Cultural Impact of Enterprise Computing Platforms in Higher Education

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This report represents the work of one or more WPI undergraduate students submitted to the faculty as evidence of completion of a degree requirement. WPI routinely publishes these reports on the web without editorial or peer review. For more information about the projects program at WPI, please see https://www.wpi.edu/project-based-learning/project-based-education/global-project-program
Abstract
Enterprise resource planning (ERP) software has long been used for operations management in the corporate world, handling everything from financial management to human resources (HR). Over time, it has become increasingly dominant in institutions of higher education, with a relatively small set of well-established, purpose-built software packages enjoying widespread use. However, for educational institutions, not all ERP software is created equal. ERP software that has its roots in managing standard corporate operations may not be fully up to the task of managing the entirety of an educational institution's operations, causing a marked decline in user satisfaction across faculty, staff, and students. To better understand this potential problem, our project evaluated the impact of Workday, an ERP that was originally designed as a software for corporations, on users at Worcester Polytechnic Institute (WPI), a STEM university in New England. Through a survey and interviews conducted with faculty, staff (including administrators) and students, we measured Workday's effectiveness at its ability to deliver complex administrative functionalities and adapt to unique educational traditions and policies of WPI. We identified several pain points, such as poor discoverability of documentation leading to a steep learning curve for various processes; administrative tasks being delegated to non-administrative individuals who rarely needed to do them and resulting increased friction1 due to the need to repeatedly re-learn those processes; and data modeling and design issues that have negatively affected the user experience (UX) by complicating fundamental tasks. Our discussion highlights a combination of technical and cultural factors that prevented Workday from the realization of its stated goals of achieving simplified and streamlined processes.

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1 A source of "friction" is defined as anything that prevents a user from achieving their goal while using a system.
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1) Introduction

As organizations grow, the logistics required to effectively manage them become more complex. Staffing requirements grow, forms pile up, and manual processes risk becoming inefficient. Enter enterprise resource planning (ERP) software, which is designed to combine many different company functions such as payroll, human resources management, and more into one unified system. The fundamental idea behind ERP software was to act as a unified database and hub for all company information and operations (McCue, 2020).

Corporations have been using ERP software in some form since the 1960s; however, it has also seen wide use in institutions of higher education (IHEs). Banner, an ERP software package currently developed by Ellucian, has a rich history of use by IHEs — including WPI — dating back to the 1980s. In recent years, newer products such as Workday Student have seen increased adoption by IHEs. WPI's ERP software of choice was Banner for almost three decades until the introduction of Workday for HR and finance in 2018. Banner continued to be used for student management for a few years afterwards but was finally made obsolete with the introduction of Workday Student in 2021.

The utilization of education-tailored ERP software in an IHE affects three main groups: faculty, who enter grades, submit expenses, and hire students for various jobs; staff, who do everything from approving timecard entries to administering institution-wide operations; and students, who register for courses, monitor their degree progress, make tuition payments, and (if employed) enter time for their job. At the administrative level, ERP software is generally used for finance and HR processes.

This reliance on ERP software for practically every aspect of an IHE's operations means that its implementation is going to have significant effects on the quality of life of its users and the culture of the institution itself. Our investigation of these effects started with getting a holistic image of how Workday is used at WPI. Along with a survey that was distributed to the entire WPI community, we conducted interviews with faculty and staff from different departments, as well as with students with different roles and backgrounds. Through this data collection, we learned how effective Workday is at different tasks, how well Workday can adapt to handle unique elements of WPI's operations and systems, and how easy it is for users to figure out how to perform tasks of varying complexity.

We found that while the introduction of Workday came with promises that tasks would be greatly simplified, many tasks remain unnecessarily complex. Our findings suggest that this is partially due to Workday’s user interface (UI) and the apparent difficulty of discovering documentation for various tasks and processes. Students in particular were confused and frustrated by Workday Student's poor adaptation to various unique aspects of WPI's academic culture, such as the way graduate and undergraduate credits are represented, the course registration process as a whole, and the conflicting systems (credits and units) for determining the value of a course. Many functions of Workday Student are responsible for handling information relating to degree requirements, which means a confusing UI and poor UX can cause students to experience undue stress. These complexities, combined with a perceived lack of information, cause users to be reliant on their colleagues and friends to learn to navigate and interact with Workday.
2) Background

2.1) A Brief History of ERP Software

ERP software has a rich history dating back to the 1960s. McCue (2020) explains that the very first "ERP" software was not considered ERP software at all — it was instead known as "material requirements planning", or MRP software. The first MRP software was developed in a partnership between the now-defunct J.I. Case Company — a manufacturer of agricultural and construction equipment — and IBM, a major player in the mainframe and software industries of the time.

MRP software was primarily intended for inventory and production tracking, a reflection of its main users at the time. Early MRP systems were generally used by large companies that "had the budgets and resources for in-house development" (McCue, 2020), which likely would have excluded all but the very biggest. During the 1980s, MRP software gradually gave way to so-called "manufacturing resource planning", or MRP II software, which had additional functionality with a focus on coordinating and managing an entire manufacturing process. A typical MRP II system incorporated subsystems for production line scheduling, tracking purchases and sales, and quality assurance.

The term "ERP" was introduced by the management consulting firm Gartner in 1990. Gartner defined ERP as an expansion of MRP II, one that "included back-office functionality" (van der Meulen, 2020) such as payroll, accounting, human resources management, and other administrative functions that keep a business running behind the scenes.

Some of the earliest contenders in the modern ERP space were PeopleSoft, NetSuite (acquired by Oracle in 2016) and SAP. These companies made a splash by offering a sort of "everything application" that could bring various parts of a company's operations together. A more education-centered product known as Banner has been in use by many universities for decades, during which it has changed names and owners several times. Banner is an ERP system at heart, but comes with several "modules" that primarily serve IHEs, such as a student information system (SIS) and financial aid system. According to a survey of 871 institutions conducted by EDUCAUSE, Banner still dominates the market by a wide margin, despite its age and the significant competition it faces (Caron, 2023).

Workday is a particularly interesting case in the world of ERP software, in part because it is not really ERP software at all. Gartner's original definition of ERP referred to the aforementioned "everything application", where a single platform encompasses a wide variety of business operations. Gartner later introduced the idea of "ERP II", an extension of ERP to include integrations with external systems. According to Workday, Inc. — the company that develops the Workday product — Workday is not either of the traditional types of ERP software.

Workday, Inc. (from now on, both the product and company will be called Workday for simplicity) was founded in 2005. Its founders defected from PeopleSoft in the wake of Oracle's hostile takeover of the company. PeopleSoft offered a more traditional ERP product, so it stands to reason that a new company

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2 EDUCAUSE is a nonprofit focusing on supporting the use and advancement of information technology in higher education.
Workday bills its product as a so-called enterprise management cloud. Workday claims that an enterprise management cloud is distinct from an ERP system; this raises the question of what an enterprise management cloud is.

In an article titled "What Is an ERP System, and Why Workday Is Different" (Ogawa, 2021), as well as various marketing materials, Workday highlights the differences between a traditional ERP system and a so-called enterprise management cloud. Workday is supposed to allow a company to be more flexible with usage and agile with data, thanks to an "adaptable data architecture" that abstracts away the underlying data storage, treating data as "objects" of various types, and an "intelligent data core" that can transform any kind of data into "insights" for the company to leverage. Workday's adaptability — both at the data level and the system level — promises to allow a customer to rapidly adjust business processes and efficiently access and leverage their data, without having to engineer complicated database queries that may have to pull from multiple disconnected sources. Workday also allows organizations to add their own custom functionality to different modules through Workday Extend, which offers customers a set of "low code" tools for adding new features to their Workday deployment.

In contrast to Workday, traditional ERP systems often depend on massive relational databases that can be unwieldy and potentially difficult to extend and maintain without vendor support, along with other technologies that might not precisely fit a customer's needs. They can be difficult to rapidly customize, although this is not universally true; in practice, some ERP systems are more easily modified than others, with some vendors (such as Ellucian) even allowing customers to obtain and modify the software's source code.

Workday's first product, a new system for human capital management (HCM) was released in late 2006. About a year later, in the summer of 2007, Workday's financial management solution was released. A few years later, in 2010, Workday added functionality for talent management, integrating it with their pre-existing HCM solution. By then, Workday was being increasingly adopted by worldwide organizations, for standard corporate purposes.

In 2013, Workday announced its intention to develop an SIS product in collaboration with several universities. In the press release, Workday claimed that this product would be the only one "built this century for the needs of modern-day higher education institutions" (Workday Inc., 2013), and once again promised to go against traditional designs by "bringing together a system of record, a mobile-first system of engagement, and a big data analytic foundation." This system would be unified with the "core" Workday administrative platform, and delivered as a cloud product, just like the rest of Workday's product line.

3 "Low-code" systems generally require basic programming knowledge but abstract most of the "hard" things away, often by replacing typical written code with a drag-and-drop system of “building blocks.” Workday Extend can also be "no-code"; a "no-code" system is meant to be accessible to anyone, even non-programmers.

4 "Human capital management" refers to the discipline of expanding and maintaining workforces.

5 "Talent management" refers to the discipline of helping employees reach their professional goals and making them more likely to stay with their employer.
Workday had rather lofty goals for their SIS product when it was announced, seemingly aiming to create yet another "everything application." According to the press release, Workday Student was intended to be centered around a system of record that "[would assist] colleges in the recruiting, admitting, awarding, enrolling, advising, retaining, billing, and placement of students," potentially obviating the need for many external applications that each did one of those things.

2.2) Research into Cultural Aspects of ERP

Researchers have studied the effects of ERP systems on institutions for almost as long as they have existed. "Cultural fits and misfits: is ERP a universal solution?" (Soh et al., 2000), for instance, presents early findings of a then in-progress study focusing on the adoption of a new ERP system by a hospital in Singapore. The paper examines the ways in which the selected ERP system did not fit organizational and cultural requirements for operation and organizes these issues into different categories of "misfits." The researchers identified three types of misfits: data storage, output, and functionality. A data storage misfit is related to the way information is stored in the system and the formats that information can be stored in. For example, the ERP software utilized by the hospital had an unmodifiable name format following the Western convention of first, middle, and last name. However, some Asian cultures have different naming schemes that do not easily map to the Western convention. This was handled by putting the patient's entire name in the "Last Name" field or splitting the name into arbitrary "first" and "last" names if it could not fit within one field. While this may seem like nothing more than an annoyance, the selected workaround could have had significant implications for downstream users of the system, potentially impacting searches, reports and integrations with other systems that may not have been designed with this in mind.

Unsurprisingly, ERP users expect to retrieve information from the system in a way that they can understand. However, the staff of this Singaporean hospital found that the software did not expose all the information that they needed for government reporting, constituting an output misfit. To solve this, the hospital was forced to pay the ERP software vendor additional fees to set up a data export process. The export process generated dozens of files that could be imported into a relational database, which staff could query to obtain the data that they needed.

