical knowledge, and stakeholder relationships. Engagement with content experts allowed the core ACT team to utilize and leverage various experts who served as advocates and champions of the tool, promoting its usage mainly through organic avenues.

Furthermore, by incorporating user feedback and lessons learned, T-Rex was able to evolve and improve over time. As CUNY T-Rex development progressed, the importance of gathering user feedback became essential to ensure that the tool was being designed to meet user needs, and focused on equity and accessibility to serve marginalized communities. The development process embedded these processes as more features were developed, gathering insight not only from students, but also advisors to ensure that the tool's navigation was seamless enough for both parties to engage in fruitful conversations. Prioritizing user experience, including accessibility and ease of use, was perceived as crucial for CUNY T-Rex's success, underscoring the importance of designing tools with the end-user in mind.

By providing a transparent platform for viewing course equivalencies, CUNY T-Rex has enhanced the transfer process, and the hope is that over time it minimizes credit loss for students transitioning between

institutions. Prior to CUNY T-Rex, a major challenge for CUNY was the lack of transparency in transfer credit equivalencies. This tool provides a clear picture of how courses transfer between institutions, empowering students to plan their academic pathways efficiently, and advisors, faculty, and administrators to re-evaluate equivalencies that could have better alternative equivalencies that are more beneficial for students.

The success of CUNY T-Rex points to the importance of easily accessible, up-to-date, connected, and accurate information on how credits transfer and count towards degrees for both students and institutions. Since 2023, Ithaka S+R and non-profit parent organization ITHAKA have been engaged in the development of a national Transfer Explorer to expand the principles and success of CUNY T-Rex to other states and systems.[19] This Transfer Explorer will launch in 2025 and the development and project team are collaborating with community colleges, universities, and systems in four states to find creative and user-informed ways to connect and display credit transfer data to improve mobile student outcomes.

As institutions engage in developing effective and equitable transfer tools that can benefit students and improve overall educational outcomes, consider the following:

- **Iterative Development:** Adopt an iterative development approach to incorporate feedback and improve the tool over time. Prioritize user experience and user testing in the development of transfer tools. This approach guarantees that the tool is designed with a user-centered lens and feedback from stakeholders is incorporated throughout the development process.

- **Robust Data Management and Infrastructure:** Invest in robust data architecture and management systems to ensure data accuracy and reliability. Recognize that effective transfer tools require ongoing improvement of data to ensure that equivalencies remain accurate and up to date. Investing in such an infrastructure, and most importantly, having that infrastructure be centralized, can ensure that the data are comprehensive and well organized for building effective transfer tools.

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[19] Elizabeth Mueller, Emily Tichenor, Martin Kurzweil, and Alexandra Logue, "Providing Credit Transfer Visibility to Improve Credit Mobility," *Ithaka S+R*, 22 February 2024, https://sr.ithaka.org/blog/providing-credit-transfer-visibility-to-improve-credit-mobility/.

- **Investment in Key Personnel and Content Experts:** Invest in key personnel who are primarily responsible for inputting course equivalency rules or any accompanying changes. This support staff should collaborate with departments and other stakeholders to make sure that equivalency rule changes are being inputted in the data systems in a timely manner to guarantee that the data presented are correct. Additionally, ensure there is direct and sustained engagement with experts who embody both the technical know-how and institutional processes, and have strong relationships with stakeholders that can become advocates.

- **Institutional Integration:** Encourage collaboration and integration among institutions with the purpose of facilitating seamless transfer. Ongoing collaboration amongst institutional partners who periodically engage to ensure course alignment can help make students' transfer planning process much easier.

- **Engagement and Training:** Prioritize ongoing training and engagement with staff, faculty, and students to ensure tools are operationalized and become ubiquitous. Training should go well beyond launch to build familiarization and comfort and to prompt continued innovation of uses to support students.