The final concern related to whether the ERP system had the functions to meet the hospital’s requirements. A missing function, or a function without all of the necessary features, constituted a functionality misfit. For example, the ERP system in use did not have a patient billing system, so the hospital had to create a custom billing and payment collection add-on. The researchers also categorized the different workarounds used by the staff based on how much they were willing to compromise with the software. Compromises made by the staff ranged from adapting organizational processes to fit within the constraints of the software, such as the workaround for Asian patient names, to incurring additional (potentially significant) costs to resolve functional issues, such as the in-house development of a patient billing module. Compromises were characterized as essentially inevitable, with some possible exceptions. Despite the article documenting an in-progress study rather than a completed one, it still serves as an interesting example of how the organizational impacts and associated challenges of an ERP system can be quantified and critically analyzed.
Researchers have also looked at the adoption of ERP software through a cultural lens. One study presents the idea that information systems represent information in a way that is subject to interpretation, and thus culture affects the way people see these systems (Vos & Boonstra, 2022). The study utilizes Hofstede’s cultural framework to find patterns in adoption among different cultures. Under Hofstede’s cultural framework, researchers place organizations on the continuum of each of five dimensions — High/Low Power-Distance, Individualism/Collectivism, High/Low Uncertainty Avoidance, Long/Short-Term Orientation, and Masculinity/Femininity — and use the results to reveal patterns. Power Distance describes how accepting a society is of hierarchy. Individualism/Collectivism describes how much a society focuses on the goals and wellbeing of its individual members versus the group as a whole. Uncertainty avoidance measures how comfortable members of a society are with ambiguity. Long/Short-Term Orientation describes the timescale at which individuals or groups plan for or consider when making decisions. Masculinity/Femininity describes the continuum to which a culture focuses on goals like power and wealth versus happiness and other people. It functions similarly to the Individualism/Collectivism dimension (Vos & Boonstra, 2022).

Vos & Boonstra gathered documentation on previous cases of organizations adopting ERP software and classified each in terms of the cultural dimensions. However, most importantly for our project, their study establishes that the adoption and fit of ERP software is heavily based on the culture of the organization adopting it (Vos & Boonstra, 2022). While WPI is one organization, there are many groups that are mostly separated and complete very different tasks using Workday. Employees of WPI, including faculty and staff, use Workday for generating reports, managing employees and payroll, and other tasks specific to their role. Students use Workday Student to register for courses, track academic progress, and pay their tuition. This diversity in use cases can result in differing subcultures within WPI, and Hofstede’s framework can aid in understanding the different perspectives that arise from those subcultures. For example, a faculty member uses Workday to assign grades, while a student uses Workday to view their grades. In this case, power distance can be an insightful metric; how students see themselves in relation to their professors may affect how they interpret the assigned grades, and how they see Workday Student’s grade display.

The adoption of Workday Student at WPI was previously studied by Paredes (2022) for a Major Qualifying Project (MQP). In this work, Paredes focused on identifying ways to improve Workday Student’s course registration and academic advising functions. Paredes identified pain points with these aspects of Workday Student, talked to those who implemented it to understand what was or was not possible with the software, and recommended some changes to make course registration and academic advising smoother. To identify pain points, Paredes interviewed key faculty and staff members and ran focus groups with students, similar to our approach for this study. They also analyzed various error messages involved in the registration processes and the kinds of registration situations that caused these errors to occur. A solution implementation phase followed, in which various solutions to the identified pain points were piloted. Our project differs from Paredes’ work in a few ways. Paredes focused on a small area of Workday, while this study examines WPI’s use of Workday at an institutional

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6 It is worth noting that this dimension’s name is an unfortunate reminder of cultural stereotypes. There is no clear consensus on an alternative term to describe this dimension, so we are using the original.
level. Additionally, our goals for this study were more philosophical in nature: we wanted to understand how Workday impacts culture and well-being at WPI, at both the individual level and the institutional level.

Paredes' work provides some useful insight into how different groups of the WPI community — but mainly students — felt about Workday upon its implementation, and what kinds of issues were initially present. Many of the interviewed students reported that they found Workday Student's grade display intuitive and easy to use (Paredes, 2022). Students also appreciated the ability to sort their classes by date and time before registration day. However, while students generally found the Workday UI aesthetically pleasing and modern looking, they also found navigating Workday to be confusing and complicated. They expressed a need for an easier way to get help with Workday during each step of the course planning and registration process. Overall, students seemed confused about navigating the scheduling and course registration process and reported seeking help from online resources and academic advisors. One solution that was evaluated was posting announcements on the homepage of Canvas, WPI's learning management system, that reminded students of upcoming course registration periods. Although the messages could not be targeted to specific classes, survey responses reported that 93% of students found them helpful (Paredes, 2022).

Since Paredes' study was conducted in academic year (AY) 2021-22, the year Workday Student replaced Banner, sophomores, juniors and seniors at the time had only ever used Banner for course registration, viewing academic progress, and other student-related activities. In contrast, first-year students had only ever used Workday Student. Student focus groups said that they preferred Banner over Workday Student for many reasons, such as Banner's inclusion of a day-to-day schedule viewer. Some even wished that Workday Student was "modeled after the best parts of [Banner]" (Paredes, 2022).

2.3) The WPI Plan
To study how Workday affects WPI's culture, an understanding of what constitutes WPI's culture is required. Culture is a nebulous thing that is sometimes difficult to define; luckily, WPI has some institutionally defined goals and plans for achieving those goals, which for our purposes help define its culture. Although these goals largely revolve around systems, procedures, and requirements rather than specific customs and traditions (as one might expect a discussion of “culture” to involve), the implementations of these goals contributed significantly to WPI's lasting uniqueness among universities, a characteristic that remains a key element of WPI’s pre-college outreach efforts. For that reason, when we discuss “culture” in the context of academics, we are really referring to the precedent set by these institutional goals. At a higher level, much of our discussion of WPI’s “culture” concerns the time before Workday’s introduction, when — as many participants noted — various processes, procedures and technological systems were significantly different than they are today.

"The Future of Two Towers", a four-part series of documents which defined the future of WPI, was created between 1968 and 1970 by a special President's Planning Group and a faculty-elected Planning Committee. Although there had been prior (recent) attempts to create a "plan" for WPI, this new project was seemingly the first to truly come to fruition.
The President's Planning Group's work had several motivations that are outlined in the first of the four documents they produced. First, WPI's founders never provided a well-defined purpose for the school, other than for it to be a “Scientific School” (Van Alstyne et al., 1969). Second, various groups at WPI felt as though the school had inherited too much culturally from other technical schools in the pursuit of keeping up with the changing needs of the American technological industry. The authors of this report establish that it is important that WPI has its own identity, separate from other universities:

Generally speaking, its responses have been modelled on those originating from the leaders in American technical education, the Massachusetts Institute of Technology and the California Institute of Technology. WPI's uniqueness began to disappear. Instructions to President Starke (1962) were, ‘Keep things going’. (Van Alstyne et al., 1969 pg. 3)

The WPI Plan, as the product of the work done by the Presidential Planning Group and Planning Committee would later be named, was created to give the school a concrete sense of direction with measurable goals for the future. The developers of the Plan also sought to foster a more inventive spirit at a school that they found tended towards producing good workers instead of good thinkers and leaders. The report includes testimony from a student about their observation of their fellow students:

Not many of us can really express ourselves in a free manner. Nor are we encouraged toward this end by our free-manner contemporaries or our professors. Be safe. Go by the book. Some people get really turned on by being introduced to new ideas and by learning to think in unfamiliar ways. Not many of them go to Tech. (Van Alstyne et al., 1969 pg. 12)

This is very different from the perception of the WPI student today as a passionate and scholarly individual. WPI students today are encouraged to experiment and find their own path for their education.

Many of the values and traditions that WPI has maintained today, such as graduation requirements, grading schemes and an emphasis on project-based learning, are outlined in the final part of "The Future of Two Towers." This part of the report includes a proposal for the term system, which WPI maintains with some modifications today: “The Calendar recommended consists of four seven-week Terms; three-week January Intersession for a series of special, intensive seminars; and an optional seven-week summer Term” (Van Alstyne et al., 1970). Although the January seminar period has since been replaced by a similar program known as "WinterSession" that takes place at the start of the winter term, WPI has maintained the seven-week term system, with four terms making up the normal academic year and two optional summer terms. The report also defines a unit of coursework: “A Unit will generally consist of about 50 hours of work per week for seven weeks - one Term.” More specifications for common unit values for individual courses are also included, such as the requirement that an independent study project be 1/6 unit or more.

In the decades since the creation of the WPI Plan, changes have been made that diverge from its original vision. For example, a particularly significant change was made to the grading scheme. The original Plan recommended a pass/fail model, with an additional passing designation. Under this model, the three possible grades were NA (Not Acceptable), A (Acceptable), and AD (Acceptable with Distinction). While
WPI no longer uses this grading scheme, its spirit of deemphasis on grades and emphasis on actual experiences and results can be felt in the current system, using 3 letter grades A, B, and C (without the separation of pluses or minuses) and No Record (NR). It is clear that since the introduction of the WPI Plan, WPI has attempted to minimize students’ stress over their grades, emphasizing their experience and results instead.

The Plan also places emphasis on project work; the final part of "The Future of Two Towers" suggests that undergraduate students should be required to complete two units of project work to graduate:

At least two Units established by Acceptable or Distinguished work in an advanced level activity involving Independent-Study or Project work. One of these Units would have to be in the student's major field. An activity relating technology to society is recommended for the second Unit (Van Alstyne et al., 1970, pg. 19)

The descriptions of each project, one relating to a student’s major and another focused more broadly on technology and society, are very similar to the MQP and IQP that WPI requires its students to complete today. The WPI Plan establishes the importance of projects that not only provide students with hands-on experience in their field (the MQP), but also experience outside of the STEM classes that fill the majority of their degree via a social sciences project, the IQP.

2.4) A Brief History of WPI's ERP Use

For decades, WPI used the Banner ERP system from Ellucian, with the Student, Finance and Financial Aid modules. The Student module was Banner's implementation of an SIS; the Finance module was for managing institutional finances; and the Financial Aid module was for managing financial aid awards given to students. In addition to these pre-made modules, WPI's deployment of Banner had a significant layer of custom extensions, which through personal communications we learned had largely been created by one member of WPI's information technology (IT) department. WPI's custom code integrated a vast number of business processes into Banner, including academic advising operations and the management of university mailing lists. It is not at all unusual for universities to customize Banner. In fact, Ellucian provides the source code of their products to customers with the appropriate license. While this setup worked for a long time, there was eventually a movement to modernize and "transform" WPI's IT environment. This movement — known as Enterprise Transformation — would include the replacement of Banner.

Enterprise Transformation was first announced to the WPI community in 2017. It promised to "dramatically improve processes and procedures across the university" (Worcester Polytechnic Institute, 2018), with some more specific goals being to "improve usability, efficiency and security" of various systems. A major part of the justification for this significant undertaking was that WPI's systems were operated "on-premises" — in other words, on WPI-managed hardware that was physically located in a WPI facility — and were inherently limited in their ability to scale up to handle increased workloads. Enterprise Transformation meant that at least some of these systems would be relocated to cloud computer hosting or replaced altogether.
The first major change introduced by Enterprise Transformation is also the subject of this paper: the deployment of Workday. The first part of this took place in October 2018, when the HCM and finance components of Workday were rolled out. Banner’s student-facing portions would remain active for the time being. According to a communication to the WPI community at the time, Banner was being phased out because "the current version would [soon] no longer be supported by [Ellucian]" (Worcester Polytechnic Institute, 2018), and continuing to use it in the long term was perceived as a risk. According to the announcement, Workday was chosen as a replacement with assistance from an outside consultant, and it was expected to greatly simplify operations. There was an expectation that members of the community would find the new experience to be significantly simpler. The announcement put it: "After this, we'll ask why it was ever not this simple."

In April 2021, Workday Student was launched in a preview state at WPI, after a "dress rehearsal" in November 2020. According to an announcement made prior to the dress rehearsal, the intention was for students to "have a chance to login and get a feel for the course scheduling and registration process ahead of time" (Worcester Polytechnic Institute, 2020), so they could be prepared for course registration the following month. A later announcement that was made in May 2021, after students had experienced their first course registration with Workday Student, indicated that early feedback was incredibly positive. The user interface was specifically cited as an improvement over Banner (Worcester Polytechnic Institute, 2021).

The deployment of Workday Student was, according to the launch announcement, a slow and arduous process. One particularly challenging aspect of the project, according to interviews included in the announcement, was the migration of student data from the legacy Banner system to Workday Student. The migration required careful attention to data formatting to satisfy Workday Student's data ingestion process, and at the end, 100% accuracy still had not been achieved.

Even after the initial deployment was completed and the system was made available to users, there were still missing features and other issues. For instance, one co-author of this report personally experienced that transcript generation was not available within Workday Student in October 2021—that is, six months after the preview launch and five months after the full launch. To get a transcript, students had to go to Banner, where one of the few remaining functions was transcript generation; however, because Banner was no longer receiving new student records, it could not generate transcripts for first-year students. The only other option was to perform a PDF export of Workday Student's "academic record" page, which did not use the typical transcript format and included information that was not supposed to be present, such as GPA and NR grades.
Figure 1: An early “transcript” generated by Workday Student for one of the authors. In fact, this was a PDF export of the “View My Academic Record” screen, which is clearly not intended to be used as a transcript.

Today, Workday is an integral part of WPI’s IT infrastructure. It is essentially the center of a complex web of systems that integrate with each other and keep the university running. To give a concrete example\(^7\), most \texttt{@wpi.edu} accounts start life as an entry within Workday, whether it’s for a newly recruited student or a newly hired employee. The data from Workday is progressively transformed and passed through various intermediate systems, culminating in the creation of a new account. This process also

\(^7\) This information is based on an author’s experience working in WPI IT, as well as discussions with IT staff and review of architecture diagrams.
propagates changes to accounts, such as a name change or a job change. Workday, as well as these intermediate systems, end up providing a significant amount of information to various institutional "end user" systems. All of this happens through a complex patchwork of automated tasks, file transfers, and custom programs.

2.5) Abstraction in Computing and Society

ERP systems are just another example of how computation is present in many aspects of people’s lives. In its essence, this study examines the ways in which computation affects the culture of an institution. For this reason, being familiar with previous writings on this subject is useful for understanding this study and its results.

To start, we reviewed *US Operating Systems at Midcentury* by Tara McPhearson. In this essay, McPhearson analyzes changes in computer technology and society present in the 1960s and 1970s by studying the rise and design philosophy of UNIX and changes in societal operations that came with the civil rights movement, anti-war movement, and the various other calls for change that occurred in the 1960s. McPhearson identifies two common features: abstraction and modularity. Both of these concepts are related to simplifying a design or implementation but emphasize different aspects of simplification.

In computing, abstraction is a design idea that involves obscuring the exact mechanics of a program’s function and emphasizes the act of hiding more complex parts of a program under layers of a more simplified view, allowing users who may not know all the inner workings of a machine to still make use of it. McPhearson argues that this concept is also visible in some of the changes in social structures in the 1960's:

> For instance, if the first half of the twentieth century laid bare its racial logics, from ‘Whites Only’ signage to the brutalities of lynching, the second half increasingly hides its racial ‘kernel’, burying it below a shell of neoliberal pluralism ... In fact, the urban center of Detroit was more segregated by the 1980s than in previous decades, reflecting a different inflection of the programmer’s vision of the ‘easy removal’ or containment of a troubling part (McPhearson, 2012, pg. 29)

McPhearson argues that explicit Jim Crow segregation laws could be seen as a form of racism that is transparent in its operation, because explicit rules prevented African American people from using certain spaces and obtaining certain resources that White people had access to. Even after the downfall of Jim Crow era racism, there were other systemic factors that led to the oppression of African American people. For example, McPhearson identifies economic factors and other causes that enabled segregation in housing in Detroit in the 1980s. She argues that these less obvious forms of racism could be thought of as a societal abstraction, hiding the most unpleasant parts of racism to allow it to continue even after the introduction of civil rights protections.

Modularity, another computing concept, refers to splitting a program into chunks to reduce the dependency that those various parts have on one another, allowing for easier maintenance and more rapid development. In this way, modularity emphasizes the division aspect of simplification.
McPhearson uses changes in the division of studies at universities in the Cold War era to argue that context from related fields is abandoned as subjects become more segmented:

Christopher Newfield comments on the rise of New Criticism in literature departments in the Cold War era, noting its relentless formalism, a "logical corollary" or "depoliticization" (2004: 145) that "replaced agency with technique" (2004: 155) ... Many now lament the over-specialization of the university; in effect, this tendency is a result of the additive logic of the lenticular or of the pipeline, where ‘content areas’ or ‘fields’ are tacked together without any sense of intersection, context, or relation. (McPhearson, 2012, pg. 31)

McPhearson argues that an obsession with categorizing knowledge, as one may categorize the functions of a computer program to make it easier to use, has prevented the intermixing of knowledge. This was to the detriment of the university as a system of collaboration and cooperation. This can also be thought of as a side effect of universities making use of electronic systems to manage students, faculty, and staff. Each student must be associated with a department and a degree. It shows how computing can affect social systems and culture, just as much as culture affects the ways computational systems are designed.

2.6) College Experience of First-Generation Students

Although definitions vary, a first-generation student is often defined as a student whose parents did not graduate from a four-year college, while a second-generation student has at least one parent who did graduate from a four-year college (Pike & Kuh, 2005). Part of our study concerns the ways in which Workday, and in particular Workday Student, might affect the experience of first-generation students at WPI. To better understand this, it is useful to first examine the different experiences of first-generation students and second-generation students.

Storlie et al. (2024) examine the unique psychological needs of first-generation students and how counselors can better help them by evaluating reflection responses completed by participants in a career navigation course and finding common themes. The themes are categorized according to Schlossberg’s Transition Theory: situation, self, social support, and strategies.

One of the key findings of the study is that support systems are especially important for first-generation students. This includes familial relationships, institutional relationships such as a teacher or counselor, fellow community members, friends, and partners:

Family units were referenced in the career reflections as a source of ongoing support.
Institutions/communities were more often referenced as support prior to and in preparation for the transition to college. (Storlie et al., 2024, pg. 7)

It makes sense that first-generation students would look to connections outside of their family to obtain help with different aspects of the college process since their parents may not be able to offer that guidance.
Storlie et al. also emphasize the presence of unpredictable situations and examine the resources and strategies students use to manage them, finding that many of the participating students discussed their sense of control over their situation:

*Phrases related to participants’ sense of control of the transition (n = 10; 41.67%) referenced individual interest versus others, family history of career paths, competition in the field, and sense of choice.* (Storlie et al., 2024, pg. 7)

First-generation students, like anyone else, may need help dealing with new and unforeseen situations. Likewise, it makes sense that attending college may present more of these situations for the average first-generation student than a second-generation student.
3) Method

We had two major goals for this study: first, to assess the success of WPI's Workday deployment at meeting various design goals and upholding the promises that were made to justify its introduction, and second, to gain a better understanding of the software’s effects on the WPI community and institutional culture. We identified three major design goals of Workday (Workday, 2024):

- Serving as one source for all data and functionality
- Having an intuitive user interface
- Being customizable and flexible

To gather information about Workday's effectiveness at meeting these goals, we focused on examining the experience of three main groups on campus: faculty, staff, and students. These groups were selected as they were considered to encompass all the people who have to interact with Workday on a regular basis. We created an anonymous survey that was distributed to the WPI community for anyone to complete. To get more specific insights, we interviewed faculty in different academic departments, as well as staff in both technical departments (such as various groups within Information Technology) and student-facing departments (such as the Registrar's office and Academic Advising staff). In our effort to interview students, we primarily reached out to student workers, student club officers, and first-generation students due to their unique circumstances in relation to Workday and WPI as a whole, and their potential to share unique and enlightening perspectives on Workday. We intentionally aimed for diverse departmental representation to get an accurate and diverse view of the community's experiences with Workday.

3.1) Positionality

The authors are undergraduate computer science students with a focus in cybersecurity. We do not have much formal experience with UI and UX design; however, one author has a long history of building websites in their spare time, with a focus on simple and user-friendly UI design. As students at WPI, we use Workday Student to register for courses, view grades, and perform other tasks, such as monitoring our academic progress. Two authors also have experience with the employee side of Workday as a result of being employed in student worker positions.

We came into this study with our own opinions about Workday Student (and, by extension, Workday) as a result of having used it for the entirety of our WPI careers. We also received assistance from two professors who acted as advisors for the project, one with a specialty in human-computer interaction and one with a specialty in design anthropology. Both of our advisors use Workday as faculty members at WPI and, consequently, have their own opinions of it. Our advisors helped answer questions that arose during our work, and their viewpoints and experience may have influenced the study in some way. However, most of the questions they answered were about how to structure research in general, and all conclusions in this study are our own.

Additionally, this study was based on human subject research. Due to the researchers and the advisors being in the same departments, there were more professors and students being interviewed from those departments and adjacent ones. We attempted to mitigate this by broadening our outreach efforts, but
due to an imbalance in connections to different departments, and varying response rates, some departments may be over- or underrepresented. This should be considered when interpreting the interview results.

3.2) Survey
We constructed a survey with a variety of questions (See Appendix 8.2) in multiple-choice, Likert scale, and free-response format. The initial survey questions were demographic questions, which can help to contextualize the responses and potentially explain different viewpoints and perceived issues with Workday. It is important to note that we are not using demographic information to predict how an individual might respond — it is only meant to help us understand their response.

After the demographic questions, participants were asked about their experiences using Workday. To capture a high-level metric, the first question was “How difficult or easy do you find using Workday to be?”, using a Likert scale. Respondents were then asked to rate their experience performing specific tasks that are directly relevant to them. We created different sets of tasks for students, student workers, faculty, and staff. The final questions were in free-response format, allowing the participant to elaborate on the negative or positive aspects of Workday that motivated their task ratings. The last of these open-ended questions was more general — “Do you have any additional thoughts about Workday?” — and served as a catch-all for any opinions the respondent may have had that did not fit as a response to any other question. After a respondent completed the survey, they were asked if they were interested in an interview. This was not very effective, with only two respondents expressing interest.

Our survey was distributed through several channels including campus email lists, school-related chat rooms frequented by students (including Discord servers), and on-campus advertising such as table sitting. These channels were selected as they were believed to be the most effective ways to receive responses from each of the targeted groups. The effectiveness of these channels varied, with online channels far outshining the in-person table sitting in effectiveness. See Appendix 8.3 for an email that was sent to a mailing list used by faculty and staff. Emails were particularly effective for interview recruitment because we were able to send tailored messages inviting specific individuals to participate.

3.3) Interviews
In addition to distributing our survey, we conducted semi-structured, one-to-one interviews, primarily with individuals who we reached out to (as described above). While multiple sets of base questions were constructed for interviews with different groups, the semi-structured nature of the interviews allowed us to ask additional questions — as well as remove unnecessary questions — depending on the interviewee’s unique background and experience, as well as their responses to previous questions. Questions tailored to a department generally referenced role-specific tasks — for instance, when interviewing an IT employee who supports end users, a question such as “how many tickets do you get about Workday?” may have been asked. Questions tailored to an interviewee typically focused on their own experiences and were often highly specific. When interviewing students, we asked questions about being a student employee, managing club finances, and general student activities (such as course

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8 A ticket is typically a request for technical support.
registration), among other things. Our questions were designed to give insight into three main areas: the flexibility of Workday, the ease of finding data in Workday, and how the information Workday provides affects decision making on campus.

The insights gained from our interviews paired nicely with the larger quantity of survey data, which provided a wealth of information on people’s everyday experiences with Workday. We also asked interviewees to suggest other people they thought we should reach out to. This helped us reach outside of our personal and professional circles and find people at WPI who we otherwise may not have gotten to talk to.