- **Equity and Accessibility:** Design tools with equity and accessibility in mind to address the needs of diverse student populations. The transfer process inevitably impacts students from more marginalized backgrounds and ensures that these students have the access and opportunity to move ahead and progress, helping higher education institutions move closer to their strategic goals of inclusivity, student success, and equal access.
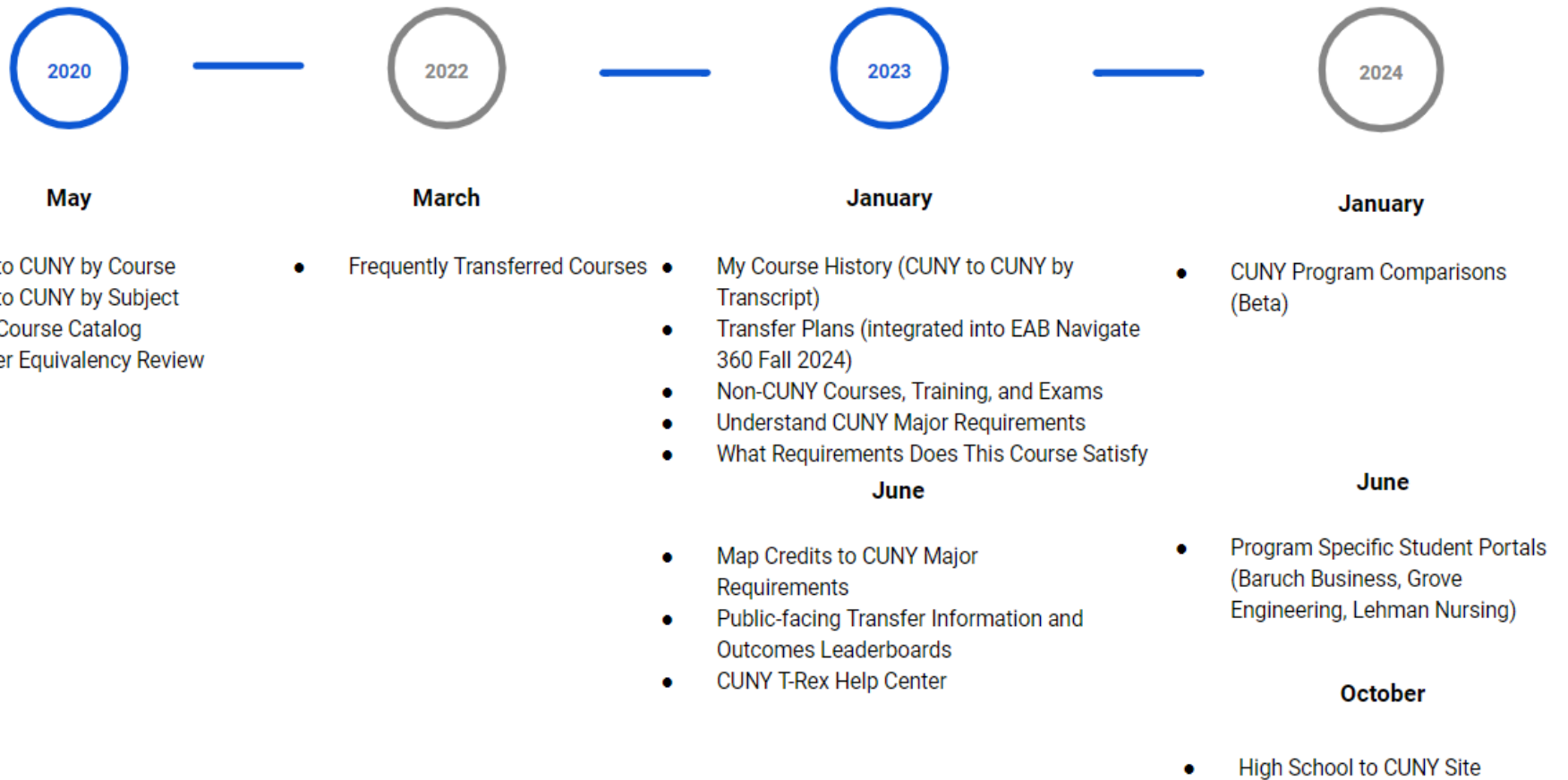
Acknowledgements

Appendix A

The following timeline provides a high-level overview of when existing functionalities in CUNY T-Rex were publicly released. For a more detailed description of each functionality, see Appendix B.