3.4) Workday Experimentation
To create our "walkthroughs" of various tasks within Workday Student, we used our own accounts to complete the tasks and took screenshots of each step. We selected some common tasks that every student will perform multiple times during their time at WPI, such as registering for courses and viewing their grades. Because we did not have access to a faculty or staff account, our walkthroughs were limited to Workday Student. The walkthroughs supplement testimonies from survey respondents and interviewees, providing a reference point as to what we, students using Workday, see when we complete certain tasks. They help provide context for any claims that participants may make, including (to an extent) those who are not students.

3.5) Data Analysis
Our survey and interviews left us with a significant amount of data that had to be processed and organized to properly present it in this paper.

3.5.1) Survey Data Analysis
Our survey was built with Qualtrics, which we selected due to its prevalence at WPI. We used Qualtrics to get an initial high-level overview of the data, but for more in-depth analysis and graphing we leveraged a combination of Excel and custom Python scripts.

There were two significant parts to the survey data analysis: analyzing the usability matrix and analyzing the free-response submissions. As previously mentioned, the usability matrix asked respondents to rank the difficulty of different tasks on a 5-item Likert scale ranging from "extremely easy" to "extremely difficult." For each task, we calculated the frequency of each difficulty on a per-group basis. We used Python with standard data analysis libraries like matplotlib, pandas and NumPy in a Jupyter notebook to analyze and eventually graph the usability matrix data.

To support our analysis of the answers to the free-response questions, we developed a "tagging" system to identify common themes. Tagging allowed us to formalize our understanding of the responses we received, which helped us confidently come to conclusions about Workday's strengths and weaknesses.

3.5.2) Interview Data Analysis
We recorded the audio of most interviews, with a small number of exceptions in response to interviewee request. The recordings and transcriptions were stored in a shared folder accessible to only the researchers. For the sake of efficiency, OpenAI's Whisper software (version 20231117) was used to
transcribe the recordings. Whisper was chosen because it could be run locally, eliminating any risk of a breach of confidentiality that could have come from using an online service.

Each transcript was reviewed and tagged with the same framework that was used to analyze survey responses. Additionally, we marked several relevant quotes to use or paraphrase in our report.

3.5.3) Tagging

Our tagging system was developed based on the thematic analysis framework outlined by Bohrer (2024, chapter 12). To define our tags, we first reviewed the free-response results from the survey and created tags based on common themes that came up; some examples include issues with Workday's user interface, general confusion, and a positive experience interacting with the payroll system. If sentiments on an issue were mixed within a response, the tag for the more prominent sentiment would be applied.

3.6) Ethical Considerations

All human subject research and outreach activities were documented and submitted to the WPI Institutional Review Board (IRB) before being performed. All proposed activities were reviewed and approved by the IRB.

4) Survey Results

4.1) Demographics

We received 105 responses to our campus-wide survey. 34 of these responses were from faculty, who made up 32% of the respondent population, and 37 were from staff, who made up 35% of the population. All but one of the remaining respondents were students; there were 33 of them, making up 31% of the population. Finally, there was a single response from an individual describing themselves as "retired staff."
4.2) Task Difficulty

As part of our analysis, we collected all the ratings for each task in the "difficulty matrix" and organized them by respondent affiliation. Certain tasks were only visible to people who declared specific affiliations, so all non-qualifying affiliations are excluded from the presentation of results for those tasks. For tasks applicable to students and student workers, the two groups were merged into one larger group since there is effectively no difference between them in that context.

4.2.1) Accessing Workday

Unsurprisingly, most respondents reported having an easy time accessing Workday, with only 20 out of 105 (19% of respondents) reporting any difficulty. These reports of difficulty were almost evenly distributed between students, who contributed 9 reports (45% of the reports of difficulty), and staff and faculty, who contributed 11 reports (55%).
We were intrigued by the reports of difficulty but were unable to glean any additional information from the free response section of the survey, which limits our ability to identify possible causes.

4.2.2) Quickly finding information
68 out of 105 respondents (approximately 65%) reported that they found it either extremely or somewhat difficult to quickly find information that they needed within Workday. Out of these, there were 24 reports (35%) of "extreme" difficulty and 44 reports (65%) of some level of difficulty. This sentiment was common throughout all the affiliation groups, suggesting that there is an underlying usability issue that warrants further examination.
4.2.3) Controlling access to information

Most of the 86 respondents reported that they found it relatively easy to control others' access to information within Workday (e.g., a student explicitly allowing a parent to view their grades). Interestingly, of the population of 36 individuals (42% of all respondents) that reported finding this task difficult, 16 of them (about 45%) were students.
4.2.4) Student specific: Finding available courses
Entering the student-specific tasks, we notice some particularly interesting results. Out of the 33 students who rated the difficulty of finding courses, only 5 (15%) reported finding it particularly easy. 23 students (69%) reported finding it particularly difficult. The remaining 5 students responded neutrally.
4.2.5) Student specific: Registering for courses
Similarly to the issue of finding courses, 21 out of 33 students (63%) reported finding it difficult to use the Workday course registration system. Out of the remaining 12 students, only two deemed the system "extremely" easy to use.
4.2.6) Student specific: Evaluating academic progress

As with finding and registering for courses, most students reported finding it difficult to evaluate their academic progress using the Workday Student "View My Academic Progress" feature. The general distribution of results was nearly identical to that of the course registration question, but there were some shifts between specific difficulty ratings on either end of the scale; 20 out of 33 students (60%) expressed that the task was difficult, 6 students (18%) reported that it was easy, and the remaining 7 were neutral.
4.2.7) Student specific: Obtaining reimbursements for club activities

This task, and the one that follows, are different from the others because they require students to navigate an entirely different part of Workday: the business-oriented financial applications that are not usually exposed to students. As a result, ratings of the difficulty of these tasks do not reflect on Workday Student, but rather on Workday’s corporate financial management module.

Students leaned slightly away from deeming this task difficult, with 11 out of 26 students (42%) rating it as either extremely or somewhat difficult, 4 students (15%) rating it as somewhat easy, and the
remaining 11 giving a neutral rating.

Figure 9: Student-respondent-rated difficulty of obtaining reimbursements for club activities through Workday.

4.2.8) Student specific: Submitting club expense reports
Of the 24 students who rated the difficulty of this task, 14 (58%) gave it a neutral or "easy" rating. The remaining 10 students were evenly split between "extremely difficult" (21%) and "somewhat difficult" (21%) ratings.
Figure 10: Student-respondent-rated difficulty of submitting club expense reports through Workday.

4.2.9) Employee specific: Performing everyday job functions

The results presented here do not necessarily speak for themselves, because there is a wide variety of jobs at WPI, each with their own responsibilities and daily activities. These results are at least partially contextualized by both the free-response answers and interviews that we conducted.

44 out of 76 ratings (58%) were either neutral (21%) or on the "easy" end of the scale (37%). The remaining 32 were on the "difficult" end of the scale. Interestingly, while the 37 staff respondents (49% of all respondents) generally gave neutral or "easy" ratings to this task, the 34 faculty respondents (45%) did the opposite and generally gave it "difficult" ratings.
4.2.10) Employee specific: Hiring new employees (full-time or student)
19 of the 31 staff (61%) who rated the difficulty of this task gave it a neutral or "somewhat easy" rating. Of the other 12 staff, 8 gave it an "extremely difficult" rating and 4 gave it a "somewhat difficult" rating. This is an intriguing result, but there is not an immediately obvious explanation for the extreme difference in responses.

The 18 faculty (37% of all respondents) who responded were evenly split between "difficult" and neutral/easy ratings, with 9 faculty on each end of the scale.
4.2.11) Faculty specific: Entering course grades

The final task on the difficulty matrix was perhaps the most controversial one: entering final grades for students in a course section. The ratings we collected for this task hint at its controversial nature, with 12 out of 32 faculty (38%) giving a difficult rating, 6 (19%) giving a neutral rating, and 14 (44%) giving an easy rating.
4.3) Written Responses

Out of the 105 survey respondents, 87 (83%) responded to at least one of the written questions. Six written responses mentioned Banner, and while many of these responses paint Banner in a negative light, in most cases Workday is criticized as well. Some respondents stated that Workday has a "steep learning curve" compared to Banner, and that it is not as intuitive as Banner was; others said the opposite.

26 respondents (30%) reported that they found some aspects of Workday confusing. Several students were confused by the process of finding courses, with one individual mentioning a "weird list of calendars" that needed to be sorted through to find the schedule for the current academic year. In the words of one student, "having the list go from the 1900s to now is so unnecessary and confusing" (See Appendix 8.1.1). This is a newer issue that did not exist in past academic years, suggesting that it is a configuration issue rather than a product issue.

Other respondents took a more extreme stance, asserting that Workday is inherently confusing and that "everything could be easier." A common complaint was that many seemingly basic tasks require too many user interactions (clicks, form field entries, etc.), and grading in particular was the source of many complaints. For example, one respondent wrote that "entering grades is painful; if I have five MQPs, it takes about seven clicks to switch between them, along with 3-4 clicks to enter each grade." The general sentiment among users with these complaints was that many tasks needed simplification, although specific tasks were not always named, making it harder to identify the exact source of their frustration.
Another common theme in the written responses was the learning curve for new, unfamiliar tasks. As one respondent put it, Workday “talks in Human Resources lingo”, which can be confusing to people who may not have been previously exposed to a similar system that uses similar terminology. Other respondents took issue with a perceived lack of documentation for various tasks that they needed to perform. Still others reported having trouble determining where they could perform a specific task or locate specific information; one respondent reported having to go through “several menus” just to find their assigned mailbox.

While respondents complained about the difficulty and inefficiency of many processes, one process stood out: filing expense reports. 19 respondents (22%), 11 of whom were faculty, expressed that filling out expense reports through Workday frustrated or confused them. A few faculty members pointed out that this was something they did not have to do when Banner was still in use. Other respondents were specifically frustrated with how Workday reports errors in an expense report. According to these individuals, errors are not clearly indicated at the field level, requiring additional navigation to determine the error’s location.

Far more students felt negatively about using Workday to set up their schedules than about the actual course registration process. Students who expressed negative experiences with the registration aspect of Workday tended to specifically refer to registering for courses when registration for an upcoming semester opened, rather than the process of making schedule adjustments early in a term or semester. Students expressed frustration with slow response times, apparent (or real) system crashes, and not getting into courses that they needed to fulfill degree requirements (although this is arguably not an issue with Workday itself, but instead an unfortunate reality of course scheduling).

One faculty member also expressed frustration with the scheduling system in Workday for helping students find available courses. Some students mentioned that they prefer to use the student-made (but now official) “WPI Planner” website to design schedules before transferring them to Workday.
Figure 14: A course schedule built by the WPI Planner, based on a student's selected course list for a single term.

Workday currently does not have an equivalent system for schedule planning and requires courses to be added to a schedule one by one, in a process that can be time-consuming and confusing, as shown by the survey results.

The more generic HR features of Workday tended to be well regarded. Faculty and staff reported having an easy time handling their pay, time off and employment benefits. 9 respondents specifically expressed that the payroll system worked well.

5) Interview Results

18 interviews were conducted in total: eight with staff, six with faculty, and four with students. We reached out to many more individuals but unfortunately did not receive responses to all invitations. Across the interviews, some common themes appeared. Participants talked about the difficulty of completing certain tasks in Workday, how the switch to Workday impacted them, and the ways in which various parts of Workday clash with the unique aspects of WPI.

5.1) Ease of Use

Overall, sentiments were similar to those expressed in the survey. Participants tended to focus on what they thought could be improved about Workday, often while describing frustrations they had with it. Positive sentiments that were expressed tended to be about an aspect of the software working at all, rather than working well.

Workday was originally designed for HR and financial management, and many of the issues that the participants of this study have experienced with Workday Student can be traced back to this fact. While some participants worked with payroll and hiring processes, which are traditional finance and HR tasks, many participants were either students or responsible for completing student-oriented tasks, like assigning grades or managing student course registrations.

Workday's implementations of payroll and hiring processes, features which are used by practically every business, were received positively. Workday had been used for HR and finance at WPI for years prior to the introduction of Workday Student, so familiarity could be an additional factor in how these features were viewed by the faculty and staff we interviewed who worked at WPI prior to the introduction of Workday Student.

However, the student workers who participated also had a neutral or positive attitude towards completing these processes with Workday. A student who has worked multiple different student jobs during their time at WPI had this to say about the student employee side of Workday:

*But I mean, in terms of the basics of submitting hours and stuff, it's fine. It's not the best system I've used, but it's okay. ... It's more manageable than any of the student life stuff, like the academic side, I would say is much more of a nightmare to figure out than like, 'hey, I got paid on Friday'.*
A student working a campus job at WPI is represented by two separate Workday objects, one designated as a student and the other as an employee, or "person." Employee tasks such as time entry and viewing pay stubs are separate from student tasks such as registering for courses and viewing academic progress. The student employee we interviewed stated they had more trouble navigating the student side of Workday than the employee side, although they only went so far as to say that the employee side was "manageable."

Now, contrast this with the same student's experience with tracking tuition payments:

But every single time I've navigated ... [to] the finances tab, it has the expected payment pending financial aid and total whatever. It doesn't really tell you if it's a surplus or if you're at the negatives, it just has a number. And so, when it just has a number and it's like, this is how much that's owed, it just makes me think, oh, I owe X amount of money versus Oh, I'm actually fine. And that coupled with like the only option at the end, like whenever you see your balance being paid WPI the first thing that comes to your mind is ‘Oh, fuck, I owe this much money' when like you have to go on the side and get your little calculator pencil. I've actually done that multiple semesters, because I was anxious thinking, ‘okay, I miss the payment deadline, whatever. ‘But it's like, you didn't miss the payment deadline. It's just the platform is just not really good at telling you that you were fine.

The two most prominent items shown on a student's financial dashboard are the “Total Account Balance” value, which indicates the overall remaining unpaid balance on their account, and the “Due Now” value, which indicates the amount due immediately (e.g., the next installment of a student’s payment plan). (See Appendix Section 8.1.4).

Before a payment plan is set up, the “Total Account Balance” value will typically reflect the amount of money due for the semester, not accounting for financial aid. There is a separate “Anticipated Balance Due” value, which is defined as the Total Account Balance minus any applicable financial aid and pending payments. This value is not nearly as easily visible as the Total Account Balance; since many students rely on financial aid to help pay for their tuition, this has the potential to cause confusion and stress.

To make matters worse, the financial dashboard does not have consistent labels for the displayed values; as shown below, there are eight values with seven different (sometimes conflicting) labels. This sort of "information overload" has the potential to cause additional stress, due to the dashboard's lack of relevant help text.
5.2) How Different Groups Interact with Workday

One of the main goals of our study was to understand the perspective of three main groups at WPI: faculty, staff and students. Although each of these groups interacts with Workday in a different way, we were able to find commonalities in their experiences.

Among faculty, a commonly expressed sentiment was that the switch to Workday caused more administrative tasks to be given to faculty instead of dedicated administrative staff; for example, filing expense reports. Faculty often file expense reports to receive reimbursement from their department for money they spend on a course, research, or other activity related to their position at WPI. Many faculty members we spoke to found this process confusing and tedious, and felt that they didn’t complete the process enough for it to become intuitive. According to one faculty member we interviewed:

*The expense reports, I do those less frequently. And I think part of the problem with that is, I forget every time how to do it. It has these weird tricks that you have to remember. I will forget the tricks, and then the red error message will pop up, and then I will get frustrated, and keep banging away trying to do something, then I do get it submitted. I'm never quite sure if it's correct, and it'll go through, or if it will come back to me for another round.*

Another faculty member identified more issues, also noting the fact that administrative staff used to handle expense reports:

*I think some of the confusion comes from the fact that there are different ways that pieces of information have to be coded and there are different cost centers. And I don't do it enough to remember which specific cost centers I need to use, how certain information should be coded. ... Historically, there was administrative staff who would take care of these things. And I mean, there still is administrative staff. It's just that they're not necessarily doing this work now.*
It is worth noting that Workday Student was officially fully integrated in 2021, towards the beginning of a labor shortage. It is possible that the faculty members’ observations weren’t the result of Workday’s structure, but rather the economic forces that coincided with its introduction. However, the general opinion of the faculty members we talked to was that this increase in administrative work delegated to them was caused by Workday’s adoption.

It is also possible that this is just a step in a larger trend of more administrative work being assigned to faculty as opposed to staff. Another faculty member, who has been at WPI for multiple decades, compared the adoption of Workday to past decisions to assign more work to faculty, with the only difference being that they weren’t given any input in Workday’s adoption:

> Those were physical records. And then we went to actually entering the grades on a machine. And the secretaries did this entry, faculty had nothing to do with it, and then there was the question, the registrar asked the faculty, and there was a faculty vote, would we want to do this ourselves? ... The faculty voted yes, under the conditions that if somebody didn’t want to do that, the registrar would do the data entry. .... and then Workday to me was a shock, because the faculty wasn’t asked at all, ‘do you want this?’ and it was said, you must do this now, this way.

Based on this person’s testimony, the switch to Workday and the increased administrative tasks it places on faculty could be seen as another part of a pattern. However, it could be troubling that faculty are given less input into such a major change for the WPI community.

After analyzing the conversations we had with WPI community members, we found that the most positive opinions of Workday were held by staff, while faculty and students tended to express more negative feelings such as confusion.

Some staff members we interviewed had very high opinions of Workday as an ERP system. One staff member of a student-facing office had glowing praise for the system:

> Several aspects contribute to the effectiveness and user-friendliness of Workday. One notable strength is its intuitive user interface, facilitating seamless navigation and task execution. The system’s design promotes a user-friendly experience, enabling users with varying levels of technical expertise to perform tasks effortlessly.

This staff member held the most positive opinion of Workday and could be considered an outlier. However, several participants appreciated the improvements that came with Workday, while still acknowledging aspects of Banner that they missed or aspects of Workday that they felt could be improved. One participant had this to say:

> There’s a lot more clicking, which I like a little less. You know, we used to have a lot of keyboard shortcuts and things that made some data entry or even just in general, navigating ... in Banner faster. But at the same time, there’s a lot of information. I can get a student really in one place as opposed to Banner where you couldn’t. ... With Workday, you can, there’s lots of different tabs.
Some of the staff participants had more neutral opinions of Workday; for example, one staff member told us:

> I think it's fine and effective for me to support students. I think it does what I need it to do in terms of seeing student schedules and who their professors are and that kind of thing.

Overall, staff opinions of Workday tended to be more positive than those of most of the faculty and students that we interviewed. This could potentially be a result of the staff members spending more time using Workday, causing them to be more familiar with its structure and quirks. The staff member who we previously deemed an outlier indicated that they are a very active Workday user:

> I spend most of my day working in Workday, with only occasional breaks to use Outlook, Zoom, Teams, and Excel.

If a user completes a process using Workday frequently, they will likely remember how to complete that in the future, even if it is unintuitive. They are essentially developing digital muscle memory. However, the initial learning curve can be steep. One participant expressed that they have trouble understanding and completing unfamiliar processes:

> When I'm doing my processes that I am familiar with, I don't have any issues. The only issues that I do have is when I get those error messages... If you did [something wrong, they're] not specific enough to say what's wrong... And so you have to go around and dig. So I find that somewhat hard to find out where I have to go to look around to find what's missing or what's wrong to change it to get to submit it.

Among staff, there was a general sentiment that "basic" tasks in Workday, such as filing an expense report, tend to be straightforward. More "obscure" tasks — such as those involving data collection — are more difficult to complete, and often require awkward workarounds (or taking advantage of professional connections) even if they are theoretically simple. For faculty, however, the opposite is true — grading is a "basic" (albeit tedious) task, done relatively often, while filing an expense report may be nearly impossible without assistance. This dichotomy serves as a reminder of the importance of considering different user populations when implementing a new system.

Another common source of complaints was the process of retrieving information from Workday in the form of readable reports. Ten participants mentioned this in their interviews, bringing up issues such as not being able to filter large datasets for specific points and work with the format of the data that they are given. One participant, who is in an administrative role at WPI, went so far as to assert that a person's internal connections (or lack thereof) can limit their ability to utilize Workday for reporting:

> It's less about the system and more about knowing who the people are who can help you access the information. Because I do believe that you have to have a special knowledge base to pull that data out.

It is important to note that this participant was specifically referring to the difficulty of correlating data from external systems with data stored in Workday. At WPI, Workday is not a true "system of record" for everything; some data, such as housing assignments, is still stored in external systems that might not
be accessible to all administrative staff. However, their experience of needing to rely on relationships to obtain data is not an outlier either — many interview participants reported that they felt like some of Workday’s functionality can only be properly used by staff dedicated to interacting with it. Sifting through articles on the WPI Hub, a repository for IT-related articles and how-tos, is often more time-consuming than it needs to be for a relatively straightforward task, if one knows to look there in the first place. Instead, when people need to complete an unfamiliar task, they often rely on their coworkers and peers for guidance; for example, a student worker we interviewed recounted a time their boss explained a task rather than directing them to official documentation:

[My boss] taught me step by step how to do it. And she explained like, ‘Oh, this is this and this is this and you can submit on the actual thing, but you have to submit like on the side, like bi-weekly’. [...] I had to rely on the people explaining it to me versus the actual software telling me what to do or relying on the institution to tell me what to do.

This student emphasized the fact that, from their perspective, there was no place within Workday or in the institution to go to learn about the software or get help. Especially for complex or obscure tasks, word-of-mouth communication over how to complete tasks can lead to inconsistent information. This is in part because Workday is a complex piece of software with many functionalities and people may simply remember how to complete tasks differently.

5.3) Cultural Misfits between WPI and Workday

As discussed in Section 2.2, Soh et al. (2000) focused on the challenges faced in the introduction of ERP software to a hospital in Singapore in the 1990s. There were aspects of the ERP software that didn’t fit the hospital’s needs, from completely missing functionality to inconvenient data models that were not well-suited to the population the hospital served. They identified these struggles as misfits of the software (Soh et al., 2000).

An issue with commercial software meant to fit the needs of many organizations is that some subtleties of the data that an organization needs to keep and represent may not be well supported; WPI and Workday are not exempt from this.

WPI prides itself on its unique way of doing things. With a lack of strict course prerequisites and an emphasis on project-based learning, WPI stands out as an outlier among universities in the United States. In section 2.3, we discuss the WPI Plan, which established WPI’s unique culture. A faculty member at WPI commented:

Part of the WPI system is not very conventional compared to other schools, which Workday is designed as a more like a cookie cutter overarching system that would work for every institution.

Because of this, it is important to think about the extent to which Workday’s design (and especially Workday Student’s design) supports the unique aspects of WPI’s culture. One faculty member we interviewed, who served on the Staff Committee on Workday, explained how Banner was able to meet WPI’s needs:
This is very important to understand that Workday allows us to configure existing technology, but we can’t customize it. So Banner was very heavily involved with customizing. We had a whole in-house team that knew how to customize Banner to be able to produce custom reports, all kinds of custom capabilities. And it became part of the WPI infrastructure. Now, Workday allows you to configure. And the difference is that means that there’s certain things that you can’t get it to do because you can only configure it.

It should be noted that this faculty member is not fully correct about Workday only being configurable and not customizable. Many participants, especially staff and faculty who were more involved with the transition to Workday, made similar claims. In reality, Workday does have a means of customization as mentioned in Section 2.1 — Workday Extend — but this is a relatively new technology, and as we will discuss later, it is not a perfect solution even if it seems like the most obvious one.