2020 — May
- CUNY to CUNY by Course
- CUNY to CUNY by Subject
- CUNY Course Catalog
- Transfer Equivalency Review

2022 — March
- Frequently Transferred Courses

2023 — January
- My Course History (CUNY to CUNY by Transcript)
- Transfer Plans (integrated into EAB Navigate 360 Fall 2024)
- Non-CUNY Courses, Training, and Exams
- Understand CUNY Major Requirements
- What Requirements Does This Course Satisfy

2023 — June
- Map Credits to CUNY Major Requirements
- Public-facing Transfer Information and Outcomes Leaderboards
- CUNY T-Rex Help Center

2024 — January
- CUNY Program Comparisons (Beta)

2024 — June
- Program Specific Student Portals (Baruch Business, Grove Engineering, Lehman Nursing)

2024 — October
- High School to CUNY Site

Appendix B

Functionality	Description
CUNY to CUNY by Course	Provides information on course equivalencies by showing users how a course at one CUNY college will transfer to and from any other CUNY college.
CUNY to CUNY by Subject	Provides information on course equivalencies by showing users how all courses within a particular subject area at one CUNY college will transfer to any other CUNY college.
CUNY Course Catalog	This feature allows users to search all CUNY courses from within CUNY T-Rex.
Transfer Equivalency Review	Accessible with a CUNY login, this feature allows designated faculty and staff to review and validate course equivalencies as well as suggest new ones.
Frequently Transferred Courses	This tool allows users to gain an understanding of which courses transfer to and from each CUNY institution, and the frequency of their transfer.
My Course History (CUNY to CUNY by Transcript)	Accessible with a CUNY login, allows users to access their transcript and see how their courses will transfer and apply across CUNY colleges.
Transfer Plans	Accessible with a CUNY login, allows students to indicate their transfer plans, which prompts action from their current and prospective colleges to assist them in their transfer journey. Transfer Plans was officially integrated into CUNY's advising system, EAB Navigate 360, in Fall 2024 and scaled system-wide.
Non-CUNY Courses, Training, and Exams	Shows users how course credits from outside of the CUNY system, exams, certificates, and other forms of validated prior learning will transfer and receive credit at CUNY.
Understand CUNY Major Requirements	Allows users to search for bachelor's program majors, and concentrations and see their requirements, as well as what particular CUNY courses can be taken at one college to satisfy those requirements at a different college.
What Requirements Does This Course Satisfy	A direct link across the platform in most features to see how any given course will satisfy major requirements.

Map Credits to CUNY Major Requirements	Allows users to enter a record of earned (or planned) courses, and/or credit for prior learning experiences, and see how it will count towards requirements for different majors in bachelor's degree programs across CUNY.
Public-facing Transfer Information and Outcomes Leaderboards	A public dashboard accessible to all users provides Transfer student outcome and college performance metrics for each CUNY bachelor's college.
CUNY T-Rex Help Center	Multiple short video tutorials on how to use CUNY T-Rex.
CUNY Program Comparisons (Beta)	This beta search tool allows users to compare Associate degree requirements at one CUNY college to Bachelor's degree major requirements at another CUNY college. The search is currently limited to six high priority transfer majors.
Program Specific Student Portals	Portals for common transfer majors like engineering and nursing. This feature shows students the requirements they need to be accepted into that specific program. Baruch Business Academy's Zicklin Explorer was also integrated into CUNY T-Rex at this point.
High School to CUNY Gateway Site	A Gateway Site for NYC High School students with information about how their prior learning such as AP, CLEP, and dual enrollment (College Now) credits transfer and apply across CUNY colleges.