Many participants seemed to acknowledge the unique aspects of WPI and were concerned with how the use of Workday impacted these cultural identifiers. We were able to talk to many staff and faculty members who worked at WPI prior to the introduction of Workday Student and, in some cases, Workday as a whole. These individuals were able to give us some insight into some of the ways in which Workday Student clashes with WPI’s academic culture. The aforementioned Staff Committee member explained how Workday over-emphasizes GPA:

So WPI has a policy of never discussing or computing GPAs. It’s part of the fabric of WPI. We don’t compute a GPA. It’s called a QPA [Quality Point Average], if you’re really curious. And we know that when you send a transcript to employers, they really want to have something. ... Workday forces a GPA computation all over the place. And there’s nothing we can do to get rid of it.

The administrator we quoted in Section 5.2, who worked at WPI before Workday Student was implemented, elaborated on this:

GPA was a big one, like we just never used GPA as a measure. We didn’t put it out, we didn’t compare it, like we weren’t like taking all the fraternities and sororities and ranking them based on GPA, like, because it’s just not a measure. You know, everyone has a 2.0 [GPA] ... at minimum here.

WPI has long avoided putting an emphasis on GPA, only calculating it so students have a metric to provide to potential employers and a metric for honors societies to invite new members. However, because of the switch to Workday Student, a student's GPA appears in many more places than before. For example, GPA is visible at the bottom of the screen when students view their grades (See Appendix 8.1.3). There is even an option to show it on a student's academic dashboard, offering a constant reminder of something that they’re supposedly not supposed to focus on. When a student checks their grades for a term, they are also shown their cumulative GPA, allowing them to monitor it as they receive their grades upon each term’s completion.

Additionally, the introduction of Workday Student affected how NRs are represented. In the past, NR grades were true to their name of “No Record.” In Banner, when a student viewed their grades, courses
in which they received an NR were not displayed. If a student received all NR grades for a term, they would simply have a blank record. According to the same staff member this was called a “Snowflake”:

I think it was harder to see NRs. So back in the day, in Banner, when you log in, if you just had nothing, that's how you knew you had an NR. But [now] you have to see the NR, so it becomes almost more like an F. .... we used to call if you had three NRs, that was called a snowflake because the page was blank. And now we don’t have snowflakes, there’s no snowflakes.

In contrast to Banner, Workday Student shows all of a student’s grades, including NRs (See Appendix 8.1.3).

Another misfit of WPI data in the Workday Student system, that perhaps caused the most confusion among participants in our study, is how the credit systems for undergraduate and graduate classes work. Most undergraduate classes are worth 1/3rd unit (three credits), with a full course load being 3/3 units (nine credits) for a term. Graduate courses are represented with credits, with a semester-long graduate class being worth three graduate credits, which are also represented as three "credits" (without any distinction) in Workday. When an undergraduate student takes a graduate course, or vice versa, conversions between these credit systems become necessary. The Registrar's office defines the conversion rate as one graduate credit to 1/6th unit. This means that a three-credit graduate course is worth 3/6th units. However, as can be seen in Figure 16, Workday represents undergraduate courses using the credit system, even though they are still worth 1/3 unit, which is less than 3 credits at the graduate level. This can cause some confusion when undergraduate students take graduate classes, as both will be represented as 3 credits of different types (which cannot be easily detected). It is up to the Registrar to know the difference between undergraduate and graduate credits and account for that.

Another faculty member we interviewed identified this issue as a potential mismatch between WPI tradition and how Workday represents course credit through the hypothetical scenario of a graduate student taking undergraduate courses:

Figure 16: Grades dashboard for a student showing how Workday represents the credit values for Graduate and Undergraduate courses

Another faculty member we interviewed identified this issue as a potential mismatch between WPI tradition and how Workday represents course credit through the hypothetical scenario of a graduate student taking undergraduate courses:
Even if it is, let’s say, okay, everything is credit based, there’s no way to display it as three credits to undergrads and two credits for grads, for example. So, because of different properties of the WPI method, we run into these kind of issues. [...[the] registrar still process[es] this as two credits when a graduate student takes these undergraduate courses, but the student gets confused seeing it as three credits.\]

While this scenario is hypothetical and not a real possibility at WPI, the point is still worth considering. Due to the existence of multiple types of credits, and the fact that a course in Workday only counts for one type of credit by default, the Registrar must manually adjust undergraduate students’ registrations for graduate courses to count for 4.5 undergraduate credits as shown in Figure 17.

![Figure 17: Grades dashboard for a student showing manually adjusted credits for a graduate course.](image)

This distinction has been known to be particularly frustrating for students in the BS/MS program, in which a student can count graduate courses towards both their bachelor’s and master’s degrees.

As that faculty member noted, this system can be rather confusing for students in general. One student cited the confusion between credits and units as a reason why they avoided using the academic progress evaluation feature of Workday Student:

So, I don’t use Workday to track my progress as like as much as I feel like it can be used [since] it’s all there for you... Because … there’s no clarity between what is a unit and what is a credit.

If a student registered for graduate courses used the Workday academic progress feature prior to credit adjustments being made to their graduate course registrations, they would see less credit than expected for those courses. They could also be led to believe that they need to take more courses than they actually do, which could cause additional, unnecessary stress.

6) Discussion

6.1) Workday and Group Divisions

With this study, we wanted to take a broad view of WPI as an institution rather than focus on one specific group. Our findings suggest that Workday may shape the way community members see their role at WPI and how other community members see them.
In Section 2.5, we introduced past works on how innovations in computing and technology can affect innovations in social thought through Tara McPhearson’s “US Operating Systems at Midcentury.” McPhearson identifies the increased division of disciplines in American universities as a smaller-scale manifestation of the modularity design principle that exists in computing.

There is a sense of modularity and abstraction already within any institution where people have different roles. At WPI, students work on their academics while a whole portion of the institution’s operation is abstracted away. Students are not involved in the process of managing course sizes or any registration problems. Students only pick their courses and attempt to register. They go to their academic advisor or the registrar’s office to fix any issues they have. Students do not have to negotiate with each other to determine who gets a spot in what course.

Additionally, staff are divided into different offices, like the Bursar’s office, IT, or Admissions. Each group is delegated a different portion of the work needed to keep WPI running. WPI is such a large institution that one office alone could not manage everything; the principle of modularity can be seen in this structure.

Workday establishes these divisions through permissions. Faculty, staff, and students all have different screens that they interact with in Workday and are often unable to interact with the parts of Workday that individuals from other groups can. A faculty member must be designated as the professor of a course in order to enter its grades into Workday. A staff member must be associated with a specific department and role, which determines what tasks they are allowed to complete. For example, an employee at the bursar’s office must be designated as such in order to bill students and administer account holds. Students must be assigned one or two majors, and possibly a minor, that reflect what they will study. A student with an on-campus job must also be designated as an employee. These various identities and permissions define what an individual can do with Workday, and thus how they experience and perceive the application. This also influences how individuals may see themselves as part of the institution. One student we interviewed, who has multiple on-campus jobs, had this to say:

> Workday has me listed as a worker too. Workday [lists] me as a WPI employee more than a student.

Even though, as a student, this person is at WPI because they want to study and obtain a degree, they are listed as an employee in more places than they are listed as a student. Staff at WPI who manage payroll or other HR-related things, who only know the student from seeing them as an entry in Workday, may regard them as an employee while their professors and peers would regard them as a student.

Workday’s design itself is heavily based on abstraction. Throughout the interviews we conducted, the idea of Workday being configurable as opposed to customizable came up constantly. Unlike Banner, Workday doesn’t expose all of its inner workings to its customers so they can modify it to be precisely what they need it to be. Since Banner was based around an Oracle relational database, reports could be created using specific Structured Query Language (SQL) queries to customize what information was obtained. One staff member who we interviewed also recalled that there were keyboard shortcuts for
different tasks in Banner, the result of fine-grained customization, while using Workday for the same tasks involves more clicking.

While WPI had the means to customize Banner to fit many of its unique aspects, Workday is more restrictive out of the box due to its different architecture. WPI's IT department cannot simply modify Workday's code like it could have done with Banner. For some individuals, this has made things easier, such as one staff member who found that the configurability of Workday made it easier for them — a person who is not trained in computer programming — to control the operations they care about without relying on people from other departments to build that functionality for them. This staff member remarked:

_workday's scalability and adaptability have been advantageous. As our needs evolve, the system has shown flexibility in accommodating changes, whether through configuring workflows or integrating new functionalities._

However, Workday is understandably seen as more limited by groups whose tasks are not easily accommodated by the system. This can be seen in students’ opinions of Workday Student’s grading and academic progress evaluation systems. Workday is a massive piece of software, and people from different groups interact with different facets of it. Some areas may be more developed and refined than others, causing significant differences in user opinions.

This division affects real people at WPI. Particularly, it can affect first-generation students, who rely on external resources and relationships with people outside their family to obtain information about all the nuances of attending college. They need to learn how to navigate Workday in addition to the various other aspects of college which are probably very new to them.

Dealing with the available resources can be frustrating. One first-generation student, who works with WPI’s Office of Diversity, Inclusion, and Multicultural Education (ODIME) had this to say about their experience attempting to help new first-generation students with Workday:

_You can’t access entering time until you have a job. ... Well then, how do I find a job as a work study student because I need money. I need to pay my tuition. And then you have to explain that. ... There's no how to guide. So it's very much like, yeah, I just get all of this knowledge and try and distribute it in a good way because there's nothing written down in one centralized location._

WPI provides documentation for different processes in Workday via the WPI Hub. However, different groups may have different ideas of what information would be useful to have in a tutorial of Workday. Different groups use Workday for different tasks, and don’t have much insight into how Workday impacts other groups. The same student shared another experience in which they helped at an information session for first-generation students to ask questions about financial aid, the specific operations of which are often impacted by Workday:

_When students were raising their hands to ask questions, a lot of the like the tone changes a bit, like depending on who's asking that question, or the, it's just generally unhelpful information_
because they don't understand exactly what a student is asking, because they haven't been in that position to ask that question

While Workday has a universal set of data stored within it, and many members of student-facing offices can emulate what a student sees when they login to Workday, how a person sees the information is impacted by their life experiences. This seems to result in a disconnect between some students and those who are tasked with helping them navigate Workday.

This can also be accounted for by the struggles that most first-generation students experience regardless of what information system their college uses. But Workday does heavily section off the views that students see from people who may be able to help. As was identified earlier, many people rely on help from their peers or coworkers to use Workday. These connections become even more important for first-generation students, as they may have trouble finding help from offices on campus.

6.2) WPI's Cultural Uniqueness

WPI prides itself on its unique academic culture, advertising it heavily to prospective students and using it to encourage current students to experiment with their educational path. The WPI Plan, outlined in "The Future of Two Towers", has long been a fundamental part of the university's identity. In essence, it is one of the things that "makes WPI, WPI," and something that sets WPI apart from most other universities in the United States.

Unfortunately for organizations like WPI, software does not always play nicely with such uniqueness. When software is written with baked-in assumptions, there is a risk of cultural homogenization. In this context, cultural homogenization is the process by which diverse use cases are forced — either instantly or over time — to become conformant to a "standard" that does not necessarily suit them well. As we previously noted, Soh, Kien et al. (2000) highlighted this issue of "cultural misfits" in the context of a Singaporean hospital adopting a new ERP system. One striking observation made by the researchers was that the ERP system operated under the assumption that every person has a clearly defined first, middle, and last name, which is the norm in many Western countries, but not the norm in many Asian countries. This baked-in, unmodifiable model was fundamentally incompatible with the population served by the hospital, constituting a "data misfit" in the authors' framework and necessitating awkward workarounds. The workarounds described essentially amounted to disregarding the model and using the Western-form "name" fields as arbitrary data storage fields to hold the non-Western names of patients. This is not an ideal solution to the problem (ideally, the software would have supported Asian names), but it was likely the best that could have been done without the ability to modify the ERP system's source code.

In the case of the Singaporean hospitals, the data misfits that staff encountered were a sign of opinionated software. When software is described as "opinionated", what is usually meant is that it accommodates very specific usages and makes any sort of divergence either difficult or impossible. The software itself does not have any opinions, but the author of the software has allowed their own opinions of what a user "should" do to leak into its design, whether they realize it or not. This concept is
often applied to frameworks (collections of code that can serve as the foundation for new applications) but is applicable to full applications as well.

In this context, the opposite of opinionated software is customizable software. An additional distinction must be made between software that is customizable and software that is configurable. Software that is customizable allows the user to build on top of existing functionality or even add completely new functionality, letting them shape the software into something that suits their specific needs; in practice, this is often achieved through the addition or modification of code. In contrast, software that is only configurable offers the user limited freedom: they may be able to change the parameters of some function (for example, changing the subject line of an automatic email), but they cannot create completely new functions.

Among survey respondents and interview participants, there was a surprisingly common belief that Workday is not customizable; in fact, as we mentioned earlier, it is customizable with Workday Extend. Unfortunately, while Workday Extend may appear to be a great solution on the surface (if one exclusively views the vast quantities of marketing material), we must recall the adage that "there is no such thing as a free lunch." Getting access to Workday Extend, let alone using it effectively, involves significant financial and staffing commitments. Being an add-on to Workday, it is not free, and implementation costs can be significant; browsing public forums dedicated to professional Workday administrators revealed that projects as seemingly basic as creating a new form can run into the tens or even hundreds of thousands of dollars. On top of all of this, an organization needs technically skilled staff who are up to the task of developing and maintaining custom extensions, or at the very least capable of collaborating with outside consultants who are already knowledgeable in the area. As of this writing, WPI has only recently begun to use Workday Extend. For example, the process for generating unofficial transcripts — previously a perfect example of an overly confusing user interface and experience — was greatly simplified in early 2024. There is now far less overhead due to the elimination of unnecessary dropdown menus and clarification of the process.

WPI's academic culture, built upon the WPI Plan, is quite different from the cultures of many other universities in the United States. Perhaps the most obvious difference is how WPI treats the concept of "failure." At most other universities, if you do not earn a passing grade for a course (often anything from an A-plus to D-minus), you are recorded as having failed the course, earning a grade of F and losing points on your GPA as a result. At WPI, however, the undergraduate grading scale is much simpler: A, B, C, or NR. A grade of NR has no effect on the student's average, making it as if the student never took the course at all. This serves as a university-endorsed safety net for students who want to experiment with classes outside of their comfort zone without potentially ruining their average.

Unfortunately, WPI's Workday Student deployment is limited in its ability to support the NR model. Since NR stands for "No Record", logically, one might expect such a grade to simply disappear from the visible record of grades. However, Workday Student continues to show NR grades alongside passing grades. This is in stark contrast to the old Banner system, where NR grades were explicitly hidden, allowing the so-called "snowflakes" to occur. Students who are already experiencing stress may, therefore, feel even worse because their "failure" is on display. The fact that Workday Student does not hide these grades is not necessarily a UX issue, but it is also obviously not a decision that best suits WPI's
long-established culture. It was more of an issue before proper transcript generation was implemented; early in the fall of 2021, the only way for first-year students to obtain anything remotely resembling a transcript was to export the page showing their grades — NRs included — as a PDF.

Another important part of WPI’s academic culture is project-based learning. Undergraduate students must complete two major projects at WPI: the Interactive Qualifying Project and the Major Qualifying Project. Both projects are considered "completion of degree requirements", or CDRs. Workday Student includes a comprehensive system for degree requirements that accommodates this relatively easily. Behind the scenes, each project is represented as one or more hidden sections of a single course that satisfies the overall project requirement. This works well in practice, although students occasionally express confusion about the project registration process for reasons that are not solely related to Workday.

Besides the NR issue, another significant misfit is the seemingly unavoidable GPA calculation and display, as we noted in section 5.3. Interestingly, there is evidence that WPI attempted to correct the GPA display issue at some point in the past, albeit unsuccessfully. In PDF exports of a student’s academic record, the text "Do Not Show: Cumulative GPA" appears in a "Cumulative Totals" section for each semester. Somewhat ironically, the student’s cumulative GPA appears immediately below this text. According to student chats (on Discord and similar platforms used by WPI students) that we reviewed, the old Banner system did not show a student’s GPA everywhere — in fact, the GPA was excluded from unofficial transcripts, and was generally not trivial to find. The WPI Plan's original grading system, consisting of a Pass, Pass with Distinction, and Fail grades, implied an emphasis on the work done rather than an obsession with evaluating students with numerical means. In fact, the proposed outline for a student’s transcript omits GPA or any equivalent measure (Van Alstyne et al., 1970 pg. 24). The fact that Workday Student displays GPA everywhere is not necessarily a UX issue, but it serves as a constant reminder of how it is still limited in its ability to handle all the unique characteristics of WPI’s academic system.

A more obvious issue is with Workday Student’s handling of the distinction between graduate and undergraduate credits, as well as between "credits" and "units." Recall that graduate credits and undergraduate credits are not the same, and do not even have the same value; however, Workday Student only displays a single credit value that is applicable to the "intended" audience of the course (i.e., graduate students, or undergraduate students, but not both), and at times this causes problems that can only be solved with intervention by the Registrar’s office. This is at least partially a UX issue, since the user (in this scenario, a student) should always be confident that they know exactly what they’re signing up for and how much it will contribute to the completion of their degree. The issue of credits vs. units is similar: WPI’s undergraduate major tracking sheets speak in terms of "units", while Workday Student only speaks in terms of "credits." This distinction has been known to cause confusion in the past. Although the tracking sheets have something close to a digital equivalent — Workday Student’s "View My Academic Progress" page — they are still generally considered authoritative, and the difference in terminology can end up adding undue stress as students attempt to reconcile their registered credits with the tracking sheet's advised unit requirements.
Another highly impactful issue is how WPI's course scheduling clashes with Workday Student's model of course scheduling. WPI's undergraduate courses are typically one term long, but graduate courses are an entire semester long. It is not unusual for undergraduate students to be enrolled in both undergraduate and graduate courses. For a student to register a slate of four undergraduate courses across two terms and one graduate course that is also across two terms, they must create three different schedules and go through a separate registration process for each schedule. This can be attributed to Workday Student's "academic period" system, in which each term and semester is defined as a separate academic period. Semester periods do not include term periods, even though such a hierarchical structure makes intuitive sense. Term periods are used for undergraduate courses while semester periods are used for graduate courses, and because a schedule in Workday Student can only be associated with one academic period, registering for courses in three different (but seemingly related) periods requires three different schedules. With this knowledge, it may come as a surprise that the course search function seems to interpret academic periods differently, and searching for undergraduate courses within a semester-long period works as one would reasonably expect it to. The unintuitive handling of academic periods has been known to confuse and frustrate students, but it is unlikely to be fixable without support from Workday.

There is one final, minor misfit that we would like to address. At WPI, some courses have separate sections dedicated to reviewing material covered in lectures (usually on a day without a lecture, which is often Wednesday) and sometimes administering quizzes. According to the documents outlining the original WPI Plan, these sections were to be called "conferences", and Banner respected this (as shown in Figure 18). However, the migration to Workday Student brought a new term for conferences: discussions. This does not seem to have been a decision made by WPI, and investigating contemporary conversations in student chat rooms reveals that the discrepancy was immediately noticed.

![Figure 18: A course page from WPI's old Banner system. There is a Lecture section as well as a Conference (not Discussion) section. Image courtesy of another WPI student.](image)

None of these misfits on their own are particularly outrageous. However, when put together they paint a clear picture of how Workday Student might not be the best suited to handle WPI's unique culture. In fairness, there are plenty of things that Workday Student can handle quite well — such as the near complete lack of course prerequisites that allows students to chart their own course during their time at
WPI — but this certainly does not mean the obvious misfits should be ignored. Nearly every misfit detracts from the overall student experience, and the result is an experience significantly different from that of just four years ago.
7) Conclusion

In our study, we aimed to examine how Workday affects the faculty, staff, and students of WPI and the overall institutional culture. This was done by sending out surveys and interviewing people in many different roles to paint a complete and holistic picture of the community's experience. By analyzing data from these surveys and interviews, we made several key findings about Workday's impact on WPI.

We found that despite claims that Workday would greatly simplify tasks, many of the survey and interview participants stated that a lot of common tasks were confusing and required a lot of clicking, sometimes turning a process that used to take minutes into one that takes hours. This complexity of tasks was further exacerbated by the difficulty of discovering corresponding documentation. For students, many of these confusing tasks were related to tuition payments, course registration, and other basic parts of being a student. The importance of these tasks, combined with their confusing nature and the difficulty of finding helpful instructions, was found to cause users a lot of stress and frustration.

We also analyzed Workday's compliance with and impact on WPI's culture. There were several ways in which Workday Student specifically was unable to accurately represent various unique traits of WPI's academic system. These include the emphasis on GPA in students' academic dashboards when WPI does not use official GPAs, that NR grades are not hidden as they were in Banner, or the inability of Workday Student to transparently handle the differences between undergraduate and graduate credits for undergraduate students.

Additionally, we explored how Workday affects the communications and interactions between the different groups we surveyed and interviewed. For example, we found that many faculty members viewed the increasing movement of administrative work from department staff to faculty with a mix of displeasure and worry. Additionally, across all groups, there was a desire for more resources outlining how to use Workday. With these resources appearing to be in short supply due to poor discoverability, we found that individuals often relied on knowledge within their respective department or group to determine how to complete certain tasks, putting a strain on those less connected with their peers.

7.1) Recommendations for WPI

1. Make specific department staff responsible for completing expense reports within Workday instead of requiring all employees to do so on their own. This would address the current issue of users forgetting and having to repeatedly re-learn processes that they may only rarely complete, and potentially streamline processes by reducing the rate of errors and rejected forms. The expense report process was a common source of complaints, and one coauthor can personally relate to the experiences of some of the survey respondents and interview participants who expressed frustration with the process.

2. Seek support from Workday to be able to accurately represent graduate and undergraduate credit for all students without the need for manual intervention or other workarounds. If a satisfactory solution cannot be found, it may be worth reconsidering the current credit conversion system entirely. We understand that this is unlikely to be easy, but the existence of two types of credit with different value — and, more specifically, Workday Student's handling of this system — is a significant source of confusion for students in BS/MS programs. Solving this
issue would also reduce the workload on the Registrar by eliminating an entire class of issues that require manual administrative effort to correct.

3. Re-evaluate the discoverability, user-friendliness, and accuracy of WPI’s official Workday training resources. For discoverability, ensure that users are equipped with the right tools to find information about any task they may need to complete; this could range from community outreach sessions to embedding relevant links to documentation (or even the documentation itself) in various Workday pages. For user-friendliness, we suggest soliciting community feedback to identify and remediate any issues that could be negatively affecting a user’s ability to understand the documentation. For accuracy, determine which parts of WPI’s Workday deployment have recently seen significant changes (as of this writing, some examples are the unofficial transcript request process for students, as well as the new Benefits and Pay Hub for employees) and ensure that the corresponding documentation is up to date. Some respondents expressed frustration with inaccurate walkthroughs, and with a platform as complex as Workday, a slight change can cause a lot of confusion. In any case, discoverability is critical; documentation that a user does not know about might as well not exist from their perspective. Everyone could benefit from more discoverable documentation, but for students (especially first-generation students) the impact could be particularly significant.

4. Finally, we recommend soliciting community input on desired Workday changes. We could not capture everyone’s thoughts, but a more concerted internal effort would likely glean additional feedback that could inform the priorities assigned to the improvements and features that are most desired by the community. Anonymous surveys are useful for this type of research because they allow people to express more candid opinions that they might be uncomfortable having their name attached to, even if their words are not inflammatory. There are some issues that are likely to come to the forefront of the discussion, such as grade entry; this presents an opportunity to investigate new use cases for Workday Extend, which may be able to solve problems that are at risk of not being addressed by Workday’s own development teams.

### 7.2) Recommendations for Further Study

While this study focuses on Workday as a whole, the rather broad topic prevented a deep analysis of many of the issues and areas we identified during the study. This leaves several opportunities for further research. Here are some potential research areas that we wanted to highlight:

1. Workday, with Workday Student, is utilized at many other IHEs. It would be interesting to learn how Workday accommodates the culture and organizational structures of these institutions, and how it works at various scales of institution: large, small, and everything in between.

2. Two of the interview participants we talked to were first-generation students. Based on their experience and their friends’ experiences, one of these students suggested that Workday Student has had an outsized impact on first-generation students at WPI. While we did not explore this in depth, we believe that this topic could also warrant its own study, potentially spanning multiple universities.

3. A proper UX study of Workday would likely produce interesting results. One of the main points used to justify switching to Workday was that it would “simplify things” and "streamline
processes", yet our results indicate that these goals have not been fully met even after six years (or three years for Workday Student). A deeper study into users’ experiences with Workday, both pleasant and frustrating, would likely be informative. For example, a key concept in UX design is the idea of cognitive load (put simply: the amount of effort that a user must expend to understand the system they are interacting with), so it would be interesting to examine Workday from that perspective. Ideally, such a study would identify specific design decisions within Workday that are either particularly problematic or particularly good, to inform short-term modifications and long-term development.
8) Appendix
8.1) Workday Task Walkthroughs
8.1.1) Planning and registering for courses; creating new schedule

1. Navigate to the Academic Landing Page in Workday

2. Click “find course sections”

3. Choose Academic Period and Academic Level. Note the presence of several "conversion calendar" categories in the "Start Date within" dropdown; these are irrelevant, and a student who is registering for courses will want to select "WPI Academic Calendar" to see more recent academic years. The "Academic Level" dropdown also includes several options that are irrelevant to most students, such as "Mass Academy at WPI", "Non-Academic" and "Professional Development" (which carries a "do not use" warning).
4. Find the desired course or just browse on this page. Courses can be searched and filtered by Subject, Section Availability, and various other parameters.
5. Select a course section. The user is brought to a page showing the details of the specific section that was selected.
6. From this page, the course section can be added to a schedule. This is how a student plans out their schedule and registers for multiple courses at once on registration day. If registration is already open, students can also directly register on this page.

7. Upon Clicking “Add to Saved Schedule”, a popup will open, prompting the student to select a schedule that the section should be added to.

8. Users can either create a new schedule or add to an existing schedule.

9. Next, the user is prompted to choose times for lectures, labs, and discussions that are associated with the course. Some courses with multiple components, such as the Calculus III course in this example, have different “clusters” of sections. Students must register for component sections in the same cluster.

10. In this example, the user attempts to register for sections in different groups. Selecting different sections that are not in the corresponding group will not prevent the user from adding the course to their schedule.
11. Once courses are added to the schedule, the user is brought to the view of the schedule:
12. Here, the user can add another course, edit their schedule, or, if registration is open, register for the classes in the schedule
13. When the user tries to register, an error is produced.

14. The user can resolve the error by selecting lecture and discussion sections that are in the same cluster.
15. When the user has successfully registered for a course, they will see this screen:
8.1.2) Viewing and Modifying a Saved Schedule

1. Navigate to the Academic Landing page in Workday
2. Select the “View my Saved Schedules” option
3. Select the “All” option, and then choose the academic period.
View My Saved Schedules

Start Date within *

- Search
- By Type
- All
- Partial List (First 500 Entries)

OK  Cancel
4. If the user has multiple saved schedules for that period, it will show all of them.
5. From this view, the user can edit the schedules, add or remove courses, and register for courses if registration is open.
8.1.3) Viewing Grades

1. Navigate to the “Academics” page.
2. Select the “View my Grades” tab
3. Select the semester (not term) to view grades for.

4. The grades are shown in table format.

8.1.4) Viewing Tuition Information

1. Navigate to the “Finance” page. This is what the user will see:
2. “Total Account Balance” indicates the total amount of money that the student owes the university.
3. “Amount Due Now” indicates the amount of money that is immediately due. For students on a payment plan, this is usually the next installment of the plan.

8.2) Survey Questions

Informed Consent

You are being asked to participate in a research project investigating the effects of Workday on the WPI community. This research is being conducted by a team of undergraduate students - Katherine Jesse, Kai Kaufman and Thei Riley - as the basis for an Interactive Qualifying Project.

Participation in this research is voluntary, and you may choose to stop participating at any time prior to submitting your responses. You may also choose not to take this survey, or to skip any questions that you would not like to answer.

You will not be required to identify yourself as part of this survey. Please note that sharing certain demographic information (such as department) may create a slight risk of de-anonymization; however, the researchers will not attempt to identify respondents who choose not to share their identity.

Your answers to the questions in this survey may be included, either in full or in an abbreviated form, in the final research product. They may also not be included but used as part of a larger analysis instead. Records of your participation in this study will be held confidential so far as permitted by law. However,
the study investigators and, under certain circumstances, the Worcester Polytechnic Institute Institutional Review Board (WPI IRB) will be able to inspect and have access to confidential data that may identify you by name, if and only if you have chosen to identify yourself. Any publication or presentation of the data will not identify you.

By completing and submitting this survey, you agree to allow your anonymous responses to be used in this research alone. Any personally identifying information (PII) will be used solely for the purpose of coordinating and conducting an interview.

Questions regarding this research may be sent to the researchers via email: gr-workday-igp-2023@wpi.edu

- No
- Yes

Demographics

1. Select the option that best describes your affiliation with WPI.
   a. Student
   b. Student Worker
   c. Faculty
   d. Staff
   e. Other (please specify)
2. For how many years have you been at WPI?
3. What department or office are you a part of?
4. What is your role in your department or office?

Usability

The first two questions ask the survey taker to rank things on a 5-point Likert scale, with options ranging from Extremely Difficult to Extremely Easy. The options are:

- Extremely difficult
- Somewhat difficult
- Neither easy nor difficult
- Somewhat easy
- Extremely easy.

1. How easy or difficult do you find using Workday to be?
2. Rate the difficulty of the listed tasks, except for the ones that are not relevant to you. You do not have to make a selection for irrelevant tasks.
   a. Accessing Workday
   b. Quickly finding information
c. Performing everyday job functions (Staff)
d. Controlling access to information
e. Finding available courses (Students only)
f. Registering for courses (Students only)
g. Evaluating academic progress (Students only)

3. Are there any tasks you wish were easier? Why are they currently difficult?
4. Are there any tasks that you find particularly easy?
5. Do you have any additional thoughts about Workday?

Interview Scheduling

1. Would you like to have a short (30 minute) meeting with the researchers to further discuss your experiences with Workday? This is optional, and your identity will not be revealed to anyone other than the researchers.
   a. Yes
   b. No
2. (If "Yes") What is your preferred name?
3. (If "Yes") What is your WPI email address?

8.3) Email to Staff and Faculty
Do you have thoughts about Workday that you’d like to share? We are a student IQP team studying how the introduction of Workday has impacted the WPI community and operations.

If you have time, please consider filling out our short anonymous survey.

We also have slots for 30-minute interviews (remote or in-person), if you’d like to speak with us. You can sign up for an interview on our bookings page.

Contact gr-workday-iqp-2023@wpi.edu with any questions. Thank you for your time!

8.4) Tagging Scheme

<table>
<thead>
<tr>
<th>Tags</th>
<th>Definitions</th>
<th>count</th>
<th>staff_count</th>
<th>faculty_count</th>
<th>student_count</th>
</tr>
</thead>
<tbody>
<tr>
<td>academic_prog_</td>
<td>negative experience monitoring academic progress</td>
<td>4</td>
<td>0</td>
<td>0</td>
<td>4</td>
</tr>
<tr>
<td>neg</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>academic_prog_</td>
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<td>1</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>pos</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>access_issues</td>
<td>issues with the Workday permission model as applied at WPI</td>
<td>5</td>
<td>1</td>
<td>1</td>
<td>0</td>
</tr>
</tbody>
</table>
any bad experience relating to the user interface, including mentioning it takes a lot of clicks to do something, complaining about they way something is laid out, etc. | 37 | 11 | 7 | 8  
bad_ui |  
mentions banner | 13 | 4 | 0 | 2  
banner |  
states that banner did something better than workday | 3 | 0 | 0 | 0  
banner_better |  
states that banner did something worse than workday | 8 | 3 | 0 | 0  
banner_worse |  
mentions negative experience navigating club financials | 1 | 0 | 0 | 1  
clubs_neg |  
expresses a task or function of workday confuses them | 28 | 12 | 10 | 4  
confusing |  
expresses a negative experience with registering for courses | 5 | 0 | 0 | 4  
course_reg_neg |  
expresses a positive experience with registering for courses | 3 | 0 | 0 | 2  
course_reg_pos |  
a response that talks about a crash of some kind | 2 | 0 | 0 | 1  
crash |  
mentions negative experience entering grades for a course | 9 | 0 | 7 | 0  
entering_grades_neg |  
mentions positive experience entering grades for a course | 5 | 0 | 4 | 0  
entering_grades_pos |  
negative experience filling out and submitting expense reports | 22 | 5 | 11 | 2  
exp_rep_neg |  
positive experience filling out and submitting expense reports | 3 | 3 | 0 | 0  
exp_rep_pos |  
negative experience attempting to get any sort of organized data for their use | 21 | 7 | 4 | 0  
get_report_neg |  
positive experience attempting to get any sort of organized data for their use | 1 | 0 | 0 | 0  
get_report_pos |  
negative experience with payroll | 4 | 1 | 1 | 0  
payroll_neg |  
positive experience with payroll | 8 | 5 | 2 | 1  
payroll_pos
### Positive Experience

**schedules_pos**
- Positive experience using Workday to find available courses and plan schedules

| schedules_pos schedules  | 1 | 0 | 0 | 0 |

### Negative Experience

**schedules_neg**
- Negative experience using Workday to find available courses and plan schedules

| schedules_neg schedules  | 13 | 0 | 1 | 11 |

**slow**
- Mentions some aspect of Workday slowing down a task

| slow slow | 20 | 8 | 4 | 6 |

**stud_info_class_pos**
- Positive experience finding info about classes

| stud_info_class_pos info | 1 | 0 | 0 | 1 |

**stud_info_class_neg**
- Negative experience finding info about classes

| stud_info_class_neg info | 0 | 0 | 0 | 0 |

## Transcripts

**transcript_neg**
- Mentions negative experience with acquiring transcript

| transcript_neg transcript  | 3 | 0 | 0 | 3 |

**transcript_pos**
- Mentions positive experience with acquiring transcript

| transcript_pos transcript  | 1 | 0 | 0 | 0 |

**tuition_neg**
- Mentions negative experience viewing or paying tuition

| tuition_neg tuition  | 2 | 1 | 0 | 0 |

**tuition_pos**
- Mentions positive experience viewing or paying tuition

| tuition_pos tuition  | 2 | 1 | 0 | 0 |
9) References

Bohrer, R. (2024). Human-Centered Programming Languages (1st ed.).
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https://www.gartner.com/smarterwithgartner/understand-the-4th-era-of-erp


